Natural Resources Institute

DFID Department for International Development

Dimensions of Participation

Experiences, Lessons and Tips from Agricultural Research Practitioners in Sub-Saharan Africa

Alistair Sutherland, Adrienne Martin and David Rider Smith

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The Natural Resources Institute (NRI) of the University of Greenwich is an internationally recognized centre of expertise in research and consultancy in the environment and natural resources sector. The Institute carries out research and development and training to promote efficient management and use of renewable natural resources in support of sustainable livelihoods.

Production of this publication was funded by the United Kingdom's Department for International Development (DFID). However, the views expressed are those of the authors and are not necessarily those of DFID.

Price £25.00

Copies of this book can be obtained by writing to NRI Catalogue Services, CAB International, Wallingford, Oxon OX10 8DE, UK. When ordering, please quote **ECN16**.

Natural Resources Institute
ISBN: 0 85954 539 3

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CONTENTS

CASE STUDIES

Notes on authors and contributors

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Adrienne Martin is a social development specialist with a long-standing interest in participatory research and 25 years of experience in agricultural development work with a range of organizations, including an International Research Centre and NGOs, in Sudan, Syria and Kenya. Adrienne joined NRI in 1990, and has undertaken research, consultancy and training activities on the themes of participatory and client-oriented research, local knowledge and sustainable livelihood approaches.

David Rider Smith joined NRI in 1999 after working as senior monitoring and evaluation officer on a USAID food security programme in Mozambique. David is a social development specialist working in performance and impact improvement with Northern and Southern NGOs, research institutions and donors in sub-Saharan Africa and Latin America.

Case study contributors and roles in projects documented

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Oscar E. V. Magenya	Kenya Agricultural Research Institute/ National Agricultural Research Programme Phase II	Regional research co-ordinator 1997–99
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Johnson W. Irungu	Dryland Applied Research and Extension Project, Kenya	Agronomist and Team leader 1993–94
Maushe Kidundo	Dryland Applied Research and Extension Project, Kenya	Agro-forester 1993–96
David Mellis	Dryland Applied Research and Extension Project, Kenya	Agricultural engineer 1995–96
Julia Compton	Larger Grain Borer Control Project, Ghana	Research team leader 1993–96
Felix Motte	Larger Grain Borer Control Project, Ghana	Extension specialist 1993–96
Ejigu Jonfa	Farmers Research Project, Ethiopia	Project agronomist 1992–97 Project co-ordinator 1997–2001

ACKNOWLEDGEMENTS

This book is a product of the collaborative effort of many players over a period of more than four years in the eight sub-Saharan countries hosting the DFID-funded projects documented as case studies. These projects involved the effective participation of committed and interested individuals; small-scale farmers, local traders, local NGOs, frontline extension staff, research staff from national organizations and a range of others too many to mention by name. The idea of a forum to enable practitioners on DFID-funded projects in Africa to discuss their experiences with participatory agricultural research was first discussed in 1996 in Nairobi, at a meeting with Jim Harvey and Phil Evans (at the time DFID Advisors for East Africa). Funds for a Participatory Technology Development Forum were provided by DFID in 1997, facilitating the drafting of case-study material and the exchange of experiences between practitioners. After the forum, some of these practitioners returned to continue with their projects, while others moved on to other activities.

The case material lay dormant for several years. The editors were encouraged to further develop the initial case material after being alerted to the need for published accounts of frank first-hand experiences with participatory methods in agricultural research. In 2000, funding towards the editing and printing costs of the book was made available through the DFID Advisory and Support Services Contract (ASSC) dissemination fund, which is gratefully acknowledged. A lengthy dialogue with most of the original forum participants was resumed. We would like to acknowledge all of the case-study authors and also those who put in additional time to comment on earlier drafts and further develop their case-study material, including Barbara Adolph, Michael Drinkwater, Ejigu Jonfa, John Kang'ara, Kudakwasha Murwira, Hugh Bagnall-Oakeley, David Rees and Dominic de Waal. Valuable assistance with compiling, formatting and proof editing has been given by Kerry Albright, Alex Rowland and others. Valerie Howe has provided invaluable editorial support.

Presenting a practitioner perspective

1

1.1 WHAT IS THIS BOOK ABOUT?

This book is about participation in agricultural research. It documents the experience of practitioners in implementing agricultural research projects in which participation has been a central issue. This experience is documented through case studies, and through summaries of the authors' experience. Reference is made to other literature on aspects of participation, both specific and general. The case studies give first-hand accounts of the challenges and successes involved in using participatory approaches in agricultural research projects undertaking technology development and adaptation. Written by practitioners, the case studies cover many practical aspects of design and implementation that are not covered in more academic and conceptual writing on this subject, or in general manuals on how to undertake participatory agricultural research. The existing books, manuals and guidelines adequately outline the key principles and approaches in participatory agricultural research (e.g. Okali *et al.*, 1994; Van Veldhuizen *et al.*, 1997; Sutherland, 1998). This book is different from most others on participatory agricultural research in the following respects:

- it organizes and compares case-study experiences within topical chapters, rather than having case studies written as separate chapters
- it embraces a wider view of participation – in addition to interaction between farmers and researchers, this view includes participation both within project teams and between the project team and other stakeholders in the agricultural research process
- it is not a training manual detailing what to do, when to do it and how; however, lessons and tips are provided for the topics covered
- it is rooted in project experiences rather than in development discourse, and does not advocate a particular participatory research philosophy, or claim to break new ground in terms of participatory concepts and methods.

The aim of the book is to stimulate learning, primarily by presenting examples of how a range of projects handled various components of the participatory research process. These examples are given within a broader discussion of the typical challenges and issues faced by projects and practitioners when using participatory approaches to develop and adapt agricultural technology. Drawing on the case studies and other experiences, some lessons, strategies and tips are outlined in relation to particular topics within participatory agricultural research.

1.2 WHO IS THE BOOK FOR?

This book is intended for all those interested in the practical aspects of agricultural research and development, including practitioners, project managers, development specialists, advisors, donors, academics involved in development teaching and research, and students of agricultural development. While the case studies are based on project experiences in sub-Saharan Africa, it is anticipated that many of the lessons, strategies and tips will also apply to participatory research for smallholders in other parts of the developing world.

1.3 HOW DID THIS BOOK ORIGINATE?

The material for this book originated from people actively involved in advising and implementing participatory agricultural projects in Africa. These people were interested to establish a forum through which to share their experiences. Along with other donor organizations, the UK Department for International Development

(DFID) has supported a significant number of agricultural research projects in Africa over the past two decades. Many of these projects have emphasized active participation by farmers in the research process. Projects have been located across a range of agroecological and institutional settings. Up to 1995, each project had been largely self-contained, with limited opportunities for practitioners to share their experiences and ideas across projects. This lack of sharing concerned some DFID advisors and project staff. In 1995, the DFID Natural Resource Advisor in East Africa actively encouraged visits between participatory agricultural research projects operating in Kenya, Uganda and Tanzania. During a visit by representatives of two other projects to the end-of-phase-one workshop of the ActionAid Farmers' Participatory Research Project, held at Jinja in Uganda, the idea of a wider learning forum was discussed informally. In further discussions with DIFD advisors, it was suggested that such a forum could also draw on agricultural research projects operating in other parts of Africa in which DFID had been involved. Two parts were proposed for the forum. The first part involved a review of experience within project teams, leading to the production of case studies. The second was a workshop to bring practitioners together and share experiences, with a view to working towards consensus on better practices for implementing participatory agricultural research. The Natural Resources Institute (NRI) undertook the co-ordination of the forum on behalf of DFID.

The review of project experiences and case-study writing took place from October 1996 to April 1997. The leaders of 11 relevant, ongoing or recently completed DFID-funded projects in Africa were contacted and invited to participate. All except one were able to do so. Guidelines were provided to help structure the writing of the cases studies, detailing areas of focus. To optimize learning and reduce individual bias, it was emphasized that the writing should be a team effort rather than an individual one. Of the 10 projects that agreed to participate, nine produced case studies and submitted these for external review and editing. Seven of the nine case studies were prepared in a collaborative mode by project team members. The case-study guidelines encouraged candid and frank discussion of real experiences, including disappointments and points of conflict within teams.

The workshop was held in May 1997 in Nyeri, Kenya and included representatives from the 10 projects submitting case studies, and also representatives of the Lake Zone Farming Systems project in Tanzania, which had participated in an earlier exchange of experiences with the Dryland Research and Extension Project (DAREP) and National Agricultural Research Project (NARP II) projects based in Kenya. The diverse backgrounds and perspectives of the practitioners at the workshop led to long debates on some fundamental issues and terminology. This somewhat limited the time for developing consensus on improved practice in some of the topical areas. At the end of the workshop, participants suggested that the case studies and outputs should be more widely disseminated, but noted that more time would be needed for analysis to draw out the key lessons from the body of case-study material prepared. The participants noted that they had limited time to undertake further analysis. A summary report on the workshop process and outputs was disseminated widely through the Overseas Development Institute's *Natural Resource Perspectives Series* (Number 25) in early 1998 (Sutherland *et al.*, 1998).

This book builds primarily on the outputs from the 1997 forum. In addition, it draws on a wider body of literature relating to participatory agricultural research, and on the experience of the editors and case-study contributors who have commented on earlier drafts.

1.4 HOW DID THE BOOK DEVELOP?

Demand from practitioners for publication of the case studies was identified through feedback on the 1997 summary workshop report.

Participants at the Participatory Research and Gender Analysis International Workshop on Participatory Natural Resources Research at the Landscape Level, held at NRI, Chatham, UK in September 1999 further stressed the need for case studies demonstrating the effective application of participatory approaches to natural resource research situations. The editors of this book attending the 1999 workshop were motivated by this demand to develop a plan for publication of the 1997 case studies. Contact was re-established with most of the authors, and parts of the original case studies were incorporated into the 16 topical chapters in this book. Revisions and additions to the original case material were made in the light of subsequent developments in some projects.

1.5 WHICH PROJECTS PARTICIPATED?

The 10 projects in this book represent the experiences in non-governmental organizations (NGOs) and public-sector research and extension in seven sub-Saharan countries (Table 1.1). They provide a breadth of institutional experiences and philosophical perspectives on participation, as elaborated in Chapter 2. Four of the projects were located firmly within national agricultural research institutes; one straddled the research and extension directorates; one was in the national extension organization; and four were in NGOs. One of these NGO projects with long experience of institutionalizing farmer participatory research, FARM Africa's Farmers' Research Project in Ethiopia, was unable to participate in the forum. However, one of the editors was technical advisor to this project after

Table 1.1 Projects covered in this publication

Project title	Institutional location	Country
Kavango Farming Systems Research and Extension Project	NARO/NAEO Directorates of Agricultural Research and Training and Extension and Engineering Services	Namibia
Intermediate Technology Development Group-Chivi Food Security Project	NGO – Intermediate Technology Development Group	Zimbabwe
Adaptive Research Planning Team	NARO – Research Branch, Ministry of Agriculture	Zambia
CARE Zambia's Livingstone Food Security Project	NGO – CARE International	Zambia
ODA/DRT Cashew Research Project	NARO – Directorate of Research and Training	Tanzania
Farmers' Research Project	NGO – FARM Africa	Ethiopia
KARI/ODA National Agricultural Research Project, Phase II	NARO – Kenya Agricultural Research Institute	Kenya
Dryland Applied Research and Extension Project	NARO – Kenya Agricultural Research Institute	Kenya
ActionAid/NRI Farmer Participatory Research Project	NGO – ActionAid, Uganda	Uganda
Larger Grain Borer Control Project	NAEO Ministry of Agriculture – Extension	Ghana

the forum, and has incorporated some of the experiences into the chapter covering institutionalization issues. Most of the projects were completed, or nearly completed, at the time of the forum, and so were in a strong position to reflect on their experiences. Two were at a relatively early stage of implementation, and so benefited considerably by using the case-study writing exercise to think through and discuss their strategies and approaches to implementing various activities.

1.6 THE BOOK'S STRUCTURE

Three dimensions of participation in agricultural research provide the framework for the three sections of this book. These are:

- farmer participation
- participation within project teams
- participation by other agencies external to the team.

Farmer participation in practice

Part One covers various aspects of farmer participation in the formal research process. Chapter 2 sets the organizational context for the case-study projects and summarizes, in the words of the practitioners, a range of philosophies and goals relating to farmer participation. The importance is emphasized of setting realistic expectations as to what can be achieved through farmer participation, in the context of the constraints and opportunities provided by the implementing organization's programmes, capacity and mandate.

Chapters 3–8 follow a similar format. A brief introduction to the topic is followed by a presentation of case studies from a selection of projects. The cases are then discussed, along with the important lessons emerging. In most chapters the helping and hindering factors are identified, together with tips for improved collaboration between researchers and farmers during situation analysis, research agenda development and experimentation.

Chapters 3 and 4 address the central issue of targeting research. Chapter 3 discusses the characterization of farming and livelihood systems. It describes why some of the projects undertook detailed studies in order to provide a biophysical and socio-economic context for decisions about research focus, while others gave this type of study lower priority. Approaches used to describe and classify the range of biophysical and socio-economic features and to delineate livelihood and farming systems, household types and distinct farmer categories are discussed, and some tips for improved practice identified. Chapter 4 discusses farmer- and site-selection strategies and their implications, particularly for achieving a poverty focus.

Chapters 5 and 6 explore how projects have arrived at a research agenda and experimental designs, and how experimentation has been conducted. Chapter 5 explores various approaches tried by researchers to engage with farmers in understanding their situation, and developing a research agenda to address the key constraints and opportunities identified together with farmers. Factors are identified which influence the focus of diagnostic activities and the emerging research agenda. Chapter 6 looks at the rationale behind farmer participation in formal experimentation, and documents how the various case-study projects involved farmers in their experimental activities, from design through to evaluation and redesign. A discussion of issues and lessons relating to experimentation with farmers follows.

Chapter 7 deals with the uptake of new knowledge and practices, as the intended result of increasing farmer participation in agricultural research. Project experiences with involving farmers in formulating technical messages, and in disseminating information and new technology inputs to other farmers, are presented. It argues that, from the perspective of a cost-effective use of public-sector agricultural research resources, participatory approaches need to show significant impact beyond the group of producers immediately involved.

Chapter 8 focuses on institutional aspects of farmer participation within communities. It examines how projects have worked with existing local institutions, and also new institutions that projects have tried out in order to facilitate more farmer participation and build farmer research capacity. Experiences with group approaches, including farmer research groups, are compared with experiences of working with individual farmers. The benefits and challenges of group approaches and other forms of institutionalizing participation within and across communities are presented.

Teamwork

Part Two deals with the important but neglected topic of teamwork in agricultural research. This includes internal reflections by team members and team leaders on their experiences of teamwork.

Chapter 9 provides the context for teamwork in the case-study projects, and outlines typical phases in the development of agricultural research project teams, pointing to similarities and differences from phases outlined in management literature. The four phases identified, based on an analysis of the projects which share their experiences, are covered in the remaining chapters of this section. Chapter 10 discusses the factors that influence team structure, team composition, effective team leadership, and the selection of team members. This includes a discussion of influences of the wider organizational context on team structure, and experiences with addressing gender imbalance and the selection of team leaders.

Chapter 11 describes team-building processes, including joint planning, fostering interdisciplinary working habits, and building competencies through training. Chapter 12 addresses a range of consolidation and operational areas that are important to sustain effective teamwork. These include enhancing interaction and communication, fostering project ownership, team management, addressing issues of hierarchy within the host organization, incorporating support staff, and the (often delicate) issue of managing project resources. Chapter 13 discusses team closure, and emphasizes the value in planning an exit strategy and documenting the project process; it also covers handing-over of activities and resources, and saying farewell to collaborators.

Other stakeholders and institutions

Part Three addresses issues related to linkages, working with other stakeholders, building capacity, and other aspects of institutionalizing more participatory research approaches.

Chapters 14 and 15 address issues relating to effectively linking with and involving other stakeholders in the participatory research process. Chapter 14 examines the important role of linkages in participatory research. It explores the reasons why linkages are so important, and why they remain an area of concern in many projects. The chapter documents experiences of projects in identifying other stakeholders and building working relationships with them. It also draws out some lessons from this experience, and proposes strategies for more effective ways of building linkages. Chapter 15 examines the rationale for more permanent types of linkage, and the challenges involved in maintaining and sustaining the collaborative process.

Chapter 16 explores the experiences of projects in influencing institutional change in the direction of more participatory research. Contributions and efforts by various projects to change institutions in sub-Saharan Africa are presented as case studies, and are discussed in relation to the main areas where projects may be expected to influence change in the implementing organizations involved. Chapter 17 takes the discussion of institutional change further. An overview is provided of some practical challenges faced by projects when introducing and institutionalizing participatory approaches into the agricultural research process, and summary lessons are noted.

Overarching issues relating to the future development of programmes and projects that facilitate more effective participation in agricultural research are identified, along with cross-cutting strategies for more effective management of institutional change.

Some of the reasons behind the variable impact of projects on institutional change are discussed, along with the issues, challenges, lessons and implications for future strategies. The chapter ends with a summary of the main learning points on the three dimensions of participation covered by the case studies, and of future directions in making more effective use of participatory approaches within agricultural research.

The views expressed in the case studies are those of the practitioners. The editors have retained differences of opinion and perspectives throughout the cases. In contrast to the cases, the summaries of helping and hindering factors, the lessons and the tips for practitioners contained at the end of most chapters are based on a more consensus-based perspective, achieved during the 1997 practitioners' forum and the collegiate editing process of the book (notwithstanding that some practitioners were more vocal and concerned than others to put forward their ideas and advice).

PART ONE Farmer participation in practice

Part One addresses farmer participation in formal agricultural research, and documents the experiences of project teams working to involve farmers in activities relating to technology development and dissemination. These experiences have given rise to a number of viewpoints, and to significant consensus about some of the 'dos and don'ts' for effective farmer participation. The experiences of practitioners differ to some extent with the organizational context of projects, and the philosophies and goals relating to farmer participation. These are outlined in Chapter 2. Chapters 3 and 4 address the central issue of targeting research, including the characterization of farming and livelihood systems, and decisions on selecting farmers and sites. Chapters 5 and 6 explore farmer participation in setting research agendas and conducting experiments. Various approaches to engaging with farmers and understanding their situation, and to factors that influence the focus of diagnostic activities and the emerging research agenda, are discussed. The rationale behind farmer participation in formal experimentation is discussed, along with issues and lessons relating to experimentation with farmers.

The uptake of new knowledge and practices, the intended result of increasing farmer participation in agricultural research, is documented in Chapter 7. Experiences of involving farmers in formulating technical messages, and disseminating information and new technology inputs to other farmers, are presented. Chapter 8 focuses on institutional aspects of farmer participation within communities. Both working through existing local institutions, and setting up new institutions to facilitate more farmer participation and build farmer research capacity, are documented. Experiences with group approaches are compared to working with individual farmers, and various institutions for fostering participation within and across communities are listed.

Perspectives on participation

2

This chapter starts with a brief discussion of some perspectives and conceptual approaches relating to participation in agricultural research, then introduces the projects from which the case studies are drawn. Perspectives and conceptual approaches influence the way projects start; as time goes on, the perspectives of the two major stakeholders, farmers and researchers, may change. Moreover, the project may be influenced by the introduction of concepts and targets, either through a process of internal reflection or by interaction between the project team and project advisors, reviewers or other development agencies external to the project.

2.1 THE MEETING OF TWO WORLDS

In situations where both farmers' and researchers' experience with participatory approaches is limited, participatory agricultural research projects provide a meeting point for two distinct perspectives or worlds. Projects provide opportunities for more effective participation by resource-limited farmers in the world of agricultural researchers, and vice versa. Farmers enter the researchers' world in various (and limited) ways. For example, at the start, farmers discuss their farming practices, problems and priorities with researchers, and in the process learn about issues that interest researchers. These discussions may be generated through various participatory rural appraisal (PRA) tools: flow diagrams, matrixes, transect walks, maps and time lines, which are facilitated by researchers. While diagrams may assist in communication, language can remain a barrier to effective communication, particularly when researchers convert what farmers do and say into reports written in another language. Farmers also become involved in researchers' experimentation, providing land, labour and other inputs, recording data, and meeting with other farmers and researchers to discuss the results. As the relationship develops, farmers may be offered lifts in project vehicles; visit the nearest research station to see on-station field trials, laboratories and the offices where researchers sit, and develop personal relations with researchers.

Researchers also have an opportunity to enter, albeit briefly and partially, the farmers' world. During PRA activities and diagnostic surveys, and when visiting on-farm trials, researchers can talk with farmers about farming and related problems, and even offer farmers help with field operations. Researchers may receive hospitality and be invited to share food or drink with farmers, and conversations are likely to extend to topics beyond the research at hand. As relationships are strengthened, the researcher may feel moved to engage with farmers on a wide range of agricultural and even non-agricultural topics. As time passes, researchers may start to include collaborating farmers as part of their social world. Some of the farmers will be mentioned by name in discussions with the project team, becoming 'famous' within the project environment. Phrases like 'our farmers' may be heard in some countries; a phrase used by researchers to describe the farmers they are collaborating with and with whom they have developed a good relationship.

Specific opportunities for farmers and researchers to enter each others worlds are discussed further in relation to the research project cycle in Chapters 3–7. This chapter addresses five questions relating to farmer participation in agricultural research:

- what are the benefits of farmer participation in agricultural research?
- which approaches to farmer participation are most appropriate?
- to what extent should a highly structured activity sequence be followed?

- how important are the project objectives and organizational context?
- what do the case-study projects say about their philosophy or approach to participation?

2.2 WHAT ARE THE BENEFITS?

Increasing farmers' involvement in the design and implementation of research on their farms can provide a number of benefits in terms of the functional effectiveness of the formal research process (Martin and Sherington, 1996; Farrington, 1998). Among other things, greater farmer participation means that:

- applied and adaptive research will be better oriented to farmers' problems
- farmers' knowledge and experience can be incorporated into the search for solutions, and highly inappropriate technologies can be 'weeded out' early on
- the performance of promising technologies developed on-station can be tested under 'real-life' agroecological and management conditions
- researchers become aware of socio-economic factors (e.g. gender relations) operating within the farming community that may have important implications for the type of research they are doing and the way they do it
- researchers will be provided with ongoing and rapid feedback during the research process and promising technologies can be identified, modified and disseminated more quickly, reducing the length of research cycles and saving time and money
- farmers' capacity and expertise for conducting collaborative research is built up, becoming a valuable human resource for future research programmes
- farmers gain access to new information and new technical products earlier, and are empowered to conduct more of their own research
- researchers are provided with ongoing feedback of qualitative and quantitative data as the growing season progresses.

2.3 WHICH APPROACH TO USE?

As researchers start to enter into the farmers' world, and at the same time consult the literature advocating participatory agricultural research approaches, they may start to ask themselves questions along the lines: 'which approach am I using/which approach should I be using?' This section briefly discusses some of the approaches that have been promoted during the past two decades, emphasizing the benefits of a pragmatic approach in fitting with the organizational context and project objectives.

Several new approaches for involving farmers have been advocated as effective alternatives to conventional 'top-down technology transfer' agricultural research and extension (Farrington and Martin, 1988; Cornwall *et al.*, 1994; Okali *et al.*, 1994). Perhaps the three best documented approaches in the English language literature are farming systems research (FSR), farmer participatory research (FPR) and participatory technology development (PTD) (Merrill-Sands, 1986). These three approaches share much in common. They have borrowed from each other, and also from approaches used in other fields of development, particularly from rapid rural appraisal (RRA), PRA, participatory learning, and action and training for transformation.

Common threads running through these three approaches include:

- emphasis on diagnostic activities to establish a research programme focus or agenda (at times also including an extension focus)
- conducting experiments on farmers' fields or animals with their collaboration
- engaging in a dialogue with farmers through the research process and, in varying degrees,

- a concern with demonstrating the impact and uptake of new ideas developed
- using the approach to link researchers with realities at farm level
- developing a research and extension agenda where the farmers are the principal clients for the research carried out.

The differences between these approaches are listed in Table 2.1. They relate mainly to the relative importance attached to using systems perspectives; the need to extrapolate research results; farmer empowerment; indigenous farmer experimentation and technical knowledge; and linkages with mainstream research, extension and development programmes.

Farming systems research offers the potential to make public-sector institutions more accountable to farmers; to influence national and sub-national research priorities; and to extrapolate and disseminate research results. The FPR and PTD approaches provide a more flexible role for farmers in setting research priorities, experimentation and dissemination, and also focus on empowering farmers to improve access to research services and undertake their own semi-autonomous research activities.

Other anglophone approaches related to these three include adaptive research, on-farm research, farming systems research and extension, on-farm client-oriented research, farming systems development, farmer-back-to-farmer and farmer field schools. In francophone literature, *recherche developpement* and *recherche des systems agraires* also have some similarities (Fresco, 1984). Some distinguishing features of these related approaches are summarized in Table 2.2.

While each of the more participatory approaches has its own history and features, Biggs (1989) has developed a typology for describing differences in types of farmer participation in on-farm agricultural research (Table 2.3). The degree of farmer involvement in decision-making varies, and increases as one moves to the right-hand side of Table 2.3. In the contract mode of participation, researchers dominate decisions and farmers' views are not actively sought by researchers.

Table 2.1 Differences of emphasis between three popular anglophone approaches to farmer-oriented agricultural research

Areas of emphasis	Farming systems research (FSR)	Farmer participatory research (FPR)	Participatory technology development (PTD)
Use of a systems perspective	High	Low	Low
Priority to extrapolating research results	High to medium	Low	Low
Farmer empowerment	Low	High	High
Use of formal experimental methods	High	Low	Medium
Indigenous knowledge and experimentation	Low	High	High
Strong links with development programmes	Low to medium	Low	Low
Strong links with mainstream research and extension	High	Low	Low to medium

Table 2.2 Other 'branded' approaches to more participatory agricultural research

'Brand' label	Distinguishing features
Adaptive research	A parallel development of FSR, emphasizing adaptive testing of developed technology, with or without systems analysis – the main rationale being increasing uptake of on-the-shelf technology
On-farm research	A more commodity-oriented application of FSR principles (Tripp, 1991), sometimes referred to as 'on-farm research with a farming systems perspective'
Farming systems research–extension	Emphasizes the need for farming systems approaches to be embraced by extension as well as by research, at the same time acknowledging a blurring of boundaries between research and extension
Farmer-back-to-farmer	Emphasizes learning from farmers' technical knowledge, and a learning-cycle approach to the research process (Rhoades and Booth, 1982)
Recherche developpement	Fresco (1984) notes three features differentiating this approach from conventional research – detailed procedures for data collection outside the research station throughout the research process; explicit linkages between research and development organizations; and accepting the *systeme de production* as a unit of analysis leading to decentralized and location-specific research and recognition of farmers' motivations and national development goals as additional evaluation criteria
Farming systems development	Conceptually linked to FSR. Promoted by the FAO with strong emphasis on service delivery and the institutional and policy environment, like the recherche developpement approach (FAO, 1989).
On-farm client-oriented research	Embraces FSR, adaptive research and recherche developpement, and emphasizes the demand-driven aspect of agricultural research; a more embracing category used for purposes of analysis of effectiveness, rather than practitioner guidance (Merrill-Sands, 1986; Merrill-Sands and McAllister, 1988)
Farmer first	Emphasizes empowerment of farmers in the research process, including analysis, choice of technology options, farmer experimentation, and researcher's role as facilitator and searcher for new knowledge and technology to broaden choice (Chambers, 1989)
Farmer field schools	A knowledge-based approach to extending more complex technical ideas, originating from integrated pest management extension approaches; the field school process may involve some elements of farmer testing and joint experimentation (Ooi, 1998)

Table 2.3 Typology of farmer participation in agricultural research

Contract	Consultative	Collaborative	Collegiate
Farmers' land and services are hired or borrowed, e.g. 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 roughly equal partners in the research process and continuously collaborate in activities	Researchers actively encourage and support farmers' own research and experiments

Source: Adapted from Biggs (1989).

Consultative participation is exemplified by applications of the farming systems research approach of the early- to mid-1980s. It includes: "diagnosing farmers' practices and problems, planning an experimental programme, testing technological alternatives in farmers' fields and developing and extending recommendations" (Tripp, 1991). Researchers, after consultation, provide the solutions, plan the experiments, and finally recommend what is best practice. In collaborative participation, the ideas for interventions to be tested also come from farmers or other knowledgeable people in the locality, and are the product of discussions between researchers and natural resource users. In collegiate participation, it is the farmers themselves who play the lead role in identifying what the content of the experiments will be, and the manner in which they will be conducted.

While Table 2.3 implies some discontinuity between types of participation, the four types of farmer participation are probably best thought of as points on a continuum. In the early stages of a project, due to significant differences in power and interest between researcher and farmer, the researchers initiate action and the consultative mode is likely to predominate, simply because the researcher has much more control over the process. More collaborative relations can develop after relations of trust and interdependence have been built up between researchers and farmers, and the farmers begin to see for themselves what is involved. This will require explicit efforts on the part of researchers to invest time in clearly communicating their ideas to farmers, carefully listening to farmers' responses and counter-suggestions, and explicitly handing over key decisions to farmers. Otherwise, starting in a purely consultative mode may lead farmers to expect this mode to continue, with the expectation that researchers are the outside 'experts' who make all the key decisions.[1]

2.4 HOW MUCH STRUCTURING OF PROCEDURES IS REQUIRED?

Contractual and consultative modes of farmer participation might be expected to be more structured than a collegiate mode. However, approaches espoused in textbooks and manuals on participatory research, while proposing some type of sequencing, do not directly address the question, 'to what extent should participatory procedures be structured and sequenced?'. A rule-of-thumb response to this question is that an open-ended approach, which relies on the application of general principles to meet agreed objectives, will enable practitioners to learn as they implement. However, such an open-ended approach has several requirements:

- the general principles should be well known and available to the team (brief written guidelines can help)
- at least one, and preferably several, team members should have positive experience and/or confidence in applying these principles
- the project design has to provide room, including time and resources, for making mistakes and reflecting on them.

The introduction of participatory approaches as part of organizational change does not imply rejection of a structured and systematic approach. A 'learning organization', one that is open and willing to change, still requires structure and systematic operational procedures, perhaps even 'systems thinking', in order to provide a framework for reaching consensus for action (Bawden, 1994). The researchers and farmers involved need to broadly understand where they are going, and how they are going to get there.

Handbooks and field guides on farming systems and participatory agricultural research generally provide an operational sequence of activities to follow (e.g. CIMMYT, 1988; Mutsaers *et al.*, 1997; van Veldhuizen *et al.*, 1997). Guides are particularly valuable when there is limited experience in the project team, and staff have not been exposed to participatory and client-oriented approaches during their training. However, it is impossible to write a single set of guidelines that covers the wide range of contexts (organizations and programmes) within which participatory agricultural research can take place. Guidelines may make assumptions, which are not always explicit, about the organization or context for research. Moreover, detailed guidance as to how farmer participation may be facilitated in undertaking particular activities is not always given in the guidelines.

The main danger with over-reliance on such guides, as with PRA manuals, is that they may be used as blueprints rather than as useful literature to be used thoughtfully and with specific objectives in mind (Chambers and Guijt, 1995). Rapid rural appraisal, PRA, on-farm trials (and even questionnaire surveys) are often applied in a mechanistic way, repetitively, and with a lack of clear focus. Such unfocused use of methods can take place in a range of institutional contexts, and NGOs are not exempt from this pitfall. Mechanistic application of methods is to be avoided, and guides should be used as prompts rather than as a blueprint (Chambers and Guijt, 1995). However, where farmers play a greater role in the decision-making process, there is less risk of falling into this trap. With a high degree of farmer participation, unpopular or marginally relevant activities are unlikely to be repeated. Nevertheless, in circumstances where farmers benefit in terms of material inputs or status, some may still favour activities that add little to the stock of new knowledge.

The need for a highly structured process is likely to be greatest when there is a short time horizon within which to come up with results. The Larger Grain Borer (LGB) Control Project, the National Agricultural Research Project (NARP II) and the Dryland Research and Extension Project (DAREP) faced this situation, having only 3 years, a relatively short time for experience-based learning in participatory research. In such a situation, there is limited room for formal experimentation with various methodologies in order to identify those most suitable for particular situations. Time may allow only for applying a combination of procedures found to be useful in similar situations elsewhere, followed by reflection, monitoring and documentation of the results. The shorter the time available and the more limited the resources, the greater the need for a pragmatic approach, bringing experience to bear in order to address a particular situation.

In short, there is much to be said for a pragmatic approach that avoids rigid adherence to a particular terminology or approach. A pragmatic perspective recognizes that 'real' participation is not a question of using politically correct phrases, or of applying a sequence or toolkit of activities (Chambers and Guijt, 1995). It looks at how the strong points of each approach can be combined to make participatory agricultural research more effective. Moreover, 'real' participation is a process of two or more parties getting to know each other, building a rapport, and negotiating what they expect from each other. The emphasis is on sustaining an effective and transparent process of negotiation and collaboration that is driven by the interests and agenda of both parties – farmers and researchers.

2.5 HOW IMPORTANT ARE PROJECT AND ORGANIZATIONAL OBJECTIVES?

The approaches to involving farmers in the research process adopted by particular projects are influenced by several factors, including the technical research objectives, the organizational context and its culture, and the views of the implementers. A project's objectives have an important influence, as many of the cases below illustrate. However, these may change during the project's life, along with the views of those implementing it. For example, Cases 2.1 and 2.4 in this chapter illustrate how longer-term programmes and projects have changed their objectives relating to farmer participation over time. Similarly, while bearing in mind that organizational objectives and cultures provide both constraints and opportunities to more or less participation by farmers, projects often provide an important means through which these objectives and cultures can be influenced. We return to this topic in Chapter 16.

2.6 WHAT DO THE CASE-STUDY PROJECTS SAY ABOUT THEIR APPROACH?

The case studies discussed at length cover a range of organizational contexts and various types of technical research focus. Four of the projects were located within national agricultural research organizations, three straddled both extension and research departments within government ministries, and three were located within NGOs having connections with extension and research organizations. The technical focus of the projects ranged from a highly specific focus on particular pest outbreaks and on particular commodities, to a generic focus on agricultural and related problems identified by farmers as important (Tables 2.4–2.6).

This range of organizational contexts and objectives has, to some extent, influenced approaches to farmer participation espoused in project documents and expressed by project staff. The cases are presented in three groups:

- views from projects within national agricultural research organizations
- views from projects within research and extension organizations
- views from projects within NGOs.

Table 2.4 Case-study projects in national agricultural research institutes: organizational context, technical focus and general approach

Project	Organizational context	Technical research focus	Approach orientation
Adaptive Research Planning Team (ARPT)	Zambian Agricultural Research and Extension System: provincial teams covering eight provinces	Broad-based, problem-oriented adaptive research based on problems identified through farming systems diagnosis	FSR and adaptive research
KARI/ODA National Agricultural Research Project, Phase II (NARP II)	Kenya Agricultural Research Institute – parastatal with national mandate; project operating through regional research programmes	Broad-based adaptive research based on problems and opportunities identified through expert consultations and PRAs	Adaptive research and FPR
Dryland Applied Research and Extension Project (DAREP)	Kenya Agricultural Research Institute – parastatal; attached to a regional research centre in eastern Kenya	Broad-based, problem-oriented adaptive research for semi-arid areas, based on problems identified through farming systems diagnosis	FSR/PTD
ODA/DRT Cashew Research Project	Based in Tanzanian Department of Research at a cashew research station in southern Tanzania	Focus on technology for increasing cashew production, particularly disease control	Farmer field schools/farmer first

2.7 VIEWS FROM FOUR PROJECTS WITHIN NATIONAL AGRICULTURAL RESEARCH INSTITUTES

Projects within national agricultural research organizations, either explicitly or implicitly, build on the existing body of researchers' experience (positive and negative) in involving farmers in the research process. Researchers in national institutes may be cautious about adopting new approaches in such a wholesale fashion. The four projects described here had clearly defined technical outputs. While they were all influenced by some of the approaches described in the previous section, most did not rigidly prescribe a particular methodology or approach. In practice this allowed room for the implementers to select from a range of methodological options during implementation.

CASE 2.1

ARPT: WORKING TOWARDS A COLLABORATIVE APPROACH

Zambia's Adaptive Research Planning Teams were grounded and trained in FSR methodologies. However, unlike some other FSR projects started at a similar time, they also had a clear influence from adaptive research ideas, and were shaped by an agricultural planning perspective that acknowledged the importance of linkages between FSR on the one hand, and commodity research, factor research and agricultural planning on the other (Kean and Singogo, 1988). The ARPT programme was open to new ideas, and used these to evolve its own participatory approaches and philosophy for farmer participation over a 10-year period.

From the mid-1980s to early 1990s, the ARPT programme was probably the largest FSR initiative of its kind in the world, consisting of eight provincial teams and a national co-ordinating team.[2] By 1990, six different types of specialist staff were contained in these teams – farming systems agronomists, agricultural economists, research extension liaison staff, rural sociologists, nutritionists and livestock specialists. In the early days of ARPTs' work, agricultural economists worked with agronomists at field level in undertaking diagnostic work and establishing FSR programmes to improve farm management practices (Drinkwater, 1991). From 1986, when rural sociologists and, subsequently, nutritionists began to join ARPT, the focus and mode of working altered. The economists in the programme began to conduct more upstream research, for instance on marketing or more policy-related issues, whilst the sociologists took over the role of social science partners to the agronomists at field level. Two changes occurred – the introduction of more participatory approaches, and an introduction of a household food security perspective as a new contextual framework for appraisal and adaptive research work.

The evolution of ARPTs' approach to farmer participation is summarized below.

Consulting with farmers, 1984–90

During the period 1984–90 a series of tentative steps were made towards developing greater levels of farmer participation in ARPTs, which by the end of the period had led to a greater realization that for an FSR programme to be effective, farmers had to be more involved throughout the process. The steps taken during this period sought to address three main problem areas:

- a lack of farmer participation at particular stages of the FSR sequence
- the poor quality or token nature of participation by farmers
- the inadequate representation of women.

In reviewing this period, Drinkwater and Sutherland (1993) note a number of issues that arose and shifts that began to occur during this period as a result of these issues.

- **Farmer empowerment:** Sutherland (1987) noted how, when farmers had not been consulted sufficiently, they would frequently exercise negative power in the implementation of trials, either by not carrying out specific treatments or by effectively sabotaging a whole trial. Similarly, if a farmer provided a bad piece of land for a trial, it was an obvious indication of the lack of importance accorded to the trial by the farmer.

- **Easing logistical constraints to participation:** initially, trials were scattered around a geographical area, with farmers being selected by trials assistants through a mixture of semi-random selection and working with farmers whom they knew. Such scattering made both farmer participation and obtaining meaningful data difficult (Kean *et al.*, 1985). As a corrective measure, clustering of trials was adopted in many provinces – initially Lusaka, then Central, Western and Luapula. In Lusaka Province, with the advent of a sociologist on the team, this evolved into a community approach, albeit still using a largely consultative methodology. In conjunction with this, constraints to participation by women farmers were reduced by holding separate field days for women in some provinces.

- **Targeting and equity:** concerns began to be expressed in this period that trials were being conducted mostly with wealthier, male, small-scale farmers. Nevertheless, attempts to derive more cross-representative selections of trial farmers were still largely social engineering. This resulted in some obvious problems, as in Northern Province where some farmers 'selected' on the basis of equity did a poor job because they lacked experience of the trial crop (ARPT, 1989). Most of the ARPTs adopted a policy of positive discrimination in selecting farmers for trials, so that at least one in every three of the trial farmers would be a female-headed household.

- **Farmer assessment:** as it became increasingly accepted that the formal statistical analysis of farmer trials had serious limitations, from around 1984 many of the provincial teams introduced farmer field days to try and improve the level of feedback. It was found that field days were not events at which in-depth, frank discussions could be held, due to influences from extension officials and local political figures. Consequently these field days met with limited success as far as this objective was concerned. From 1987, Lusaka Province began to use evaluation questionnaires with farmers at the end of each season, and at ARPT review meetings the question 'which is more important, statistical results or farmers' opinion?' was being raised (ARPT, 1989).

- **Indigenous knowledge:** from the mid-1980s the first sociologists in ARPTs also began undertaking research work into indigenous technical knowledge with a series of classificatory studies: the local terms for soils, weeds and crop varieties in Lusaka Province; for soils, vegetation and cassava cultivation practices in Luapula Province; and a large collaborative study on indigenous soil classification systems in Northern Province. This last study was controversial: soil scientists at first rejected farmers' ability to classify soils differently, but eventually accepted some of the criteria farmers were using (Sikana, 1994a).

Farmer collaboration, 1988–93

In 1988, the Northern Province ARPT began to work through village research groups, and by 1990–91 on-farm trial work was also being conducted with farmer research groups in Central, Copperbelt and Western Provinces. In Central Province the groups were established in 1989, following an evaluation of the provincial team's 8 years of experience. This evaluation concluded that of the five technologies released for dissemination by that time, not one was being adopted on any significant level by farmers. Instead, the lessons of value farmers felt they had learned – for instance, on maize planting methods and plant spacing – had passed unrecorded by the provincial team (M.J. Drinkwater, unpublished paper, 1990). The decision to work through farmer research groups was supported by recommendations developed at an ARPT annual review meeting in 1990, at which Biggs' typology was discussed. This meeting supported a motion that the ARPT should try to move from a consultative to a collaborative mode of participation over the next 5 years. This initiative came from the researchers involved within the ARPT, rather than from the donors, many of whom were not interested in the development of a more effective research approach.[3]

Sources: Drinkwater and Sutherland (1993); Drinkwater (1997).

The next case presents a perspective from a project that started operating in 1994, more than 10 years after the ARPTs began. This project design and approach took account of previous experiences of introducing more farmer-oriented research approaches within Kenya and neighbouring African countries. It was particularly sensitive to the consequences of forming separate units or teams (e.g. ARPTs) to conduct on-farm research within research institutions, and attempted to avoid the potential pitfalls of such an approach (Matata and Wandera, 1998).

CASE 2.2

NARP II: CONSULTATIVE ADAPTIVE RESEARCH

The philosophy of the regional research programmes (RRPs) within the Kenya Agricultural Research Institute (KARI) is to involve farmers, extensionists and others in all stages of technology development and dissemination. KARI's interactions with farmers and other stakeholders have been, and remain, largely consultative in nature, through diagnostic surveys and researcher-managed trials. A major objective of the National Agricultural Research Project (Phase II)'s support to the RRPs is to increase the involvement of farmers and others, so that the RRPs' relations with farmers become more collaborative. However, the size of the regions to be served, in terms of numbers of smallholder farm families, ethnic groups and socio-economic conditions, and agroecological conditions and agricultural enterprises, pose considerable problems to real collaboration, particularly in priority-setting. Accordingly, a two-stage approach is taken throughout the research and dissemination process of the RRPs, where first the 'experts' (scientists, extensionists, NGOs and government organization representatives) take the lead in setting regional priorities and formulating a research agenda and interventions, then farmers validate the agenda and interventions proposed for their area. As discussed later (Cases 3.3, 4.1, 4.7, 5.6), farmers' reactions are taken very seriously in selecting who within a community should participate in the trials and which research activities are to be implemented.

The NARP II adaptive research programme in Kenya also had a clearly defined and pragmatic view on farmer participation, one that took account of what was possible within a government research institute with a broad technical and geographical mandate, and which used the Biggs (1989) typology of participation as a reference point.

Source: Rees et al. *(1997).*

In a similar institutional setting to NARP II, but with a mandate geographically focused on semi-arid areas, the project outlined in Case 2.3 was guided by a philosophy that emphasized the importance of holistic, farming systems approaches and developing participatory methodologies that also strengthened linkages.

CASE 2.3

DAREP: PARTICIPATORY RESEARCH WITHIN A FARMING SYSTEMS CONTEXT

The Dryland Applied Research and Extension Project documentation summarizes its philosophy as "participatory research within a holistic farming systems context". It further states that this is to be undertaken within a national agricultural research systems (NARS) research framework. Methodology development is a key objective of the project: "participatory farming systems methodologies will be evolved so that linkages between farmers, extensionists and researchers are strengthened within an integrated framework". The project documentation further states the interest of the UK partner: "NRI's principal interest in the DAREP project is in the development of an adaptive research process that is responsive to the needs of farmers and enables farmers to be full partners in the research process". The emphasis on farmer partnership goes along with the notion that "the project will be complementary to, and will strengthen, farming systems activities ongoing at Embu and elsewhere". The project document further proposes complementarity with two other proposed DFID projects, the NARP II adaptive research programme (Case 2.2), and a proposed project to strengthen development planning and implementation capacity in the Embu and Meru Districts of Kenya. The latter project never took off, hence the linkages between DAREP and local development planning institutions were not a central part of project activities. However, relations were established with the NARP II adaptive research project, members of which participated in the DAREP participatory methods workshop and end-of-project dissemination conference.

While partnership between farmers and researchers is emphasized, the project document also identifies technical areas for technology development relating to dryland agriculture. This implies research will be conducted to solve identified problems, not only what farmers demand, but also what researchers identify.

Source: Sutherland et al. *(1997e).*

The next project, the Cashew Research Project, started as a straightforward applied research project, and did not appear to have an explicit view or philosophy of farmer participation at the outset. The project evolved a more participatory and learning-centred approach out of a conventional, on-station research programme, drawing on ideas relating to offering farmers a basket of choices and empowering them through sharing technical knowledge: key elements in the farmer-first and farmer-field-school approaches, respectively.

CASE 2.4

CRP: BOLTING ON FARMER PARTICIPATORY RESEARCH – A MIXED METAPHOR?

> "If we believe in one absolute truth, disagreement can only mean negation. If there are multiple realities, disagreement means negotiation, accommodation, learning and the ability to reconstruct someone else's reality."
> *Maturana (1991)*

The Cashew Research Project began in 1990. As researchers refined the technologies they were working on, their interest in extending the technologies to farmers grew. Before the formal introduction of the FPR component in 1994, there had been two ways to test and extend technologies – directly, through on-farm trials, and indirectly, through an occasional meeting of the Tree Crops Extension Recommendations Working Group.

On-farm trials

Four of the six sections doing research on cashew at Naliendele Agricultural Research Institute (Crop Protection, Agronomy, Vegetative Propagation, Soils) were carrying out trials on-farm. The other two sections, Cashew Breeding and Plant Pathology, were doing trials at Naliendele and its sub-stations. Cashew agronomists were testing seed material put forward by the breeders, working closely with vegetative propagation, testing grafted and top-worked planting material, and working out ways to first rehabilitate and then upgrade abandoned cashew fields. The Crop Protection section was testing different types and rates of fungicides for the control of powdery mildew disease, and the Soils section was monitoring the effects of sulphur dusting on soil pH. These on-farm trials would have been most accurately described as multi-locational field trials. Each section was doing its own trials with individual farmers scattered across the Southern Zone of Tanzania, an area encompassing Mtwara and Lindi Regions and Tunduru District. The motive for doing these trials (aside from appeasing social scientists) was to find generalized recommendations for farmers across the Southern Zone.

Tree Crops Extension Working Group

During 1993 this working group met four times to review existing extension recommendations and to formulate modified extension recommendations under the following headings:

- rehabilitation and upgrading (of abandoned cashew fields)
- pest and disease control (of cashew)
- grafted plants; polyclonal seeds; selections; top-working
- powdery mildew disease.

The members of the working group varied according to the topic in question. The core of the working group was made up of research scientists, extensionists and officers from the Cashew Improvement Programme. This working group was set up to try and solve the problem of perceived lack of communication between researchers, the Tree Crops Extension Support Unit (part of the World Bank Cashew Improvement Programme), and the government regional and district extension systems. The mechanism agreed upon was that issues discussed by the group would then be relayed to farmers through the extension system as recommendations and impact points. The output would be prescriptions for generalized agricultural practices written as directives, in short sentences, applicable and understandable to all.

Bolting-on farmer participatory research

The institutional result of bolting farmer participation onto the CRP was the Integrated Cashew Management (ICM) programme. The ICM programme was initially envisaged as an institutional open space that would provide an unstructured forum, a learning environment, encouraging freer thinking, dialogue and action around the theme of cashew management. The role of the facilitators was first to create the space, then to maintain in that space a relatively non-hierarchical and non-threatening environment in which all involved would enrol themselves in communicative action. The action would involve farmers, scientists and extensionists learning from each other, understanding each other, and committing themselves to actions agreed by all parties. Alongside this role of environment-setting, the facilitators had the job of tracking what was happening in the space, continuously recording, reviewing and drawing from the debate a common understanding of what cashew management was about.

That was the theory. What actually happened in this open space is described very well by the following explanation of how the internally held understanding of structure combines with external resources at the point of negotiation, in this case making sense of what it means to manage cashew trees:

> "Relations and processes of domination are central to an explanation of how people – differently positioned – contest the meaning of a situation, use economic and institutional resources available to them at that historic moment to try and make their definition of the situation 'stick', and try to garner the material outcome."
> *Wright (1995)*

Naturally, the various people based in the different research sections, regional extension, district extension and technicians, took on different roles, behaviour and attitude in this learning environment. Some tried to control the process, others did not want to play a part in it.

Which metaphor?

The ICM programme ended up a rather unhappy cross between a 'basket of choices' model and 'multiple sources of innovation' model (Biggs and Clay, 1981). Some aspects of these models appeared to be mutually exclusive, at least when used within one project team (Case 4.4).

Source: De Waal (1997).

2.8 VIEWS FROM PROJECTS WITHIN MINISTRIES OF AGRICULTURE BUT OUTSIDE MAINSTREAM AGRICULTURAL RESEARCH

Two of the case-study projects were within ministries of agriculture, but did not fall entirely within the structures of the mainstream national research programmes. The Kavango Farming Systems Research and Extension (KFRSE) Project was one of a number of donor-funded FSR programmes. It spanned research and extension, working with staff seconded from the Directorates of Agricultural Research and Training and Extension and Agricultural Engineering within the Namibian Ministry of Agriculture, Water and Rural Development (MAWRD). The Larger Grain Borer (LGB) Control Project research team was located in the Extension Department of the Ministry of Food and Agriculture in the Volta Region of Ghana.

Table 2.5 Case-study projects in national ministries spanning extension and research: organizational context, technical focus and general approach

Project	Organizational context	Technical research focus	Approach orientation
Kavango Farming Systems Research and Extension (KFSRE) Project	Namibian Agricultural Research and Extension System: located in remote northern area where smallholder agriculture previously neglected by government services	Broad-based, problem-oriented adaptive research based on problems identified through farming systems diagnosis	FSR and training for transformation
Larger Grain Borer (LGB) Control Project	Based in Ghana's Ministry of Food and Agriculture, with the research team operating in the Volta Region	Development of technology for control of larger grain borer for smallholders in the Volta Region	Adaptive research/food systems

CASE 2.5

KFSRE: AIMING FOR INTERACTIVE PARTICIPATION

The Kavango Farming System Research and Extension Project began with a clearly stated philosophical position and set of linked objectives.

"Our philosophy is:

- That the needs of all stakeholders, including disadvantaged groups such as women-headed households and the poor, should be addressed by MAWRD in its research and development activities.
- That farmers' knowledge, experience and organization can make a valuable contribution and improve effectiveness at all stages of research and extension.
- That farmers' knowledge and experience is fed into the development of technologies and the subsequent extension messages. There is no recipe; farmers and extension agents are left to select the options which suit them.

Because ultimately farmers are responsible for their own development, they must have control over the process.

Our objectives are:

- To facilitate the participation of all stakeholders (with particular emphasis on disadvantaged groups) in research and development activities.
- To ensure that FSR/E activities address the needs of all stakeholders.
- To have farmers contribute to the research planning process."

The team sees itself as attempting to achieve a level of 'interactive participation' as defined by Bass *et al.* (1995):

> "People participate in joint analysis, development of action plans and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices."

Participation is specifically referred to in the project logical framework under purpose, outputs, indicators and specific activities.

The mid-term review of the project (June 1996) noted that "Farmer participation has been achieved in all stages of the research process, and women's participation was important in the selection of collaborating groups and case study households." The review team, however, recommended more detailed monitoring of participation by different groups, as well as a sociological study of community relations in riverside villages. A specific study of the needs of the marginalized bushman community was also recommended.

The KFSRE project in Namibia is also building capacity in the national research and extension services by formulating a philosophy and approach relating to farmer participation. This emphasizes the importance of learning, as well as understanding more about the social dynamics of the local target communities.

Source: Matsaert et al. *(1997).*

The LGB project also had a clearly formulated philosophy of participation, derived from matching its expected research outputs with the participation options and values associated with the literature on participatory agricultural research current at the time of the project.

CASE 2.6

LGB: A FUNCTIONAL APPROACH TO PARTICIPATION

The Larger Grain Borer Control Project took the 'functional' approach to participation typical of many government-based research and development projects (Farrington, 1995; Farrington and Nelson, 1997). That is, the main purpose of participation was to develop more appropriate and acceptable technologies for farmers. Empowerment of farmers (except as an indirect spin-off) was not thought to be a realistic objective given the wide coverage, short time span, and very narrow technical focus (maize storage) of the LGB project.

Individuals on the project varied in their initial experience of and enthusiasm for participatory approaches. Participatory technology development is not yet common in the Ghana agricultural research establishment, although there is increasing interest in this approach. Many research team members first came across the term 'farmer participation' as a result of project training courses. However, the majority came from farming backgrounds similar to those of the clients, so found it comparatively easy to empathize with their practical farming problems. Empowerment, on the other hand, was not formally discussed as a project aim, and team members' perceptions of this concept, as well as their belief in it, varied greatly.

The project saw client participation as an integral part of a research and extension cycle involving both farmers and maize traders. The cycle can be summarized as follows (more details are given in sections below). Introductory discussion meetings to find out how farmers viewed the storage pest problem were followed by close observation of farmers' storage practices, and meetings to discuss possible pest-control options with farmers. New technical methods were developed specifically to facilitate farmer participation, in particular, the use of rapid methods for loss assessment and insect assessment that could be performed on-farm with farmers. On-farm trials took place in farmer-managed stores with farmer-selected, researcher-managed, farmer-applied treatments, evaluated independently by store owners and researchers. Researchers observed practical problems and technical difficulties (e.g. dose calculations for insecticidal materials), and tried to solve these with farmers. Research station trials were evaluated by farmers (as well as researchers), and maize from the trials was valued by traders. Extension recommendations were tested with farmers, and new methods for helping extension workers advise farmers on the choice between technical options were explored. MoFA extension agents were trained in new maize-storage techniques, and fed back information to the research team. Maize traders were also trained as informal extension agents. Experience from one round of the research–extension cycle fed into the next round.

Cost-benefit analysis (CBA) should also be highlighted here because it was fundamental to the project approach and is often not employed by PTD practitioners, probably because of the nature of the technologies being evaluated. While it may be unnecessary to carry out CBA for a new composite variety or soil-management technique (as farmers can try it out in a corner of their field for little or no cash investment and decide whether they like the look of it over a couple of seasons), the investment, risks and potential benefits are often much higher when pest control is concerned. This is particularly true in storage, because it is hard to experiment with a small portion of a store, so failed pest control 'experiments' can put the whole family food stock at risk. For this reason, the project devoted time and resources to conducting realistic CBA of new technologies and to testing ways of incorporating simple CBA into extension decision advice.

Source: Compton and Motte (1997).

2.9 VIEWS FROM NGO-BASED PROJECTS

The relevance of alternative approaches to agricultural research is likely to be influenced by the institutional context of each project (Cornwall *et al.*, 1994). While FSR and its close relatives developed in the context of formal agricultural research and extension and development programmes, the FPR and PTD approaches have largely grown out of NGO programmes. Often these have been relatively small-scale research programmes within already established community development programmes, such as the ActionAid's Farmer Participatory Research Project described below. Alternatively, participatory research has been used as a catalyst for empowering local communities such as the World Neighbours programme in Mali (Gubbels, 1997) and the ITDG-Chivi Project, and to some extent the CARE Livingstone Food Security Project, both described below. The FARM Africa Farmers' Research Project combined an FPR with an FSR approach in its training and capacity-building activities with governmental and non-governmental organizations involved in agricultural research, extension and training in southern Ethiopia.

Table 2.6 Case-study projects in NGOs: organizational context, technical focus and general approach

Project	Organizational context	Technical research focus	Approach orientation
Intermediate Technology Development Group-Chivi Food Security Project	ITDG, a technology-oriented NGO working at community level in Central Zimbabwe within ward structure in close collaboration with government extension and research, including CONTILL, a conservation tillage project	Focus on general theme of food security, with emphasis on demand-led technology interventions	PTD and training for transformation
ActionAid/NRI Farmer Participatory Research Project	ActionAid – project's Farmer Participatory Research Unit (FPRU) attached to area development programme in central Uganda	Problems identified by farmers in meetings with researchers	FPR
CARE Livingstone Food Security Project	NGO working at district level in southern Zambia through communities and in collaboration with government extension and research	Broad range of issues around food security, with immediate focus on drought-recovery technologies	Training for transformation
FARM Africa Farmer Research Project	NGO working through other non-governmental and governmental organizations in the Southern Region of Ethiopia	Determined by diagnostic PRAs conducted as part of capacity building at district level	FPR and FSR

CASE 2.7

ITDG-CHIVI: COMMUNITY PARTICIPATION, INDIGENOUS TECHNICAL KNOWLEDGE AND LOW-INPUT AGRICULTURE

Key principles of the Intermediate Technology Development Group-Chivi Food Security Project approach were:

- to foster and facilitate community participation in decision-making, planning and implementation of project activities
- to build and strengthen local institutions, rather than create an independent project structure, so that the process would be sustainable without continuing external support
- to build on existing local skills and knowledge
- to act primarily as a facilitator and allow the process to unfold at the community's own pace (it was recognized that this might take time)
- to adopt a strategy of participatory technology development (PTD) – this approach seeks to strengthen local institutions, build on local skills and knowledge, and facilitate the community's choice of technical solutions from a range of options; it seeks to build the technical and managerial capacity and capabilities of both individuals and community institutions in the management of technical change.

The ITDG was particularly keen to ensure the involvement of the more marginalized households in this process. Means were constantly sought of including the perspectives of these households in discussions and planning. An important method was to bring the issue of the inclusion of these households on to the agenda of community meetings and discussions, and to encourage the examination of ways of including them more in planning and implementing activities.

The second thrust of the project's philosophy was exploring and reinforcing local sources of information and expertise. From the project's outset, it was decided that ITDG would not be implementing an operational project in the conventional sense, nor would it adopt the role of sole (or main) provider of technical information to farmers.

The project sought to link farmers in Chivi with sources of information which, after ITDG's involvement finished, they could continue to tap without having to rely on ITDG. These included government research stations, other NGOs and training institutions, and farmers in other districts.

While the focus of the project was food security, the team worked to a fairly open agenda. This was because it was recognized that strategies supporting rural food security also need to focus on developing and supporting other linkages that permit increased food production to support a wider rural economy. There was no preconceived area of specific technical focus. The approach was to allow the technical focus to emerge through discussions with community, and to attempt to work with them to identify, then meet, some key prioritized needs.

In general terms, the objective has been to focus on low (external)-input, low-investment activities that fit with farmers' resources. These contrasted with the standard recommendations of Agritex staff, which frequently required a high investment in terms of time, money and risk.

Source: Croxton and Murwira (1997).

The ActionAid Farmer Participatory Research Project (FPRP) in Uganda had a grassroots orientation, aiming at starting with a collaborative mode of participation and eventually developing into a collegiate mode, as advocated by Biggs (1989).

CASE 2.8

FPRP: DEVELOPING METHODOLOGIES FOR COLLABORATIVE AND COLLEGIATE PARTICIPATION

The ActionAid Farmer Participatory Research Project aimed to investigate, develop and test appropriate methodologies for promoting the active participation of men and women farmers throughout the research process. The approach intended to build on farmers' knowledge and understanding, as well as strengthening their independent capacity to experiment and investigate future problems. The project aimed to achieve the active collaboration of farmers in formulating, implementing and evaluating research, working in partnership with field workers, natural scientists and social scientists. The broader objective was to benefit resource-poor farmers by producing sustainable and equitable improvements in agricultural production and management (Martin, 1990).

The primary beneficiary groups in the project were to be men and women smallholders whose main, or only, source of income was derived from agriculture. Women were to be encouraged to play an active role in all phases of research, and could have constituted separate research groups where necessary.

The project was a practical exploration of the ways in which NGO farm-level research could be linked with expertise in scientific research establishments, and so enable farmers' priorities to influence priority-setting in research and improve technology generation and diffusion at farm level.

Emphasis was certainly placed on trying to develop a collaborative research process and, where possible, the project aimed to explore the possibilities of encouraging collegiate research where farmers take the lead in the design and implementation of trials.

Source: Salmon and Martin (1997).

The CARE Livingstone Food Security Project stands out as quite different from the previous two cases, combining a strong relief and development orientation, using participatory approaches as a means to shift from a relief into a development mode of operation.

CASE 2.9

LFSP: REVERSING THE ORDER OF RESEARCH AND DISSEMINATION

Compared with the traditional farming systems agenda of appraisal, adaptive research and then dissemination, the Livingstone Food Security Project has followed a different route. After initial appraisal exercises, its first major activity was the dissemination of early maturing, drought-tolerant crop varieties that had been successfully piloted in on-farm research elsewhere. Only once this priority need of farmers had been met was a more thorough diagnosis and on-farm experimental programme begun. There are two significant implications of this reversal of the traditional ordering of activities:

- the project went to scale quickly, so that its demonstrable impact was obvious within two seasons (the first being only a limited pilot)

- an impact was demonstrated so rapidly that the Ministry of Agriculture, who are involved in the activity, have shown growing interest in replicating the overall methodology, at least elsewhere in the Southern Province.

In July 1994, after Zambia had just experienced its second drought in 3 years, another drought-relief exercise was initiated. CARE Zambia had carried out the relief exercise in Kalomo South in 1992. In 1994, the Kalomo South area around Livingstone was the focus of CARE's activities, but this time the approach was different. The relief effort, implemented through food-for-work, was paralleled by a pilot seed-multiplication and distribution scheme intended to provide the springboard into a much larger drought-mitigation programme. The seed scheme was implemented as a seed loan, with the aim of forging a relationship with farmers that was not simply dependency-generating.

The pilot seed scheme was implemented with the village committees who organized the food-for-work and distributed food relief at the village level. The scheme was advertised in area-level meetings. Although only 330 volunteer farmers participated in the initial scheme as individuals, it received wide publicity and communities as a whole were well aware of it. Once again in 1994/95 the rains failed, and there was a further crop failure – except for the farmers who were participating in the seed scheme. Their early maturing fields of half a hectare of sorghum and cowpeas went on to provide these farmers with an extra 3–6 months' food. As a result, when the seed scheme was expanded in the following 1995/96 season, a total of 6800 farmers in 180 villages in Kalomo South and Livingstone Districts participated in the scheme. In 1996/97 the scheme was expanded into the Kalomo North area to encompass some 9600 farmers. By the 1999/2000 season there were over 25 000 participating farmers.

Source: Drinkwater (1997).

The Farmers' Research Project (FRP) differed from those of the other NGOs in that it started with capacity-building in other organizations as its main objective, rather than directly developing capacity within local communities.

CASE 2.10

FRP: BUILDING CAPACITY IN OTHER ORGANIZATIONS

The rationale behind the Farmers' Research Project, established in 1992, was that the public-sector organizations involved in formal agricultural research were mainly engaged in strategic, applied and some adaptive research, and had limited capacity to meet the multiple demands created by a very large peasant population farming in very diverse ecological and socio-economic conditions. The project sought to build additional participatory research capacity, at community and higher levels, through other organizations including NGOs, government extension services and the agricultural training institutions in the Southern Region. The project used methodologies and training materials developed elsewhere to initiate its activities, and modified these as it gained more experience with training and capacity-building within the partner organizations. Training in diagnostic PRA approaches and participatory on-farm trials have been strongly influenced by training materials developed as part of earlier FSR training initiatives in East Africa. However, the project has developed these materials and approaches with a strong orientation towards increasing farmer participation in the research process, and influencing the perspective of the partner organizations towards an approach to agricultural research in which farmers play a leading role.

This chapter offers insights into the range of approaches used in participatory agricultural research worldwide. The practitioners writing about the perspectives and approaches that influenced their projects have provided a background to the case studies that will be used in subsequent chapters. Practitioners' accounts make it clear that none of the projects was driven by a single approach or philosophy, and that most developed a fairly pragmatic stance with regard to the most suitable approach for their particular project. Some of the approaches used by these projects have written guidelines, intended to assist in project implementation. It has been noted that while these guidelines are useful, they should be used carefully and are not a substitute for building experience into a project and allowing adequate space for learning during project implementation. Participatory approaches to agricultural research include a number of common elements and activities. These elements do not have to be implemented in a strict sequence. They are discussed in Chapters 3–6, using case studies to illustrate different approaches to implementation used by the projects.

NOTES

1. This is particularly true for research implemented through a national agricultural research systems organization which is likely to see farmer participation as a more effective means of promoting demand-driven research agendas and improving technology uptake. It may also apply to community-oriented NGOs who usually initiate action in terms of deciding which communities to work with, and set limits with regard to the scope of their interventions and the mandates of particular projects or programmes.

2. An initiative of similar scale, which started a little later but evolved and grew at a faster pace, was the Farming Systems Section of the Department of Research and Training in Tanzania, which by 1998 had 43 professional staff under an Assistant Commissioner (Lema and Meena, 1998).

3. A comment on the ARPT experience by Godfrey Mitti, an ARPT agronomist and provincial team co-ordinator for over 10 years, was that "Too much institutionalization can be a problem in that it can lead to the point where FSR is just a job. Getting technology tested and adopted becomes the prime philosophy driving the trials and the actual programme. To some extent I feel this was a problem in ARPT Eastern Province and other teams, where the donor was more interested in just having a team undertaking surveys and trials, rather than in developing the research approach. Little was done to analyse experience with the approach and better it as a science. In some cases there was no capacity to analyse the approach used. Instead, emphasis was placed on capacity to analyse trial or survey data, rather than capacity to analyse and improve the research process."

Characterization and targeting – approaches and issues

3

3.1 INTRODUCTION

Agricultural research projects that see themselves as participatory do not suggest that the project will work with just any willing farmers, anywhere. Many projects have explicit strategies for characterizing their operational areas and target groups, and selecting sites and farmers for particular activities. Other projects make implicit assumptions that guide the targeting of their activities. Characterization and selection strategies are related in practice, but are conceptually distinct. Both are elements of poverty-oriented agricultural research strategies, and are means to ensure that agricultural research activities involve and benefit a particular group or category of farmers who have been neglected by previous research activities. This chapter deals with characterization as one of two key elements in targeting participatory agricultural research. The related topic of selecting communities, farmers and sites is addressed in Chapter 4.

Characterization is important because agricultural research has specific technical objectives and is intended to benefit a particular geographical area and/or socio-economic group of farmers. Characterization provides a context within which to make decisions about technical and socio-economic focus during the research process. It includes activities relating to describing and classifying a range of biophysical and socio-economic features, including agroclimatic zones, livelihood and farming systems, household types and distinct farmer categories.

The project case studies in this and the next chapter illustrate some differences of approach to characterization, reflecting the differing objectives, history and organizational contexts. A programme with a national research mandate for smallholders, such as the Adaptive Research Planning Teams (ARPTs) in Zambia (Case 3.1), is likely to adopt a different approach to characterization from a project focused on a particular commodity or problem, such as the Cashew Research Project (CRP) which focused on disease management in cashew (see next chapter, Case 4.4). Similarly, the Dryland Research and Extension Project (DAREP), concentrating on a particular area, semi-arid production systems in three districts (Case 3.2), is likely to see a different approach from a project like the ActionAid Farmer Participatory Research Project (FPRP), which specifically targeted poorer smallholder farmers (Case 3.6).

3.2 CHARACTERIZATION EXPERIENCES

Projects that aim to improve the client orientation of public-sector research organizations have attached considerable importance to characterization. Four of the six projects whose experiences are detailed below were located within the public sector, and were a part of national policies and strategies to re-orient agricultural research towards the smallholder farmer, and away from research agendas driven by scientists and large-scale commercial farming interests. These four cases cover experiences in Zambia, Kenya and Namibia. The other two cases cover experiences of NGOs, reflecting particular concern to work with the poorest farmers, and using wealth ranking as a basis for characterizing target communities.

The first case, from Zambia, illustrates how the provincial ARPTs, in common with other farming systems research programmes of the 1980s, emphasized target group characterization in the early stages.

CASE 3.1

ARPT: APPROACHES TO CHARACTERIZATION

Zambia was one of the earliest countries in the southern and eastern Africa region to institutionalize farming systems research within its national agricultural research organization (Kean and Singogo, 1988). The Adaptive Research Planning Team programme was established in 1981, with the mandate of conducting adaptive research in all Zambia's nine provinces. By 1985, with assistance from a number of different donor projects, farming systems teams had been established in eight of Zambia's nine provinces (Southern Province, the ninth, received a fully funded team in 1997).

While each donor had its own philosophy of farming systems research, a model for targeting had been developed by a study conducted in 1978 in Central Province, through which CIMMYT had demonstrated the farming systems approach (Collinson, 1979). This model advocated the 'zoning' of farming systems, based largely on distinguishing features relating to crop production. Subsequently somewhat different approaches to targeting were used in zoning studies done in the various provinces (Table 3.1). Moreover, within provincial ARPTs the approach to targeting evolved over time. The account below from Central Province illustrates how, during the research process, better endowed farmers were included in a research programme initially targeted on resource-poor households.

Targeting on-farm research in Central Province ARPT

In 1978 the province was zoned into eight recommendation domains, as part of CIMMYT's demonstration of the farming systems approach (Collinson, 1979). This exercise was conducted by interviewing frontline staff from all the agricultural blocks in the province, and mapping out their descriptions of the main features differentiating the farming systems in their local areas. The number of farmers in each domain was calculated, and this calculation served as the basis for deciding where to start on-farm research: Traditional Recommendation Domain 2 (TRD2).

TRD2 had the largest number of 'traditional' farmers in Central Province. In 1981 an informal diagnostic survey was conducted in TRD2. However, the sample frame for this survey was not rigorous, and as a result data were also collected from emergent farmers (farmers with more commercial ambition and with access to credit and improved inputs), who comprised a separate recommendation domain. Based on this survey, research trials were initiated with farmers. Selection of farmers for the on-farm trials in TRD2 was left largely to the local extension staff, and many of the farmers selected were not 'traditional', but progressive emergent farmers, who in the zoning had been classified as another recommendation domain. In this sense the trials had moved off-target. Nevertheless, the emergent farmers proved to be easier to work with and appreciated the technologies being tested.

In 1982–83 research was expanded into two more traditional recommendation domains (TRD3 and TRD4). Again, the sampling for informal surveys and on-farm trials was not sufficiently rigorous to exclude emergent farmers who, after a few seasons, tended to be the majority involved in on-farm experimentation. In 1985, after further examination of population census data and sensitization to gender issues, it was found that up to one-third of households in the province were female headed, with a particularly large proportion in TRD2. A survey conducted at this time indicated that female-headed households were sufficiently different from male-headed households in their farming practices to be regarded as a separate recommendation domain (Hudgens, 1988). In 1990, the approach to targeting on-farm research was modified through the introduction of rapid rural appraisal (RRA). Using RRAs, with mapping and wealth ranking by participating farmers, provided an approach

Table 3.1 Approaches to 'zoning' farming systems in different provincial farming systems teams in Zambia

Provincial team (year)	Criteria emphasized	Main methods used
Central* (1979)	Farmer practices, household resources	Province-wide frontline extension
	Market influence	Key informant interviews
Lusaka (1983)		
Luapula* (1983)		
Copperbelt (1987)		
Eastern* (1982)	Land-use systems	Land-use classification
	Farm power sources	Diagnostic survey refinement
Northern (1986)	Agroecological zones	Secondary data
		District-level key informant interviews
North-western (1987)	Farmer practices	Frontline extension
	Land-use systems	Key informant interviews
Southern (1984)	Land-use systems	Secondary data
	Climate	Baseline farmer monitoring
	Service infrastructure	Province-wide frontline extension
Western*† (1987)	Farmer practices	Key informant interviews
	Ethnic and microecological factors	
	Market influences	

*These provinces added an explicit gender dimension to targeting activities through focused socio-economic studies from 1983 onwards.

†A separate study was undertaken to characterize livestock production systems.

that moved away from a household-based stratification of farmers to one based on different types of production clusters and, within each cluster type, different levels of producer (Drinkwater, 1992). The RRAs showed up considerable changes in farming systems, as they were studied 7 and 10 years previously, and provided an effective means for updating the earlier zoning study and a recharacterization of farming systems.

From the end of 1991 to 1993, 10 RRA exercises were carried out in Central and Copperbelt Provinces. The exercises involved interactive and joint analyses of farming systems and household food security, and were carried out by farmers and researchers. Nearly all the participatory rural appraisal (PRA) exercises were carried out in the areas with farmer research groups (see Case 8.4), and they helped to establish a mutual understanding between the involved researchers, extensionists and farmers of the area's farming system issues. This understanding undoubtedly contributed greatly to the building of productive, collaborative relationships during the on-farm research process (see Case 15.8). The findings from the RRAs listed below were particularly pertinent to characterization and targeting.

- Use of a relatively sophisticated, although uncomplicated, form of social analysis, which shows both intra- and inter-household relationships, which was termed cluster analysis and resulted in a categorization of clusters of households. A cluster was defined as a group of households between which there are multiple resource exchanges, and the analyses were able to show the inter-relationships between different households and individuals in each cluster type, as well as their comparative status when contrasted with households and individuals in other cluster categories (the approach is outlined by Drinkwater, 1994).
- Quite distinct farming systems, built on totally different principles of social organization, could coexist in the same geographical area. This phenomenon occurred where immigrant Shona and Tonga farmers had moved into areas occupied by Bemba-speaking groups. Both the Shona and Tonga have patrilineal forms of organization (in Southern Province the Tonga are matrilineal but patrilocal, and as they migrate, and it is men who move and establish farms and settlements and own the key production assets, they become effectively patrilineal), whilst the Bemba peoples are matrilineal.
- Off-farm income sources are often crucial to household food security, especially (but not only) during the hunger season, and thus household farming systems really need to be considered more broadly as household livelihood systems.

Sources: Sutherland (1996a); Drinkwater (1997).

The ARPT case illustrates two challenges in targeting farmer categories: coping with the dynamism and variability of farming practices (Maxwell, 1986); and reaching consensus on the methodology and criteria to be used for targeting (Sutherland, 1996a).

Secondary data sources should be consulted, and full use made of existing information so that duplication is avoided. Maps may already exist that identify the various agroecological zones, and government agencies usually have data, either in report form or as expert knowledge, on the spatial distribution of crop production and ethnic groups.

Key information required may also have to be collected by the project through short overview surveys, to enable characterization of farming systems in a way that is most relevant to the project's objectives. Initial characterization can be modified as further information is collected during the course of a project (Harrington and Tripp, 1985). Commonly, projects have a predefined farmer target group, defined in relation to the developmental goals of donors and national governments. These goals are agreed at policy and programme level, and often address socio-economic issues such as rural poverty, food security, gender inequality, productivity, incomes and livelihoods. They are 'givens' in a project, and not defined through dialogue as part of the project process. However, within these policy guidelines the project may be required to characterize a general category such as 'resource-poor farmers'. Nevertheless, many projects will have an opportunity to characterize their target group further in relation to poverty and gender issues during diagnostic or baseline activities. A target group may also be defined in relation to an agricultural problem or issue. Within a 3-year project time horizon, detailed farmer characterization studies to address issues of complexity and change over time are costly and time-consuming; indeed, the results of such studies are likely to come out as the project is entering its final year. In the context of national research and extension systems, there is a need to consider the capacity for this type of work, and formulate low-cost, easy-to-use approaches that provide effective rough sketches of current situations and future trends. If time is very pressing, target groups can be developed iteratively during the process of needs assessment, monitoring and on-farm experimentation, as the case of DAREP illustrates (Case 3.2).

CASE 3.2

CASE 3.2 DAREP: CHARACTERIZATION AND TARGETING

A comprehensive study to produce recommendation domains for targeting the project's research activities was not undertaken in the Dryland Research and Extension Project. Two topical overview surveys, one on tools and tillage and one on livestock, were conducted at the start of the project. For the other technical components, characterization and targeting were incorporated into ongoing diagnostic and experimental activities. This approach had several advantages. First, it allowed the technology development activities to commence almost immediately. In a 3-year project, a pre-experimental phase of farming systems characterization could have seriously cut short the window of opportunity for technology development. Second, the conditions for using extension staff as key informants and providers of secondary data were not favourable; there were very few extension staff with long experience, and very few written records were available in local extension offices. The diagnostic activities containing a characterization component, or used later for targeting activities, are summarized in Table 3.2.

The activities in Table 3.2 show that much of the characterization and targeting in DAREP was specific to certain types of technical focus. This was because different areas of technical focus had different requirements.

Table 3.2 DAREP diagnostic activities with aspects of targeting and farming systems characterization

Activity (date)	Topical focus	Main uses
Tools and tillage survey (April 1993)	Tool ownership and tillage practices	Inventory of local technologies Target area selection
Livestock reconnaissance survey (September 1993)	Livestock species and breed distribution: problems and management	Targeting diagnostic activities Selection of experimental sites
Literature review – socio-economic (1994–95)	Socio-economic parameters and enterprise problems	Targeting diagnostic activities Understanding household and area differentiation
Tharaka and Mbeere broad-based diagnostic surveys (November 1993 and May 1994)	Farming systems overview and trends analysis	Understanding farming systems and household differentiation Develop criteria for farmer and site selection
Seasonal on-farm socio-economic monitoring (November 1994 to January 1996)	Farmer practice and problem monitoring	Monitoring representativeness of collaborating farmers and relevance of research topics
Tools and tillage farmer research group discussions	Relevance of technologies to constraints at farm level	Understanding household differentiation in relation to new technology being tested
Tree propagation survey and farmer group discussions	Local propagation practices	Understanding constraints and practices to guide targeting of experimentation

Future applications of the information generated include: analysis of experimental and socio-economic data to enable further extrapolation of results based on soils and agroclimatic data; development of site-specific recommendations for the technologies developed; and guidance for future research planning for the semi-arid areas, and for development policies and project planning for semi-arid areas.

Additional experiences during targeting

Using farmers as key informants during livestock systems characterization helped to complement and balance the views provided by government extension staff, who tended to be biased towards innovative farmers and current policy issues. However, the farmer informants tended to come from the more resource-rich category, and this further biased some of the information they provided.

During the broad-based diagnostic surveys, wealth ranking in locations in which farmers were used to receiving hand-outs, and during a time of food-for-work programmes, resulted in unreliable information provided by the key informants.

When focused farmer research groups for soil and water conservation met to discuss new technologies, the extent to which household resource differences affected ability to use new technology was raised by the researcher. Farmers underplayed the importance of resource differences for technology adoption. They emphasized that being innovative and willing to work hard was more important than resource endowment when considering technology adoption.

Sources: Sutherland et al. *(1997b); Mellis (1997).*

Compared to the DAREP project, the National Agricultural Research Project (NARP II) had a much more extended geographical mandate, and a clearer institution-building mandate within the Kenyan Agricultural Research Institute (KARI). This is reflected both in the pragmatic stance taken over using existing data and characterization frameworks as a basis for getting started with more participatory research on-farm, and also in the longer-term importance accorded to regional research programmes (RRPs) identifying recommendation domains.

CASE 3.3

NARP II: CHARACTERIZATION OF FARMING SYSTEMS/TARGET GROUPS

In the National Agricultural Research Project (Phase II), farming systems were described in two stages: first for the mandate region, by 'experts'; then for particular farming communities, carried out by farmers, extensionists and scientists together.

National and regional level

KARI and the Ministry of Agriculture, Livestock Development and Marketing (MALDM) make extensive use of the agroecological zoning system of Jaetzold and Schmidt (1982) to describe farming systems at national and regional level, based on rainfall, temperature regimes and soil. Recent topical diagnostic surveys (e.g. Crop Protection Survey, 1994; Maize Database Survey, 1995) provided additional data on current smallholder practices and constraints at the level of district and of agroecological zones. During July–September 1995, scientists also collected secondary data on current research findings, recommendations and actual smallholder practices in the mandate regions. These data, and summaries of current extension, NGO and government organization activities in the mandate region, were reviewed in workshops at which regional research priorities were set, and sites selected for RRP activities.

Neither farming systems nor target groups were characterized in the sense of defining more-or-less homogenous groupings for which the same research efforts would apply (i.e. recommendation domains). The lack of detailed information on which to base such delineations, particularly in terms of resource endowment, opportunities and constraints, was highlighted as a major shortcoming and as an important research thrust for the RRPs.

As the project progressed, further attention was paid to the characterization of farm families through a series of studies conducted by KARI researchers and their partner organizations in various districts where the project was operating. These studies were conducted using a questionnaire approach, using key informants, and were administered in different agroecological zones in the districts. The findings further highlighted the importance of understanding wealth differences, and particularly that "technologies need to be developed to alleviate poverty". One of these studies recommends targeting technology design for market-oriented enterprise at "high-resource households", while "the resource poor can be targeted for technologies on food crops" (Mailu *et al.*, 1999). The same study also noted that labour was a factor that needed to be addressed in technology development and targeting.

Sources: Rees et al. *(1997a,b); Mailu* et al. *(1999).*

The Kavango Farming Systems Research and Extension (KFSRE) Project, having a longer-term perspective and more explicit focus on capacity-building, undertook characterization at both district and community levels. Compared to earlier farming systems projects, KFSRE had a stronger emphasis on farmer participation throughout the research process, and was also informed by a livelihoods perspective during characterization. Farmers played a major role in the community-level exercises.

CASE 3.4

KFSRE: CHARACTERIZATION OF FARMING SYSTEMS/TARGET GROUPS

Examples of effective farmer participation

Participatory rural appraisal methods and indigenous characterization of household types assisted the Kavango Farming Systems Research and Extension Project in identifying target groups within the focus communities. Indigenous classification was used to identify the most important factors differentiating livelihood systems. This was carried out in group discussions or with one or two key individuals. In a similar way to PRA wealth-ranking exercises, cards were used representing different households in a community to compare and contrast livelihood systems. Where the preliminary household classification had identified livestock ownership as an important factor, this exercise identified a number of other important variables, such as ethnic group and residence pattern. (In retrospect, the project agronomist noted that farmers' interest and involvement in the process of experimentation proved to be the single most important variable in terms of selecting farmers who would effectively participate in the research process.)

Case-study monitoring of representative households further developed our understanding of the differing needs and interests of distinct household types. Group discussions with farmer researchers, and evaluation and appraisal of research activities, were undertaken to ensure that the farmer research group activities addressed the needs of the whole community, rather than of an elite group only.

Source: Matsaert et al. *(1997).*

Table 3.3 Guidelines in the project document on characterization

Output	Activity
1. Understanding of communal farming systems increased and research priorities and opportunities identified by the KFSRE team activities using FSR/PRA methods.	1.1 Regional zoning of different farming systems and selection of focus areas.
Activities carried out by KFSRE of relevance to this included:	
Regional zoning (district profiles)	Consultation of secondary sources, discussions with local experts, extension, projects etc., transect drives through region
Community-level surveys	PRA methods, involvement of all interested community members
Case-study monitoring	Selected households representing different farming types
Indigenous characterization of household types	Group discussion/discussion with local elders

Compared with the cases above from projects within public-sector organizations, the next two cases from the NGO sector illustrate somewhat contrasting approaches to the issue of characterization. The first case, where the Intermediate Technology Development Group (ITDG) was working in a community that it did not know well, illustrates how substantial time was spent in characterization in the early stages of the project. The second, in which ActionAid embarked on participatory research within communities where its development programmes were already established, illustrates an emerging awareness of the importance of farming systems characterization.

CASE 3.5

ITDG-CHIVI: FARMER PARTICIPATION IN THE CHARACTERIZATION OF FARMING SYSTEMS/TARGET GROUPS

Characterization of the farming systems and target groups took place during the first year of the project's life. This was an evolving process, which became more and more participatory as the months went by. At first, one Intermediate Technology Development Group staff member did the bulk of the work (supported by a social scientist from ITDG's UK office, who made some short visits). The first step was to select two Wards (using criteria similar to those used to select the District). The next was a survey of government and NGO activities, which provided an understanding of the roles of various institutions. This was rapidly followed by a series of meetings at Ward level, organized by District officials, to introduce ITDG to local leaders and community members. This, in turn, was followed by study of institutions active in the Ward, covering traditional, formal and informal institutions, and focusing particularly on those involved in food security-related activities.

Farmers' roles

First, farmers identified and prioritized problems through household interviews facilitated by project staff. The household interviews did cut across all wealth ranks identified by the community during the wealth-ranking exercise, but bias was placed in favour of the lowest wealth ranks. Second, project staff carried out investigations with local communities to determine how local farmers had been trying to address these problems. In the third step, project staff encouraged farmers to assess both weaknesses and strengths of traditional or current practices. The project's approach of explicitly valuing and building on existing skills and knowledge strengthened and encouraged community participation. It also strengthened feelings of ownership, and allowed local control of the technology development process to develop.

Gender needs

In addition, the project has recognized that men and women have different needs and problems, as well as different skills and knowledge. This has meant that, despite the fact that gender-specific work has not been guided by a formal process of gender analysis, the project has had some success in providing solutions to differing problems of men and women. This has come about because the participatory approaches used by the project have themselves assisted in identifying differing needs of different social groups. In the case of gender differences, this resulted in different technology options being developed for men and women because their needs were different, and these needs emerged through the process of problem identification and prioritization.

Source: Croxton and Murwira (1997).

In Uganda, the Farmer Participatory Research Project (FPRP) operated within a similar conceptual framework in terms of attention paid to characterization, but perhaps was constrained by project objectives and NGO policies to work more exclusively with the lowest income group of farmers, who had already been defined through existing community development programmes.

CASE 3.6

FPRP: FARMER PARTICIPATION IN THE CHARACTERIZATION OF FARMING SYSTEMS/TARGET GROUPS

The project document stipulated that the Farmer Participatory Research Project should work with the ActionAid Uganda (AAU) target group, which constituted approximately the poorest third of the population. The project intended to encourage farmers to work in partnership with AAU field workers, as well as natural and social scientists, and in so doing to develop dialogue as a continuing process of exploration and reflection.

In practice, the initial stages of the project focused more attention on developing trials, and not on characterizing the farming system and the mandated target group. A farming systems diagnosis took, as its point of departure, prioritized farmer problems which formed the basis of the trials and which were identified using PRA tools. Farmers' groups, already in existence and identified by AAU field workers, took part in this PRA work, and others assisted in specific work, undertaken early in the project, which explored the historical context of soil fertility decline and the reduction of fishing on nearby Lake Wamala.

On reflection, the project team realized that they had paid insufficient attention to characterizing the farming systems and target group. They did not carry out a thorough or a strategically selective, characterization with suitable coverage in the early stages of the project when such data would have been very useful. In the latter part of the project, farming systems data were collected in an attempt to formalize the accumulated but *ad hoc* understanding. This used some PRA tools, including checklists, and farmers participated in the way normally hoped for with PRA.

Farmer participation in the very early stages of the project was certainly influenced by the team's reliance on AAU field staff for their knowledge and understanding about the local farming system as well as potential participating farmers, and one team member had previously been an AAU agricultural field worker in one of the two AAU Development Areas in which this project was operating. In addition, promises by AAU of secondary data on the local farming systems, which eventually did not materialize, influenced the approach adopted by the project team and ultimately reduced the likely participation of farmers.

Whether or not (and this is a critical debate) a systematic farming systems survey or a relatively rapid problem-oriented appraisal is deemed the appropriate starting point for a project, it is important for practitioners to appreciate the need to generate enough appropriate data to inform the ongoing project process. Relevant, available secondary sources should be used; but farmers are likely to be perfectly able and willing to participate in such data collection exercises if approached sensitively. The participation of farmers can be significantly affected by the presence and influence of a partner NGO. This can work both ways, as it did in this case. AAU provided invaluable support and speeded up the process of the team gaining access to a reasonably appropriate target group, but at the expense of the team generating an understanding of the farming system (and the documentary evidence of this) and of early, more rounded participation of farmers.

Source: Salmon and Martin (1997).

3.3 LESSONS

Continued concern from donors and governments about the impact of research on poverty and the uptake potential of research results means targeting is likely to remain an important issue in agricultural research project implementation. Some lessons emerging from the cases described are set out below, along with helping and hindering factors, and tips for doing a better job of characterization.

It takes time to do a good job

Setting up an iterative process, through which target groups are redefined and recharacterized as new information comes to light, is a comparatively long-term task. It will probably require support from longer-term projects (perhaps of 5 or more years), and may be best implemented through national research and extension programmes.

Key elements in characterization

Important elements in a more cost-effective approach to characterization are selective use of secondary data; undertaking contextual data gathering and analysis as a part of more focused research activities; and fostering a general awareness within the team of the importance of trying to better understand the wider socio-economic and biophysical context within which their research is situated. Working in a broader context is vital.

No single way

The cases above illustrate that while in theory characterization should precede other research activities in order to improve their focus, in practice it is often undertaken in conjunction with other research activities. There is no single way to undertake characterization. Different situations may require different approaches.

Characterization is not a baseline survey

Many projects are good at collecting data, but very poor at analysing it. An important pitfall for new projects to avoid is that of misunderstanding characterization as a type of baseline survey, against which to assess project impact. Such surveys are notorious in taking an unjustified share of project resources, collecting large amounts of data of dubious worth, and rarely producing information in a timely way. An approach to characterization that avoids these pitfalls is needed.

Depending on one source of information is risky

For example, over-reliance on field staff to provide definitive knowledge of the local farming system can lead to disappointments later on, as can over-dependence on dated or large-scale studies of land use and agroecological zonation.

An opportunity to build relations

Characterization in the form of zoning a district or larger administrative area is a very useful start-up exercise for a new project. It not only enables the team to become familiar with the physical, social and institutional environment, but also builds relations between them, and provides an opportunity to form links with key stakeholders in the project. Good relationships with all partners will enhance the effectiveness of farmer characterization.

3.4 HELPING AND HINDERING FACTORS AND TIPS

A range of helping and hindering factors are set out in Boxes 3.1 and 3.2, while Box 3.3 details some tips for more effective characterization and targeting within projects undertaking participatory agricultural research.

Box 3.1 Factors helping effective participation in characterization and targeting

- Good dialogue with farmers and clear understanding by the target group of the purpose and benefits of farmer categorization.
- Working with communities that have limited exposure to relief- and hand-out-oriented development programmes, and are small, relatively homogenous, well organized and without strong factional disputes.
- Good relations between the project team and staff of collaborating agencies and community leaders and members in the target areas.

Box 3.2 Factors hindering effective participation in characterization and targeting

- Communities with an egalitarian culture emerging in group discussions, so that important resource differences are glossed over by farmers (although an egalitarian culture may have positive aspects, including mobility from one wealth category group to another, and obligations on those with more to share with those having less).
- Projects operating under acute time pressure, where everything is done in a hurry.
- Working with communities with long experience of manipulating information given to outsiders, particularly communities experienced with programmes that provide free hand-outs.
- False expectations caused by past experiences.
- Communities lacking a clear understanding of project aims.
- Large and poorly organized communities where there is a lack of co-operation between households.
- A small and inexperienced project team, not fully appreciating the importance of ensuring the collection of contextual data to assist decision-making.
- Limited interest from technical researchers in the benefits of farmer categorization during on-farm experimentation.
- Knowledge that surveys have been carried out by other agencies, but not analysed and disseminated in a timely manner, presenting a dilemma – should the team replicate past research work or wait indefinitely for findings to be published?
- Poor co-ordination between projects and change agents working in the same area.
- Working with communities where the concept of distinct, objectively defined, wealth-based categories are problematic, for example, communities that are largely homogenous, or that are so diverse that each farmer and household is unique.

Box 3.3 Tips on characterization

- ✔ Establish working relations with project partners quickly and involve relevant stakeholders, including farmers, at the beginning of the targeting process, reaching a clear agreement on criteria and objectives for defining targets.
- ✔ If project objectives allow, starting from a specific problem or opportunity agreed with farmers to be a priority will reduce costs and increase the relevance of any targeting activities conducted.
- ✔ In projects with a broad technical mandate, a quick, low-cost characterization based on local grassroots knowledge can be undertaken at the start of the project. Farmer categories can be refined as new information and issues arise during the research process. Basal understanding of the social system is vital to subsequent activities.
- ✔ Spend time on initial literature review before rushing to collect data in the field.
- ✔ Avoid expensive baseline surveys and lengthy questionnaires. 'Quick and dirty' overview surveys give meaningful information.
- ✔ If promised secondary data are not forthcoming, use local expert knowledge and key informants such as extension staff, and make field trips with them to verify what they say.
- ✔ Use existing information (maps, literature, opinion of grassroots workers), with awareness of its inherent limitations and biases.
- ✔ Devote adequate time and resources to clearly explain the reasons for characterization to farmers, extension workers and researchers.
- ✔ Co-ordinate efforts with other projects to reduce duplication.
- ✔ Try an indigenous classification exercise to identify potential target groups.
- ✔ Try PRA methods such as wealth ranking, resource mapping, and separate group discussions with social or wealth categories.
- ✔ If culturally acceptable, stay overnight in the village and (if resources allow) undertake short spells of participant observation and community studies as an alternative to PRA.
- ✔ If undertaking case-study monitoring, use this as part of ongoing characterization in order to refine understanding of targeting criteria and processes underlying differences between farmers.
- ✔ Diagnostic trials provide an opportunity for developing dialogue with farmers and obtaining a deeper understanding of farmers' circumstances.
- ✔ Use an iterative approach and adopt a dynamic perspective to foster a continuous understanding of the nature of farming systems in the area, and the redefinition of target groups and zones.
- ✔ Through effective dialogue, work towards achieving a clear understanding by the target group of the purpose and benefits of farmer categorization.
- ✔ All team members should be involved in the exercise.
- ✔ Avoid trying to develop models – teams become caught up in the methodological process and debates about typology, losing sight of their main participatory and technical objectives.
- ✔ Be imaginative – there are a range of different approaches.

Selecting research sites and farmers – experiences and strategies

4

The previous chapter discussed how characterization of farming systems enables projects to be more effective in targeting their research activities. Targeting also involves selection decisions. Selection decisions enable research activities to target specific farming systems (or agroecological zones), locations and socio-economic categories. In the context of a participatory approach, the term 'selection' does not imply that a project team makes all the selections on its own, but acknowledges its role in initiating and facilitating the selection process. Selection involves selecting sites (operational areas) for particular research activities, and selecting communities and individual farmers as participants in the research process.

This chapter examines the following aspects:

- selection of farming systems/agroecological zones
- site selection issues and experiences
- farmer selection issues and experiences.

4.1 SELECTING FARMING SYSTEMS

As with characterization, the strategy for selecting sites and farmers will be influenced by project objectives. Longer-term projects in which capacity-building in public-sector organizations has greater emphasis, such as the Adaptive Research Planning Teams (ARPTs), the Kavango Farming Systems Research and Extension (KFSRE) Project, and the National Agricultural Research Project, Phase II (NARP II), pay more attention to selecting appropriate research sites and communities. For example, ARPT target areas within recommendation domains were selected as focal points for diagnostic surveys and on-farm experimentation. In purposely selecting the locations and farming systems for participatory agricultural research, a good understanding of the biophysical and socio-economic factors delineated during characterization exercises is central. The selection criteria used in the ARPT in most cases included: representativeness (of the wider farming system, as defined through farming systems characterization); geographical accessibility; availability of suitable frontline extension staff; and the readiness of a particular local community to collaborate. In NARP II, similar criteria were used but with more emphasis on agroecological criteria and the severity of priority research constraints (Table 4.1) than on socio-economic factors. In the other case-study projects the operational areas selected were predefined in the project documents; selection of farming systems of zones was not part of the project process.

4.2 SITE SELECTION ISSUES

To what extent is site selection participatory?

The idea of a participatory research project 'selecting' sites and farmers may appear to be against the ethos of participation. However, in the absence of strong farmer organizations, or a system akin to the Local Agricultural Research Committee programme in Latin America which has an organized system for representing community interests (Ashby *et al.*, 2000), the task of setting up a representative process to select research sites would be beyond the mandate of many research projects. The selection of sites (geographical locations and communities) is a decision usually undertaken by project staff in consultation with other stakeholders, including the members of any project steering committee that has been set up. Existing structures for making such decisions may be in place at the start of the project. These structures may be top-down, and one task of the project team may be to foster greater participation in this decision.

Table 4.1 Crop enterprises at Oyuer, south-west Kenya, ranked by smallholder farmers

	Rank (1 = high) in terms of:				
Crop	**Food**	**Cash**	**Security food**	**Labour required**	**Severity of production problems**
Sorghum	1	5	1	3	2
Maize	2	3	3	3	2
Groundnut	3	2	4	2	4
Bean/cowpea	4	4	2	4	5
Cotton	–	1	–	1	1

A limitation on numbers

It is worth stating the obvious, that although a large target group may be expected to benefit from a particular research programme or project, it is not possible for a project to conduct participatory research with very large numbers of farmers. Researchers are few and specialized, while rural farming populations are large and involved in a wide range of enterprises. Conventional agricultural experimentation methods usually require a small number of on-farm sites (perhaps 5 to 30), while farmers with a potential interest in participating in agricultural research may number several thousand.

Efficient use of resources

One of the 'efficiency' arguments for more formal on-farm research with participation of resource-poor farmers is that it enables technology to be developed and tested under more realistic and representative conditions than experimental station-based research (Gilbert *et al.*, 1980; Simmonds, 1986; Biggs, 1989). From this perspective, selection of representative farmers and sites for experimentation becomes crucial (Tripp, 1982; Sutherland, 1994a); if on-farm research results cannot be easily extrapolated they are, arguably, an expensive luxury.

Practical, personal and political considerations

Practical, personal and political considerations limit the choice of specific research locations – villages, communities, or perhaps a network of local specialists. On the practical side, the further away selected locations are from the researchers' base/s and the greater the distance between the participating farmers, the greater the costs in time and fuel, and the less contact there is likely to be between participants and researchers. Trade-offs may be needed between the extent to which locations are representative on the one hand, and the time and resource costs involved to work with them on the other. Well informed, transparent choices are always preferable to the selection of non-representative situations that are adjacent to research stations, major roads, previous projects or a researcher's home area. Where researchers or collaborating organizations have already been working with certain villages for some time, and have developed a good rapport with community members, this may be a strong reason for selecting such villages in preference to others – provided they are reasonably representative of villages in the area concerned. This can save time and resources, as a good rapport with participants already exists. The project can build on existing goodwill and can more easily access valuable secondary data about livelihood systems, social and economic composition, and problems and priorities. Other criteria may also be used which are more personal or political in nature. For example, national researchers on low salaries have an incentive to work in areas far from the research station in order to qualify for meal and overnight allowances. Members of project steering committees may make suggestions based on local political considerations, so that research project activities are seen as a means of convincing local communities that the government is concerned for their welfare.

4.3 EXPERIENCES WITH SITE SELECTION

In national agricultural research systems, farm site selection is often strongly influenced by the concept of agroecological zones, as was the case in Kenya with the NARP II project (Case 4.1).

CASE 4.1

NARP II: SELECTING SITES WITHIN MANDATE REGIONS

The sites for the National Agricultural Research Project, Phase II were selected on criteria relating to representation of agroecological zones within the mandate region; severity of high-priority constraints; existence of established links with NGOs, government organizations and extension; and proximity to the research centre. Nine such sites were selected within the Kitale mandate region, and eight within the Kisii mandate region.

Detailed characterization of the sites was carried out with the local communities using a variety of participatory techniques: local histories, village mapping, transect walks, seasonal calendars, absolute and matrix ranking of enterprises and problems, and pairwise ranking of desirable features of specific commodities and factors. Most of these activities were repeated with separate groups within the community – mainly separated by gender in the case of the Kitale work, and also by resource endowment in the case of Kisii. Table 4.1 shows enterprise ranking descriptions for one location. Such information was helpful in terms of characterizing the nature of problems facing farmers in the selected sites which, in turn, helped researchers to select experimental sites that offered the most promise for the type of technology they were experimenting with.

Sources: Rees et al. *(1997a); Rees* et al. *(1998).*

In addition to agroecological zones, site selection may also be influenced by administrative boundaries. This is particularly true when the involvement of government extension is emphasized in the project. Thus in the KFSRE project, emphasis was placed on selecting communities which represented the main districts, and which represented both riverside and inland communities, also taking into account ethnic factors.

CASE 4.2

KFSRE: SELECTING COMMUNITIES AND FARMER COLLABORATOR GROUPS

In the Kavango Farming Systems Research and Extension Project, community selection was based on the findings of the initial systems characterization. A major biophysical and socio-economic difference identified in the Kavango region was between riverside and inland communities. It was, therefore, decided to select one community in each of these zones for further in-depth study and adaptive research work. An initial community survey using participatory rural appraisal (PRA) tools was followed by the formation of farmer research groups in each community.

Groups with effective farmer participation

Farmer research groups were active in four communities. Within the inland community, farmer researchers were selected by community members (self-selection). The project provided guidelines for selecting representative groups (based on information on household types gathered in the start-up PRA). Groups representing different household types, as well as having an age and gender balance, were selected. Participation of all group members was good. Representativeness and good levels of participation were probably a result of the start-up PRA activity and a high level of awareness of the project's aims. A workshop was organized to share ideas on causes of poverty and development aspirations, and to improve relations and understanding between farmers and extension staff (training for transformation). This helped to improve the confidence and participation of farmer research group members.

Ongoing monitoring of farmer participation was carried out by project staff, and was reviewed by the team and farmer groups at the end of the season. This resulted in adaptations being made to the membership structure of the group.

Disappointing farmer participation

The project received a negative reception in some communities due to the top-down, paternalistic approach of past development projects in this area. Some communities were not interested in participating in project activities once they realized that no free hand-outs were involved.

The first riverside community selected had to be abandoned for on-farm research purposes. This was due to the inability of the community to meet together and select farmers to represent them in the on-farm research activity. All attempts at community meetings resulted in attendance by only relations of the headman and rich, older men. Further probing revealed that this problem had several causes, including high expectations of hand-outs from the project and an attempt by an elite to highjack these; lack of communication between community members; previous disappointments with projects which did not deliver; and lack of confidence of the community in the local leader.

In the second riverside community, farmer researchers self-selected. There was some lack of understanding of the project aims (due to late entry of the project to this village). The selection process resulted in over-representation of younger households and of 'non-cultivating/non-serious' farmers. Self-selection without community consensus resulted in the formation of a group that was not prepared to share the results of its work with other community members. In response to these problems, further analysis of social relations was carried out by looking into kinship.

Kinship study and marginalized non-cultivators

The kinship study noted the breakdown of family structures in the riverine communities. This was caused in part by in-migration of Angolans displaced by civil war. Whilst some of these in-migrants were of the same ethnic origins and had family in Namibia, many did not. The riverine community has become much more fragmented, with different family groups. Following the migration, the availability of land was reduced and competition for resources increased. Payment for any good or service became a necessity, and as a consequence self-help groups are poorly attended. By comparison, the inland communities were still cohesive households and family groups, with their self-help tradition maintained and adhered to. The use of labour or the purchase of other goods and services did not require cash payments.

This has implications for extension agents. In inland communities where the traditional authorities and co-operative institutions had been sustained, these could be mobilized to motivate the community. In the riverine communities new approaches were required, for example, church groups, NGO groups and groups formed by government organizations. Non-cultivators (e.g. San bushmen) are not represented in farmer research groups: there is now more awareness of the need for positive discrimination on behalf of this group. Formation of a separate research group may be necessary if prejudice is too great, or the interests of San and Bantu-speaking farmers differ too greatly.

Sources: Matsaert et al. *(1997); B. Adolph, personal communication (2000).*

4.4 FARMER SELECTION PRINCIPLES

Why think about farmer selection?

There are good reasons why participatory research projects need to think carefully about farmer selection. Random sample selection from a large population of farmers is usually inappropriate, for several reasons: it results in the selection of inaccessible farmers; complete household listings from which to sample are rarely readily available; unsuitable or uninterested farmers may be selected. Participatory research projects can rely on voluntary selection. However, as noted in the KFSRE project (Case 4.2), putting farmer selection solely in the hands of community representatives can result in local elites or interest groups monopolizing the process and excluding weaker members of the community. 'Voluntary selection' during meetings usually includes three possibilities: individuals volunteering on their own behalf; the wider community approving individuals who have volunteered; and individuals being nominated by the community. Before asking for volunteers, researchers usually explain the purpose of the research and specify criteria for the ideal type, or types, of farmer participant for a particular experiment. To overcome a bias towards male, wealthy farmers, the ARPTs in Zambia, the Dryland Research and Extension Project (DAREP) in Kenya, and KFSRE's case-study monitoring specified the inclusion of particular categories such as women, female-headed households and households without oxen (Matsaert *et al.* 1997; Skinner and Mwaniki, 1994; Sutherland, 1994b).

A purposive approach

A purposive rather than completely random approach to selection is likely to be the most feasible, except during particular types of survey, such as sampling for pest damage (Case 4.3). Purposive selection requires a prior understanding of the socio-economic composition of the village or community, and interhousehold relations, so that farmers' views and reactions can be seen and understood in context (Sikana and Kerven, 1994). The project should seek to improve its understanding of the local social structure as it progresses. Participants are rarely self-selected in consultative and collaborative modes of research.

Benefits of proximity

While willingness to participate is a common criterion, participants are normally selected from within the villages or communities that have been chosen because first, it is logistically easier for the project staff to engage with participants who are located close together; and second, participatory research seeks to encourage farmers to work together so that they can share their knowledge and experiences and learn from each other (Sutherland, 1994b; Sutherland *et al.*, 1997b).

Research objectives are an important context

Who participates, and the options used to foster involvement, will depend largely on the research objectives – in terms of particular topics or issues, or specific target groups – and on whether researchers consider it important to be able to generalize from the sample selected to a larger population. If the research is focused on one or more existing commodities or enterprises, the participants may have to be people who grow the crop or keep the livestock concerned. If the research is testing a new commodity, the project staff may decide it is necessary to select willing risk-bearing participants with more resources (e.g. land, labour, equipment) and/or previous positive experience in technology innovation. A particular topic is likely to be relevant to a particular type of farmer. If extrapolation is to take place, this must be based on criteria relating to the type of farmer (resource level) likely to find the technology useful. Community-based farmer participatory research projects often aim to work with all members of the selected communities, or to give priority to resource-poor farmers and/or women; it is unusual for them to target better-off members of the community, except perhaps where an intervention involves a high degree of innovation or risk.

Biases in selection

In practice, farmer selection has usually resulted in a bias towards better-off, influential farmers (Martin and Sherington, 1997 citing Ewell, 1988; Case 4.3). This is partly because of the procedures adopted for participant selection. Options for engaging participants include: (i) volunteering (as individuals or community representatives); (ii) delegation of selection to the community; (iii) probability sampling; and (iv) guided purposive selection. Some researchers have tended to take a somewhat *ad hoc* approach, and/or to favour option (i) or (ii) on the basis that they are more participatory than (iii) and (iv) (Sutherland *et al.*, 1998).

Approaches (i) and (ii) tend to bias the selection, skewing participation away from the poorest, for two reasons. First, within communities power is distributed unevenly, and often volunteer or community-nominated participants are male and more resource-rich. Second, for many of the poorest a prolonged involvement in research activities is not attractive, as they are preoccupied with more pressing livelihood issues.

4.5 EXPERIENCES WITH FARMER SELECTION

The case studies below illustrate a variety of approaches to selecting farmers for various activities. The Larger Grain Borer (LGB) Control Project clearly shows how aiming for 'representativeness' in selection does not flow from applying a simply formula, but is influenced significantly by the objectives of the participation activity in hand.

CASE 4.3

LGB: ADDRESSING REPRESENTATIVENESS IN THE SELECTION OF COLLABORATORS

Guidelines in the project document

The socio-economic terms of reference for the Larger Grain Borer Control Project included: "differentiate maize and cassava production, storage and processing methods and identify strategies appropriate to the varying needs, constraints and resources of both female and male farmers". However, this referred to intended beneficiaries rather than specifically to collaborators in participatory technology development.

Volunteers compared with project-selected farmers

Different project activities involved different degrees of volunteering versus selection, as shown in Table 4.2. Roughly random selection of farmers by means of village transect walks (Compton *et al.*, 1995b; Magrath *et*

Table 4.2 Selection of farmers and traders for different project activities

Project activity	Volunteer individuals	Volunteer groups formed on the spot	Existing farmer or trader groups	'Random' (village transect)
Study of LGB impact	✔			✔
Farmer meetings to discuss ideas for testing		✔		
On-farm trials	✔			
Biocontrol impact monitoring				✔
Farmer stacking of research-station trials	✔			
Farmer evaluation of station trials		✔		
Trader valuation of station trials	✔			
Trader panels for valuing damaged maize (Compton *et al.*, 1997a)		✔	✔	
Evaluation of extension materials (decision trees)	✔	✔	✔	

al., 1997b) was used in two studies. Each household on the transect was approached individually and asked – but not pressured – to participate in the study. Very few refusals were encountered: for example, only two of over 100 farmers approached in the first study refused, and both of these were in a village which had a bad previous experience of an NGO-sponsored collective maize storage project.

In the study of LGB impact, the use of village transects as well as volunteers enabled us to gauge the representativeness of volunteers. Despite a conscious effort to search for representative farmers as volunteers (in particular for poor and female farmers), those on the final list of volunteers still tended to be richer than the average farmer, were more likely to be male, and were more likely to use purchased inputs such as insecticides. For example, in one village 90% of a volunteer sample were men, while about one quarter of 'transect' maize stores belonged to women. Similarly, the average store size of volunteer farmers in another village was about 1.5 tonnes of maize, while the average transect store contained about half that amount.

Source: Compton and Motte (1997).

The Cashew Research Project (CRP), although having a similarly narrow technical focus to the LGB project, provides a contrasting perspective, presenting the argument that achieving a truly representative selection of farmers may not be congruent with the principle of voluntary participation.

CASE 4.4

CRP: A DIFFERENT PERSPECTIVE ON FARMER SELECTION

Characterizing farming systems (Lamboll, 1993), defining target groups, and selecting representative farmers to form groups are three neat, logical steps project staff are encouraged to implement when aiming to do participatory research. However, the first step is a learning process for outsiders; the second is a labelling exercise done by outsiders; and the third is a contradiction in terms.

Farmer research groups are voluntary institutions. Farmers who join do so at their own cost, of time and effort put into the group. Their payment may be in social standing, knowledge acquired through being a member, enjoyment or hand-outs. Whatever the return, it is they who decide whether the commitment of being a member is worthwhile and, therefore, commitment is based on how they perceive the research group.

Selecting a representative sample of volunteers for farmer participatory research cannot be an active role of the outside institution. It is not the same as asking a representative sample of the population to answer a questionnaire. Farmer participatory research is a continuous, long-term activity. Who decides to become a voluntary member of an institution initiated by outsiders depends on expectations people have of the proposed institution. The role outsiders have in attracting a cross-section of a community to participatory research can only be worked on through the way those outsiders present themselves.[1]

When Cashew Research Project researchers from Naliendele Agricultural Research Institute went to villages in the Southern Zone of Tanzania to initiate farmer research groups, farmers were found to have one overriding perception of agricultural researchers: as conduits through which external resources would be channelled to rural communities. When researchers assured farmers that this was not the case, farmers just saw this as a strategy to reduce participants to more manageable numbers.

The conundrum in the Integrated Cashew Management (ICM) Programme that developed from the CRP was that researchers, trying to make a fresh start, had already been labelled as a source of hand-outs. There was, ironically, an option to buy a representative group of people by insisting that the group that would receive access to the supposed hand-outs had to be representative of the community. Instead, researchers opted to hand over the selection process to farmers in as public a way as possible.

Researchers were looking to work with groups of around 50 farmers in each village. In most villages farmers chose to select themselves through a system of public lottery. Anyone present who wanted to join had an equal chance to do so. The exception was Ligoma, a village in Tunduru, where farmers agreed to let leaders choose a 'representative' selection of people. Notably, the Ligoma group disintegrated after only 1 year.

The groups that formed at the beginning of the ICM Programme were predominantly made up of men. Although the public lottery method was very biased towards men, a study looking at the composition of the farmer groups showed that they were reasonably representative of village demographic factors, other than gender.

> "This state of affairs is cause for both celebration and dismay. On the one hand, the ICM project can pat itself on the back for having included, albeit unwittingly, many of those who most require support. On the other hand, the possibility that membership to ICM [groups] is only sustained by prospects of direct resource exchange in the form of inputs for scientific data, calls for strategic change in the manner in which scientists present themselves to their clientele."
>
> *Sikana (1995)*

Women are under-represented in the ICM groups because public meetings, cashew trees, fungicides and mechanized blowers are, in the eyes of the majority of women, controlled by men. Researchers present themselves in public meetings, talk about cashew, and are known to be the key to fungicides and mechanized blowers – small wonder that women do not subscribe.

The conclusion may be that a truly representative group is impossible. Some compromise has to be reached, the end result being a sample with differing degrees of bias – but researchers can employ stratagems to minimize this bias. The selection of a sample has to be balanced against cost, available resources and time, and if the goal of a representative sample is unattainable, researchers will have to settle for something less.

Reaching a cross-section of the community

Some do's and don'ts follow, with the benefit of hindsight.

- Initial approach: consider carefully how to present the outside intervention. The image of the intervention in the eyes of the villages largely determines who will show interest. Previous contact with research and extension will have defined what farmers consider agricultural research and science to be.
- Different forms of contact: the ICM Programme presented itself in only one way. The people who formed around this nucleus were not a representative cross-section of the community. It would have been possible to present the programme in different forms, so creating a number of different nuclei, each drawing people from different parts of the community. Community development could have worked solely with women's groups. Radio listening groups with basic recording equipment could have made their own programmes about cashew growing.
- Freebies and hand-outs: avoid a scrabble for membership based on the prospect of hand-outs. Do not have any association with any tangible goods. The only inputs should be people and knowledge.
- Customary or created: customary institutions exist in the minds of local people as an association of known interactions and activities. It is possibly the 'otherness' of an outside intervention that makes it difficult for meddling outsiders to graft their activities onto an institution. If local people begin incorporating outside practices into their customary institutions, it is because they feel that they have taken ownership of the activities and no longer consider them alien to their way of life.
- How many people: it is unnecessary to set a definite limit to the number of people who want to be involved.[2] Not setting limits raises fewer expectations that the intervention is going to yield hand-outs.
- Group 'engineering': outsiders altering the composition of groups are only fooling themselves. The members of a group belong because they identify with the group, not because they are told to identify with it. Outsiders might be able to introduce tools such as wealth ranking to the group members as a way of persuading the group to analyse itself. However, in the CRP the attempt by village-based technicians to casually introduce ranking into discussions did not prompt any changes in the ICM group membership.

Source: De Waal (1997).

Two of the NGO-based projects, Intermediate Technology Development Group (ITDG)-Chivi Food Security Project and the Farmer Participatory Research Project (FPRP), placed comparatively strong emphasis on working through existing local institutions and existing groups. They considered the issue of representativeness within this overall framework.

CASE 4.5

ITDG-CHIVI: SELECTION OF FARMER INSTITUTIONS FOR DIAGNOSIS AND EXPERIMENTATION

After the characterization of local institutions, institutions were selected that the Intermediate Technology Development Group felt it could work with. Two broad institutions were selected as representing (or having the potential to represent) a large cross-section of the community. One was farmers' clubs, which focused on food production and were linked to the national level through the Zimbabwe Farmers' Union (ZFU). The other was garden groups, which had a high proportion of women in both membership and leadership. Gardening was a significant, but undervalued (by, for example, AGRITEX) activity for food production/security.

As part of this process, wealth-ranking exercises were undertaken in the villages that constitute the Ward. These were followed by a needs assessment and household study, using the wealth-ranking data to select sample households. The results were fed back to the community, including (and encouraging discussion on) the selection of farmers' clubs and garden groups.

These early stages could hardly be described as participatory, although they were consultative. They were controlled very much by ITDG. The various formal and informal meetings that took place during this period began the process of fostering greater community participation. While relationships had not yet been developed that would permit real participation, these meetings helped introduce people to the way ITDG was trying to work, and formed the foundation for greater participation later on.

Source: Croxton and Murwira (1997).

CASE 4.6

FPRP: A MULTI-FACETED APPROACH TO SELECTING FARMER COLLABORATORS

The Farmer Participatory Research Project document indicated that on-farm trials were to be managed by men and women farmers whose resource endowments and socio-economic circumstances should be representative of the range of conditions expressed by the resource-poor in the project area (Martin, 1990). It was recognized that a larger, and possibly more representative number of farmers would participate in discussions about the research, compared to those farmers who actually participated in managing trials. Participants were expected to be volunteers. Women were to be encouraged to play an active role in all phases of the research process, and to constitute separate research groups where necessary. Finally, depending on the purpose of the trials, field staff were to help match 'collaborators' to specific trials.

The selection of farmers, within the general criteria set out here, was influenced by initial reliance on ActionAid Uganda (AAU) field workers and their links with existing farmers groups. This had implications for the representativeness of participants. The project started working with farmers groups and women's groups, intending to expand to include participation of other farmers in the communities. The decision to work with farmer groups meant farmers initially were self-selected.

In order to explore how the membership of farmers groups related to the wider community, the first community, (Butawata), was wealth ranked. It became apparent that the majority of the farmers who were participating in the project fell into the middle to higher wealth categories. To involve a more representative range of farmers, the project began to emphasize the participation of individuals who were interested in tackling particular prioritized problems, and who were within the target-group of the poorest farmers.

Selection was through a combination of methods; field workers identified farmers fitting these criteria, while individual farmers expressed their interest, or otherwise, in participating. Local community leaders were very helpful in assisting the project to organize village meetings, and generally in supporting the project. However, farmers did not have an active role in selecting their peers and the strategy relied heavily on AAU field workers' knowledge. Had the project team not drawn on the knowledge of the field workers it would have been criticized for ignoring a valuable resource, as well as for not endeavouring to integrate itself into the Agricultural Support Programmes. Nevertheless, in the light of subsequent experience, a more carefully worked-out strategy to explore the potential for greater farmer participation in the selection of participants, would have been beneficial.

Source: Martin and Salmon (1996); Salmon and Martin (1997).

An issue arising from selecting pre-set target groups is the difficulty in sustaining participation from the intended target group. When targeting the poorest, as distinct from the poorer, it is often difficult to gain their active and sustained participation, as the ActionAid FPRP case above shows. Targeting resource-poor farmers through specific issues such as pest and disease problems may raise difficulties if, during the process, researchers discover that other issues (such as soil fertility) are of greater concern to the poor they are working with (Orr, 1997).

The NARP II and DAREP projects, located within government research institutes, relied to a great extent on either forms of selection that were largely voluntary, or the use of existing networks for participation in the research trials. Nevertheless, some guidelines were provided to those involved in facilitating the selection process. In the case of NARP II, these were formulated by the project advisor in consultation with the regional research programme co-ordinators.

CASE 4.7

NARP II: GUIDELINES FOR FARMER SELECTION

The National Agricultural Research Project guidelines suggested that within each site, farmer collaborators should be appointed by the communities themselves on the basis of willingness to participate, knowledge of the commodities/factors to be investigated, and recognition/acceptance within the community as innovators.

At two sites in south-west Kenya, Oyuer and Bogetario, research and extension facilitators assisted participating farmers to formulate their own categories of resource endowment (those whose grain stores were usually full, usually empty, or in between at the end of the cropping season at Oyuer; and based on the area of tea grown at Bogetario), and to select participating farmers from the 'middle' group of resource endowment. 'Adaptive Research Farmers' trained by the NGO CARE Kenya also participated at Oyuer, as did local research assistants working with the Rockefeller Foundation-funded Soil Management Project at Bogetario.

At the other sites, facilitators (scientists, extensionists, village elders, NGO representatives) considered that the participants were representative of the majority of the villagers. A fairly broad range of farm sizes and resource endowments was represented at each site, and both men and women farmers were involved in the technology evaluations. The interest and motivation of the farmers appointed by their communities was high at the start of the project; of the 270 farmers involved in Kitale's Regional Research Programme, only had three dropped out by the end of the first year (1996).

Source: Rees et al. *(1999).*

In the case of DAREP, unwritten common understandings within the project team about farmer selection were developed in the process of project implementation, as technical researchers began to share their experiences with each other and to reflect on the farmer selection process.

CASE 4.8

DAREP: A LEARNING APPROACH TO SELECTION OF FARMER COLLABORATORS

No specific guidance on farmer selection is given in the project document for the Dryland Research and Extension Project. However, farmer categorization, which could be used in farmer selection, was included as a task in the social scientists' terms of reference. Wealth ranking was sometimes a helpful tool for selecting which farmers to visit during the diagnostic surveys, especially in locations where farmers had limited experience of hand-out-oriented development programmes, and so had less reason to distort information about wealth.

On-farm trials

In general, farmers were selected by field assistants following an initial expression of interest and a willingness to collaborate during farmer open days at the research sites. The experiment on mange control in goats was based on farmer demand – only farmers whose goats had the disease were included in the experimental programme. These were truly representative in relation to the constraints being addressed. However, in the other livestock on-farm trials, due to family obligations, animals in the trial were sold by one of the farmers (Kang'ara, personal communication, 1997). Farmers who had fewer resources were under more pressure to dispose of livestock assets, and farmers with fewer animals were also likely to be excluded during farmer selection as they did not have the minimum number required for inclusion in an on-farm trial.

In the new crop and variety trials, farmers volunteered and selected only the crops and varieties that interested them. In the tools and tillage trials, farmers for the research groups were initially selected based on categories of ownership and access to draught power and equipment. However, when selecting the specific technologies to test, these categories were not used and research-group farmers were free to select any of the technologies available.

Negative experience

The lack of specific farmer selection criteria made it more difficult to analyse the wider relevance of a particular technology to farmers of different resource categories. This was most difficult when data on socio-economic categories were not collected by the researcher or, if collected, were not used in the analysis of the experimental results.[3]

Source: Sutherland et al. *(1997e).*

4.6 CONCLUSIONS

Selection lessons and issues

Self-selected groups are not usually representative. While targeting participatory agricultural research at poorer farmers brings many challenges, the alternative, assuming that a group of self-selected farmers will represent the target group, is probably less acceptable. Continued concern of donors and governments about the impact of research on poverty and the uptake potential of research results means that targeting through some form of purposive selection of sites and farmers is likely to remain an important issue in research project implementation. Self-selection of farmers can lead to further implementation problems, because those selecting themselves may be more likely not to follow agreed action plans compared to those selected by other means. Even when conscious efforts are made to select representative collaborators through self-selection, this does not guarantee fair representation of poor and female farmers. A clear understanding of the dynamics of the community the team is working with will help to understand and address the problem of unrepresentative farmers.

It is difficult to sustain the participation of the very poorest. In practice, participatory research programmes that target the poorer find themselves making a trade-off between engaging the poorest and engaging the willing. Working with the very poorest can be costly and difficult (van Veldhuizen *et al.*, 1997; Sutherland *et al.*, 1998). Such households often require special support which goes far beyond the scope and skills of research scientists, and more properly falls under community development and safety-net programmes. Most rural communities in agrarian-based economies have many households that are poor, and yet have a sufficient resource base (some land, labour and farming skills) to engage in, and benefit from, participatory agricultural research activities. These active and productive poor often help and support the very poorest in a community. There is, therefore, an argument for targeting this type of household, rather than the very poorest who have limited interest and incentives to engage in agricultural research.

Should farmer collaborators be changed as a matter of principle?

For programmes that run for a long time, there is a question of whether to continue collaborating with the same small group[4] of farmers, or to change the farmers they work with every so often. This choice has to be looked at in relation to research objectives, and in relation to the importance of maintaining rapport and relations with the community. It is likely to be expedient to maintain contact with some of the most interested farmers over a period of years, and also to give space for new farmers to join in as others decide to drop out, or as new opportunities arise as the experimental programme expands. If there is a very high level of demand, and 'who participates' has become a hot issue on the local political scene, this may signal the need for a meeting to discuss the issue further and see what can be agreed. At this point there may be a case for having a core group of farmer researchers, linked to satellite groups or clusters who participate less intensively.

Helping and hindering factors in selection

Projects should start with an awareness of the factors that both help and hinder effective selection, and some of the potential pitfalls and lessons learned by these projects. Factors that projects found to help and hinder farmer participation in selection are summarized in Table 4.3.

Tips on selection and targeting

Some tips on targeting and selection are outlined in Box 4.1.

Table 4.3 Factors that help and hinder effective participation in farmer and site selection

Help	Hinder
Working with farmers who have been exposed to empowering and participatory research and development activities	Poor understanding by farmers, extension workers and researchers of the purposes behind selection and targeting activities
Regular monitoring and reviews of participation, with action taken as necessary to improve this	A culture of consensus in group situations so that important resource differences are glossed over by farmers
Good baseline data on households in research communities, including household listings	Projects operating under acute time pressure, when everything is done in a hurry
	Working with communities with long experience in manipulating information given to outsiders
	Limited availability of baseline data on households in research communities
	Limited interest of technical researchers in the importance of farmer categorization during on-farm experimentation

NOTES

1. Another case study writer reading this noted that outsiders have to first consider what farmers' expectations are when they arrive in a village.

2. Upon reading this, another case study writer asked 'Is it not better to start small?'

3. On reading this one practitioner commented "Researchers must be obliged to undertake this, without this their results and statistics are a lot of boloney."

4. A practitioner comments "it is important that the farmer groups remain open. Non-members can become members and others can fall away. Must be prepared to establish sub-groups around a specific technology."

Box 4.1 Tips on selection and targeting

- ✔ Develop a strategy for explaining the project's aims to the communities likely to participate.
- ✔ You will never have a truly representative sample; be prepared to compromise, accepting 80% representation as satisfactory.
- ✔ At some point during selection farmers will ask the "what's in it for me?" question. They must receive a positive answer; the project team should discuss this and have some answers ready.
- ✔ Establish effective links with local leaders, both men and women.
- ✔ Take time to develop relationships of trust with farmers through honest dialogue during PRA exercises and participatory planning, so that farmers have a clear understanding of project aims. The selection of representative farmers should follow naturally from this.
- ✔ Start wide, but quickly narrow down and focus on selected communities.
- ✔ Facilitate community involvement in selection of farmers, and allow for the additional time required for working with farmers to identify participants.
- ✔ Monitor and review participation together with farmers, and discuss action to improve representation of marginalized categories.
- ✔ Farmer participation can also be monitored by recording and analysing attendance and participation in group meetings and other research activities.
- ✔ In cases where representative selection is really important, selection through a village transect may work better than asking for volunteers.
- ✔ Monitoring the representativeness of participant farmers requires baseline data on the target group as a whole and the community involved. Baseline surveys of local communities prior to commencement of research can help – if time, resources and expertise are available.
- ✔ Positive discrimination and setting up separate organizational structures may be necessary to reach certain target groups specified as a priority in project documents.
- ✔ Farmer research groups can be used to explore difference issues relevant to targeting, but not all categories may be represented in the groups.
- ✔ To obtain a gender balance from an all-male group, invite their wives. Positive discrimination may result in antagonism within the group.
- ✔ If the project approach does not favour purposive selection or targeting and tightly controlled experimentation is not required, a wider range of technical options can be offered to a community of interested farmers to select from. Adaptation and uptake can be monitored as part of the research process as a means to assist targeting in subsequent research and dissemination activities.

Understanding situations and developing a research agenda with farmers

5

This chapter explores various approaches used by researchers to engage with farmers in understanding their situations and to develop a research agenda. It starts with a short discussion of the rationale for participatory needs assessment, situation analysis and the development or refinement of a research agenda. Project experiences are then presented, followed by a discussion of the issues emerging, key lessons and tips for improved practice.

5.1 WHY UNDERSTAND FARMERS' SITUATIONS?

The dominant trend in development thinking on agricultural research priority-setting over the past two decades has been to give increased attention to what small-scale farmers say they need, and to a good understanding of their situation, and attach less importance to what research scientists say farmers should have. Clear evidence of demand for research is increasingly the starting point for development-oriented agricultural research. The rationale is that if the problem or constraint to be investigated is not regarded as important by farmers and supported by a participatory analysis of the farmers' situation, farmers are less likely to participate in the research.

An adequate understanding of the farmers situation may vary according to the nature of the project. It will often include the analysis of interactions between various components and enterprises in the farming system, as well as who is involved in, decides on, and benefits from what activities.

While situation analysis is a key element in participatory agricultural research, not all projects start with needs assessment or in-depth situation analysis, as the case studies in this chapter illustrate. Some projects have been designed based on prior needs assessments, and have a clearly defined technical focus from the outset (Cases 5.7 and 5.8). Others start with a broad focus and have in-built flexibility for developing a research agenda (Cases 5.1–5.3 and 5.6). For projects with a broad focus, well executed situation analysis helps in narrowing down from a long list of possible experiments to a few that are most useful and likely to bear fruit. The cases in this chapter document a range of approaches and experiences with understanding researchable problems and opportunities, and developing a research agenda to address these. The accounts given by project staff show clearly that this aspect of implementing a participatory agricultural research project, perhaps more than any other, is very much influenced by the project's mandate and objectives. The project experiences are, therefore, divided into three distinct types of project mandate. The first four cases document the experiences of projects with a broad technical mandate situated within public-sector research organizations. The fifth and sixth cases present a somewhat different perspective, from projects located within NGOs with a mandate focusing on the needs of the local communities involved. Cases 5.7 and 5.8 document how projects with predefined technical mandates use somewhat different approaches to explore farmers' knowledge and solutions to known technical problems.

5.2 EXPERIENCES WITH SITUATION ANALYSIS AND AGENDA-SETTING: PUBLIC-SECTOR PROJECTS WITH A WIDE TECHNICAL MANDATE

The first two cases illustrate the importance placed within farming systems research programmes on developing a full understanding and description of the entire farming system upon which it is intended to base a research agenda.

The second two case studies illustrate projects that acknowledged the value of a farming systems perspective, placing more emphasis on achieving adaptive research outputs within a limited time frame. The cases do not document every detail of situation analysis and agenda-setting, but emphasize what the authors saw as being most important when they wrote the cases. The first case, on Adaptive Research Planning Teams (ARPTs), documents an increase in farmer participation in situation analysis and agenda-setting which followed the arrival of a rural sociologist on the farming systems team. This coincided with a determination to move the on-farm research programme from being largely consultative into a collaborative mode of participation in which farmers had a much larger role to play.

CASE 5.1

ARPT: EVOLVING A DIALOGUE WITH FARMER RESEARCH GROUPS

As noted earlier, Central Province Adaptive Research Planning Team was the pioneer province within Zambia's farming systems research programme. It had conducted characterization and diagnostic surveys in several areas from 1979 to 1984 as part of the training and demonstration activities supported by CIMMYT's regional farming systems programme. Following these surveys, a fairly large programme of on-farm trials and socio-economic monitoring activities was established, covering three districts of the province. The on-farm trials were largely researcher-designed and farmer/researcher-implemented, addressing what were perceived to be the priority problems during the diagnostic surveys. By 1989 it was time to take a fresh look at the content of the on-farm research, which as noted in Case 5.4, was achieved by setting up farmer research groups (FRGs) and then conducting rapid rural appraisals (RRAs) in the three districts.

In the first year of the FRGs, the technical focus of the on-farm programmes was relatively simple. The obvious shift from the previous years, when the ARPT-CP, rather than the farmers, had been steering the research programme, was a change in the overall objectives of the programme. In 1983/84, ARPT-CP had established short- and long-term objectives. Emphasis in the short term was to be on the fine tuning of crop management practices; in the long term on testing the feasibility of technical alternatives that had to be introduced into the system and were dependent on input delivery and credit institutions. This long-term strategy was intended to facilitate the substitution of capital for labour and the spreading out of labour demand. The research programme was based on researchers' analysis of data collected in surveys. This included assumptions about input and credit supply, and marketing services being undertaken by subsidized parastatal organizations that began to crumble in the wake of economic liberalization measures introduced in the late 1980s. In the ensuing seven seasons, the team achieved some success with the first objective, and virtually none with the second (ARPT-CP, 1991).

Once the team revisited the research agenda to talk again to farmers about their situation, their needs were, by and large, different from how they had been diagnosed in earlier surveys. Whereas ARPT-CP had been undertaking some relatively complex trials for crops such as soya bean, including experimenting with animal traction planting methods and equipment, farmers' expressed needs were considerably simpler. Soya bean was not an appropriate crop – its supply and marketing were dependent on unreliable institutions, and it could not be easily consumed in the household (years of soya bean cookery demonstrations only showed women the relative impracticality of trying to utilize the crop in the home). Now it is virtually only large-scale commercial farmers who grow the crop in Zambia, mainly for guaranteed export markets.

So instead of soya bean, endless hybrid maize and fertilizer trials, and the zero-tillage herbicide trial for which Central Province had become renowned, farmers requested variety trials of other food crops – short-season, open-pollinated maize, sorghum, finger millet, bean, and groundnut. The seemingly simple issue of whether to line-sow sorghum and groundnut was also of importance, particularly to women, at this stage.

With respect to methods, the second innovation after FRGs was the use of food availability calendars as a planning tool. These calendar exercises revealed the nature and extent of the 'hungry season' that occurred for different food categories, a season that had been referred to in the ARPT literature, but never tied down, and in some instances referred to as though it did not exist. Fairly typical exercises in Central and Copperbelt Provinces showed a hungry season for staple crops which might begin as early as November–December, and which lasted through to March–April. For food legumes – bean, groundnut, cowpea – stocks were often scarce from August onwards, and only started to be replenished in March–April. Vegetables too, depending on local dry-season water availability, might have a period of scarcity, usually in the September–November hot, dry months which preceded the rains. These hunger periods, although they varied in length according to the quality of the previous harvest, existed for the poorer categories of farmers in some form in most seasons.

Following these food calendar exercises, and the follow-on RRA activities during the 1991/92 dry season, the primary objective of the Central and Copperbelt teams – and in the next season or so for nearly all the provincial ARPTs – changed from a farm management to a food security objective. The focus now became how to meet households' diverse food needs.

Strategies developed over the next season in Central and Copperbelt Provinces essentially fell into five categories (Russell and Drinkwater, 1994).

- The use of an early maturing maize variety that produces food during the hungry period. Here Pool 16, a maize variety bred for Zambia's low-lying, drought-prone southern and western areas, has become a highly popular green maize variety country-wide because of its early maturing, sweet-tasting cobs.
- To increase the availability of food legumes, valued particularly by women (and especially important in the diet of young children), and cash crops. Men too became increasingly interested in groundnut and bean as the marketing potential of newer varieties became apparent, whilst women wanted to expand the variety trials to include also cowpea and bambara. Debates on line-sowing turned on labour needs for planting, weeding and harvesting, and its overall availability. Random planting for groundnut was quicker than line-sowing, but line-sowing facilitated lower labour requirements for weeding and harvesting. Interestingly, women in one research group in the Copperbelt also said that men were willing to help with a crop being line-sown, but not randomly planted – so for them, line-sowing also increased the quantity of labour available.
- Bringing alternative food crops into the system. Following the food availability calendar exercises at the beginning of the 1992 season, farmers added crops such as cowpea, bambara, sweet potato, Irish potato and cassava to the list of crops for which they wanted to explore the potential of improved varieties.
- The use of green manuring systems to improve maize yields. In Copperbelt Province, a trial intercropping maize with velvet bean was carried out over three seasons, which produced some interesting results, a great deal of discussion, but no conclusive recommendations (with times of planting and labour implications being the main subjects of discussion). Elsewhere, the ARPT-CP began to understand much more about traditional systems of composting, especially the mound or *fundikila* system used in northern parts of the province (Serenje and Mkushi Districts). One 'learning', for instance, is that the compost in the mounds helps to keep the soil temperature and moisture availability sufficiently high for a bean crop to be planted with cassava as late as February/March and be harvested in May/June, well beyond the 'normal' end of the growing season.

- The cultivation of wetlands during the dry season. In Copperbelt a wetlands research programme began that initially focused on learning about what farmers did already, but then slowly began to experiment with some remodelling of the wetlands system. This research was still only in its formative phase during the period the research groups were highly active, but was interesting in that all stages of this programme were entirely in the hands of the research groups – appraisal, design, implementation and monitoring, with the Copperbelt ARPT playing only limited guiding, monitoring and procurement roles.

Sources: ARPT-CP (1991); Drinkwater (1994, 1997).

The second case summarizes the experience of a farming systems team which began its operations in 1994, over a decade after ARPT in Central Province, and at a time when participatory and collaborative on-farm research approaches had gained widespread acceptance, as reflected in the indicator column of the project's logical framework.

CASE 5.2

KFSRE: RESEARCH AGENDA/PRIORITY-SETTING

The Kavango Farming Systems Research and Extension Project's logical framework (Table 5.1) provided a clear guideline for understanding the farmers' situation as a basis for identifying research priorities and opportunities.

The KFSRE project was originally established as a farmer-training project, but this was changed soon after its inception, when it was recognized that an understanding of the farming systems of the project area was the priority. Little was known of the farming systems, including the social system, the economic infrastructure, the researchable constraints and the extension issues. After the project team had recruited Namibian staff from both extension and research, it set out to determine what overall recommendation domains were present in the project area, and to identify issues that could be the subject of participatory research activities.

The project team used the situation analysis activities to train and sensitize a range of ministry staff, as well as other collaborators from the governmental and non-governmental sector. To begin to understand the farming systems in Kavango, the project used a classic farming systems methodology of looking holistically to start with, slowly focusing down to individual communities who represented the environments characterized and the problems encountered. Thus a rapid appraisal of livelihood activities was made across the administrative region (approximately 100 000 km^2). This appraisal looked at basic issues, such as crops grown, system of government, land-tenure systems and communications infrastructure. This demonstrated that Kavango region could be divided into three zones, the boundaries of which ran parallel with the Kavango River.

Each zone had different social, economic and physical characteristics. This had implications for extension agents, in terms of both the extension approach used and the types of extension messages or options farmers would be interested in.

From the region-wide level, project staff focused down on individual villages/communities from the two principal zones. These were selected at random, but based on experience with the previous study. A sample of villages/communities was used to assess the frequency of the problem and as a verification mechanism. It was at this stage that team members began to focus in detail on some of the key individual issues. No decisions on how to take forward the information collected were made until after a period of consultation. After considering the constraints faced by the Ministry of Agriculture – accessibility, representativeness and keenness of farmers to participate and, most important of all, what the farmers themselves wanted to do – a decision was made to

Table 5.1 KFSRE project logical framework

Output	Indicator
1. Understanding of communal farming systems increased and research priorities and opportunities identified by the KFSRE team activities using FSR/PRA methods.	1.1 Effective interdisciplinary research strategy formulated and implemented for Kavango region.
	1.2 Annual review of new and existing extension messages with partners.
	1.3 Collaborative research proposals based on farmer participatory prioritization and/or diagnostic survey reports developed.
	1.4 Participatory, interdisciplinary appraisal by male and female farmers, extension, research and other stakeholders of all research proposals developed.

move to an on-farm trial programme. On-farm variety trials, fertilizer trials and animal-drawn implement trials were established in two villages in each of the principal zones.

A methodology was evolved to introduce the concept of trials to the host farmers, as well as to decide what trials to undertake with them. This was initiated through a technology fair with the researchers present. Through an interpreter, each researcher had 10–15 minutes to explain what technologies they had to offer and how they might address the farmer-articulated problems. For example, the cowpea researcher displayed some short-duration cowpea varieties, which attracted much interest and subsequently proved very popular with farmers. The draught animal power researchers and others did likewise.

The farmer evaluation meetings marked the commencement of a sequence of planning meetings to determine the research agenda for the forthcoming season, in terms of varieties to be included and other trials to be conducted. All meetings were undertaken in the vernacular. Discussions between researcher and farmer, and farmer to farmer, were encouraged. It was at these planning meetings that researchers gained information on the popularity of different technologies under test, and why. It was also an opportunity for farmers to collectively put their research agenda forward. The project/ministry tried to accommodate their requests. For example, a request for sweet potato trials heralded the start of a whole new experimental programme which was linked to a Southern African Development Community regional programme.

Examples of effective farmer participation

Participatory rural appraisal (PRA) methods provided an effective means for farmers to articulate their research interests. The planning meeting sequence, which was held prior to the onset of the rains, gave farmers an opportunity to tell researchers what were the successes and failures of the previous season, as well as to discuss which technologies were to be included and which to be excluded. Farmers were the driving force behind this process, and researchers were sometimes present. Because of the relationships built up, this was frequently a vigorous two-way dialogue.

Community and farmer group meetings to screen research options ('basket of technologies' or 'technology fairs') allowed researchers' options to be critically appraised and narrowed down. Rejected options were reconsidered by researchers and, in some cases, presented again in a more appropriate form in the second season.

Case-study monitoring of individual households over the 1995/96 season helped to further develop and refine the research agenda established in initial PRA discussion groups; for example, in identifying the potential social impact (winners and losers) of new technology options such as draught animal-drawn cultivators, and developing better understanding of key problems such as weed control (specific weeds, soil types, etc.).

Regional planning meetings and increased linkages with commodity-based researchers improved responsiveness to a farmer-driven research agenda in the 1996/97 season for crops and livestock research (Cases 14.1, 15.1, 16.2).

Examples of disappointing farmer participation

- Low participation of researchers in research agenda-setting meetings with farmers: dialogue between researchers and farmers would have helped to clarify problems and develop clearer research needs.
- Disappointing response from researchers in the first season: a connection between community-based research prioritization and centralized, commodity-based research planning is difficult to make within the existing institutional framework of research in Namibia. This, however, started to change once researchers began to see the clear benefits to be gained from the approach.
- A lack of response from researchers causes disillusionment among farmers whose expectations have been raised. Livestock farmers were most concerned about the level of mortality amongst their goat kids. It was evident that no researchers were undertaking any work on goats and this caused farmers considerable dismay.

The next two project case studies, the Dryland Research and Extension Project (DAREP) and the National Agricultural Research Project, Phase II (NARP II), document approaches which placed comparatively more emphasis on developing a research agenda quickly, based on expert knowledge and on the technologies available at the time. Understanding of farming systems emerged as a longer-term objective. The DAREP, located within an established research institute with experienced technical researchers, had in its project document immediate objectives relating to technology development and the development of participatory methodologies, and did not have an explicit capacity-building or training component. Technical researchers within the project team, while accountable to each other, had substantial freedom in terms of how they developed an understanding of farmers situations, and instigated a technical research agenda based on this.

CASE 5.3

DAREP: RESEARCH AGENDA/PRIORITY-SETTING

Farmer involvement in setting research priorities is emphasized in the Dryland Research and Extension Project document. The approach implied for this in the terms of reference is a series of diagnostic surveys, but other approaches were not ruled out.

Broad-based diagnostic surveys were conducted during the first year of the project by the whole team, together with researchers from other institutes, extension specialists and NGO staff. Enterprise ranking and problem ranking within enterprises were conducted with farmers, both in groups and with individual farmers. Meetings were held in which the findings from group discussions and farm visits were reported back to farmers for further discussion and verification. At these meetings, possible solutions to problems were discussed with farmers. In some communities farmers' interests and expectations were raised, and this made it easy to initiate on-farm experimentation.

Tools and tillage approach

The research programme for tools and tillage developed in an iterative fashion, being modified each season. The first diagnostic PRA was done in April 1993, to obtain an understanding of the range of tillage practices and the differences in tool ownership and use of rich, average and poor farmers in the target area. Discussions were held with the farmers using a checklist and flashcards of certain tools. At each site, several key informants such as blacksmiths and tool-sellers were interviewed, as well as an older member of the community who could give us an historical perspective on tillage in the area.

The main objective of the broad-based PRAs that followed in Tharaka (November 1993) and Mbeere (May 1994) was to diagnose constraints and identify researchable interventions in the farming systems, broadly defined to include livestock, crops, trees, structures and equipment, post-harvest activities, off-farm activities, and the socio-economic context for all of these aspects. A checklist was developed which included issues relating to tillage and soil and water conservation, not covered adequately in the focused PRA. The broad-based PRAs were able to go much more deeply into the different farm enterprises, and rank the relative importance of moisture, fertility and labour constraints within these enterprises. The analysis also looked into interactions between different aspects of the farming systems; for example, proper crop spacing would help with moisture constraints and trees might help to break hard pans in the soil.

Towards the end of each PRA, problem-analysis sessions were held in order to conduct provisional planning of interventions, including research. The productiveness of these sessions, in terms of new ideas, was largely determined by the level of experience and specialization of the participants. In all three of the PRAs, specialist expertise in soil and water management was rather limited during the problem-analysis stage. Proposed interventions were, therefore, often left at a fairly general level, as indicated in the PRA reports.

The focused survey on tillage issues gave a lot of valuable information on the characteristics of the farming systems, their constraints and strategies. This information was of direct use in searching for solutions prior to establishing trials. The system-wide survey was useful in verifying constraints already identified over a wider area and placing the tillage work in context, as well as establishing its importance to the farmers in relation to other aspects of the farming system (Table 5.2). It also established the major importance of the labour bottleneck for weeding during the October season, particularly for women – shifting the emphasis away from tools for early planting towards labour-saving, hand-weeding tools, and increasing the use of available animal draught power for weeding.

Ideally, the broad-based PRAs should have come first in order to establish how much of our resources should have been targeted to this discipline. Because it was initiated earlier than other technical interventions, the tillage research ran the risk of trying to solve a problem that farmers did not rank highly. However, this did not happen. The system-wide PRAs confirmed the importance of soil and water conservation.

The final content and layout of the on-farm trials were influenced much more by the farmers themselves through the FRGs than by specialist researchers. The focused FRGs for tools and tillage allowed for a continuous and detailed dialogue with farmers. During this dialogue, priorities were discussed and a more specific research agenda was developed, over which farmers had a high degree of control.

In the first focused FRG meetings held in September 1993, the constraints initially identified were discussed by extension agents and farmers, and confirmed or rejected. Several areas thought to be constraints by extension

Table 5.2 Example of system-wide survey: constraints and opportunities for intervention

Causes	Farmers' strategies/compromises	Alternative options
Low and erratic rainfall	Staggered planting over seasons Drought-tolerant/escaping crops and varieties	Crop variety evaluation for drought tolerance and high yields (R)
Limited knowledge of good water management	Contour tillage (older fields)	Improved rainwater harvesting and conservation techniques (R, E)
Low water-holding capacities of soils	Use of manure (a few only)	Education and demonstration of good soil and water management techniques (E) Encourage manure use (E)
High evapotranspiration rates	Leave trees in field for shade	None put forward
Low infiltration capacities in compacted soils (*ituuru*)	Trashlines (bundled cereal stover lines along the contour)	Development of appropriate tillage equipment and methods (R) Catchment conservation (E, P)

First-ranked crop production problem: frequent crop failure due to drought stress.

R – research; E – extension; P – policy.

Source: Sutherland and Mellis (1996).

workers, such as lack of certified seed and lack of drinking water, were rejected as not important by farmers at these meetings. Table 5.3 summarizes the results of researchers', extensionists' and a farmer focus group's negotiations on defining the constraints during September 1993. The type of intervention was constrained by the researchers' aim of developing and disseminating soil- and water-related technology using participatory methodologies. Policy interventions on marketing and input supply, or technical interventions relating to issues such as plant protection, could not be addressed in depth.

When the focus group meetings were followed up with farm visits during the setting-up and monitoring of the on-farm trials, researchers and extensionists increased their understanding of the farmers' situation. For example, when a researcher asked why a farmer had not ploughed his whole farm early, the farmer replied that weeding would become a problem, so he only ploughed early the area that his family could weed. The late-ploughed area would only need to be weeded once. This close interaction between farmers and researchers allowed continuous diagnosis to feed into planning and experimentation and ensure that the research agenda kept track of the FRG farmers' interests.

Study tours were an important source of intervention ideas. There were two main types of study tour: those for professionals and those for farmers. Three professional study tours were made by project researchers, extension and NGO collaborators, to Liakipia District, Baringo District and Eastern and Coast Provinces (including Taita Taveta District). The Liakipia tour provided options, particularly mulching, which were discussed with farmers but rejected by them as not appropriate. Taita Taveta District proved to be very interested in water harvesting, so a specific study tour was planned which involved farmers from the FRGs together with field and extension staff. During the tour FRG farmers were exposed to a range of water-harvesting options, and returned very excited and keen to try these out on their farms. As a further stage of on-site training and planning, the extension officer from

Table 5.3 Confirming constraints with researchers, extensionists and farmers (September 1993)

Constraint	Source	Ranked as important by farmers	Comments
Late planting is a constraint to crop production	DAREP survey	Yes	Danger of squirrel damage for early planted crops FRG farmers suggest pre-soaking seeds
Hard soils prevent early land preparation	DAREP survey	Not ranked	
Lack of suitable tools constrains timely land preparation, planting and weeding	DAREP survey	Not ranked	
Unreliable rainfall constrains production and makes investment in farming risky	DAREP survey	Not ranked	
Lack of labour constrains timely land preparation, planting and weeding	DAREP survey	Yes	
Pests and diseases constrain production	Farmers	Yes	
Lack of markets reduces price for produce	Farmers	Not ranked	
Lack of certified seeds constrains yields	Extension	Not ranked	
Lack of drinking water	Extension	Not ranked	
Farmers' lack of planning constrains production	Extension	Not ranked	
Lack of extension	Farmers	Not ranked	

Taita Taveta came to work with the FRGs, helping them decide which structures were most suitable for their fields and laying out these structures with them, moving as a group from field to field. The most recent study tour of January 1996 was of Ukambani Districts, and combined farmers with researchers, extension and NGO representatives. This has had a rather limited input into more formal research-planning activities, but provided farmers with more ideas that they can try out on their own, as agreed at a meeting at the end of the tour.

Two types of research-planning workshop were used: FRG planning meetings, and a professional expert planning workshop. In the first FRG planning meetings with extension staff and farmers, the constraints initially identified were discussed and proposed options were either confirmed as having potential, or rejected. For example, mulching was rejected as an option for improving soil moisture because land is often burnt before planting to control weeds, and due to fears that it would obstruct ploughing or would be blown away due to the high winds in July/August. Later on, farmers also claimed that mulching would encourage chafer grub activity. After discussing constraints, the FRGs were presented with a portfolio of technical options from a range of sources, including local innovations (Table 5.4).

Table 5.4 Technologies presented to farmers to relieve identified constraints

Tools	Constraint addressed	Source
Bukura tool bar with mouldboard, chisel and ridging attachments	Late planting: chisel attachment can be used to allow early dryland preparation before rains	Developed by Kenyan Ministry of Agriculture
Ard plough	Late planting, high cost of tools and unavailability locally	Used by farmers in Marsabit and Turkana
Rotary injection planter	Late planting: rapid planting after first rainfall	DAREP, adopted by farmers in Botswana
Jab planter	Late planting, high cost of tools and unavailability locally	Developed by Kenyan Ministry of Agriculture
Emivator push weeder	Poor weed control; faster than existing weeding methods if used at an early stage of weed development	Triple W Engineering, Nanyuki
Weeding with oxen	Poor weed control; soil erosion; water deficit; much faster than other weeding methods if crops are planted in rows. Creates ridges for soil and water conservation	Local innovation (few farmers near Mwingi District), promoted by Rural Technology Development Unit
'Emibarrow'/*Mkokoteni*: wooden wheelbarrow	Lack of transport for manure; cheaper and locally available	DAREP
Soil and water management		
Micro-catchment water harvesting	Water deficit; soil erosion; controlling and storing runoff behind bunds	
Tied ridges	Water deficit; soil erosion; controlling and storing runoff behind bunds	
Earth basins	Water deficit; soil erosion; controlling and storing runoff behind bunds	
Planting pits	Water deficit; soil erosion; low soil fertility; runoff collected in pits, optimum use of manure by spot placement in pits rather than spreading over whole field	
Mulching	Water deficit; soil erosion; low soil fertility; runoff reduced, decomposition of crop trash improves soil fertility	

To make up for the limited soil and water expertise available during the surveys (the most experienced persons tended to be very busy and, therefore, not available during the PRAs), the researchers responsible held personal consultations with other experts. The influence of the advisors was restricted mainly to the general scope of the research, and the formal design and monitoring methods.

A challenging experience during PRA

During a PRA exercise in one community, researchers were challenged by the male farmers to meet their expressed immediate needs, rather than go into more drawn-out discussion on problems and their causes. After farm visits and problem analysis with groups of farmers, a report-back meeting was held with a large number of farmers. At this meeting, after hearing the summary of the PRA findings, the male farmers speaking out at the meeting restated that their main problem was pest control, and that the project should supply them with pesticides on credit. The male farmers further stated that they were aware of what was involved in research, having spent 3 years observing the activities in an adjacent research site and having seen trials on neighbouring farmers' fields. They said that the research they had seen had not addressed their need for pesticides. In conclusion the male farmers, supported by the area headman, said that if the project was not able to supply them with pesticides they had no further interest in collaborating with it, and that the meeting should be ended. The facilitators invited the women to give their opinions, but they declined to say anything. However, after the meeting, some of the women farmers approached the researchers and said that they were interested to continue with the research process. The PRA process, therefore, continued with these willing female farmers. Some of these women went on to become active trial farmers, forming a well organized farmer research panel that eventually grew into a self-help group. Clearly the past experience of research and comparisons with other projects which had provided free hand-outs of inputs had influenced the reactions of farmers at this meeting.

Reviewing the agenda in other technical areas

With the other cropping and crop protection components of the project, the research agenda was based more on repeating the same experiments over several seasons under more-or-less controlled conditions, and letting farmers select ideas of how to conduct experiments on their own farms. Expert farmer panels were introduced to evaluate new sorghum and millet varieties and to suggest the type of varieties that should be introduced for testing (Ouma *et al.*, 1997). In 1994 it was planned to have further consultations with local research-site committees before initiating new research activities. However, due to pressure of time and logistical constraints this did not happen. Instead, farmers' reactions were sought at farmer open days, and their comments were incorporated into the next season's programmes where possible.

Incorporating farmers' comments was most difficult for the agroforestry programme, where a long lead time for planning was required and it was very difficult to modify the trials on a season-to-season basis (Ochieng *et al.*, 1996). The long-term and controlled nature of soil fertility trials was another example where it was difficult to modify trials on a seasonal basis, even though farmers comments were recorded during open days (Warren *et al.*, 1996). The livestock programme was more flexible, being less tied down to seasons, and evolved in response to emerging problems, ongoing diagnosis and experiences with the results of previous rounds of experimentation.

Farmers' agenda-review workshops

Towards the end of the project, farmers held their own research agenda-review workshops in which they reviewed research priorities at community level. Detailed reports were produced on these workshops by field staff, and the results were summarized in a project report (Sutherland, 1996c). These workshops illustrated the challenges that participatory approaches can bring to national research systems when farmers raise far more researchable topics than researchers have the capacity in which to collaborate.

The results from the farmer research agenda-review workshops, together with other data generated by the project, have not to date been utilized in research planning activities conducted by follow-up projects. This is partly because they have not been targeted at individuals involved in planning new activities. However, there is also a tendency for researchers to go out and conduct additional PRAs in communities already covered, rather than spend time searching and reading through previous reports, or even discussing with fellow researchers who have experience of working in a particular geographical area. This is in part a reflection of the 'culture of independence' within research centres, including lack of ownership of the results of survey and PRA data generated by other researchers.

Sources: Mellis (1997); Sutherland and Ouma (1996); Sutherland et al. *(1997c).*

The DAREP project had a relatively compact technical team, and an established infrastructure with a defined area of operation covering part of the mandate area of one Kenya Agricultural Research Institute (KARI) regional research centre. By contrast, the NARP II project had a much more diffuse technical team and a much larger potential area of operation, which included the entire mandate areas of three KARI regional research centres. Its approach to situation analysis and agenda-setting was more firmly set within the national and regional research planning processes, to which it made a significant contribution. The approach was also driven by pragmatic considerations, including the need to demonstrate impact and draw as many on-station researchers into dialogue with farmers as quickly as possible.

CASE 5.4

NARP II: RESEARCH AGENDA/PRIORITY-SETTING

Regional priorities

Priority-setting within KARI takes place at several levels. National priority-setting provides overall priorities for commodities and factors which are used to guide the national research programmes and overall staffing at the centres throughout the country. At the level of the mandate region (which covers 11 000 km^2 for Kisii and 17 840 km^2 for Kitale), constraints and opportunities were listed by the 'experts' of the region (scientists, extensionists, NGO representatives and representatives of other government organizations) at the workshops described above (Case 4.1). The issues were then grouped into the kind of intervention required (extension, research, policy) and the researchable issues prioritized using the criteria shown in Table 5.5. On the basis of these regional priorities, the scientists of each centre then prepared outline research proposals to address the top-priority problems, using the guidelines shown in Box 5.1. The outline proposals were again screened in peer-review meetings according to the criteria in Table 5.5.

Table 5.5 Criteria for prioritizing regional research topics

1. Severity of the problem	
Number of farmers involved	High / Medium / Low
Land area involved (ha)	High / Medium / Low
2. Importance of the problem (food security, farmers' income, regional/national security, etc.)	High / Medium / Low
3. Frequency of occurrence of the problem	High / Medium / Low
4. Likelihood of proposed solutions being accepted by farmers	High / Medium / Low
5. Probable time and resources needed to solve the problem	High / Medium / Low
6. Resource allocation within the research centre	
Similar projects funded at the centre	Yes / No
Need for additional funding	High / Medium / Low

Box 5.1 NARP II Guidelines for preparation of regional research proposals

- The farming systems relevant to the proposal should be adequately described. Unless diagnostic surveys have recently been carried out in the proposed areas of work, the proposed research activities should start with one (formal, informal, RRA, etc.).
- There must be explicit collaboration with extension and farmers detailed in the proposal.
- Priority will be given to participatory 'farmer-managed' activities, and experiments should be designed for execution by farmers. Where necessary, 'researcher-managed' back-up experiments should be included in the proposals, but these should support the farmer-managed activities, not replace them.
- In general, scientists should not expect to supply inputs to farmers, except for the specific item being tested – commodity/factor should, by definition, be tested under genuine smallholder farmer conditions for the work to qualify as adaptive research. If necessary, include on-station or researcher-managed back-up trials.
- In most cases the proposals should start with participatory activities to: (i) describe the particular farming system of the collaborating farmers and the relevance of the commodity/factor to those farmers (enterprise lists and descriptions, matrix ranking of enterprises, etc.); (ii) document farmers' opinions about the problems/desirable characteristics of the commodity/factor to be researched (pairwise ranking can be particularly useful here); and (iii) agree upon a research agenda and programme of activities with the farmers.
- The research should be oriented to farmer circumstances/problems, rather than to commodity or factor ('How can farmers make optimum use of available resources?' rather than 'What is the best way to produce a commodity or control a pest?').
- Special attention should be paid to indigenous technical knowledge regarding the commodity/factor.
- Trial assessment must include economic and social factors, as well as biological. Biological attributes of production should be measured, but should also include components such as returns to cash investment and labour investment; risk of investment; acceptability and 'fit' into farm and farming system, etc. This means scientists should formulate checklists of questions/items to observe during the agricultural cycle (i.e. observe and write down what is happening on the rest of the farm, including who carries out land preparation/planting/weeding, how long does it take, what does it cost, what inputs were used, what activities clashed with each other, etc.).
- Farmers' evaluations of the activities must be included.

Farmer mandates

The outline research proposals from the researchers were finally screened by farmer communities during participatory community exercises. Most of the proposed activities were in agreement with the local farmers' own priorities, but some were rejected by farmers. At Oyuer scientists proposed research on (i) integrated pest management; (ii) groundnut; (iii) banana; (iv) *Striga* control; and (v) control of helminthic diseases. The farmers confirmed the importance of activities (i), (ii) and (iv) in their area and farming system, provided detailed information on their preferences, production practices and constraints on those topics, and agreed on the details and implementation of the research agenda. Bananas, however, were not widely grown in the area (although they are grown in similar agroecological zones elsewhere in south-west Kenya), and helminthic diseases ranked only fourth of the major animal disease groups prevalent in the area. Consequently, animal health research activities for Oyuer were redesigned, and participatory evaluations of bananas were relocated to other areas of south-west Kenya.

Similarly, discussions with farmers in other areas resulted in modification of some of the proposed activities: the use of leguminous trap crops in *Striga* control was vetoed by farmers, who insisted that control had to be through the development of resistant/tolerant maize and sorghum varieties; testing of ridging versus flat planting in potatoes was vetoed by the participating farmers on the grounds that they already knew the answer;

evaluation of indigenous vegetables in Timboroa was rejected as the farmers of that particular community were interested only in 'exotic' vegetables (cabbage, kale, etc.). In general the 'expert' opinions of extensionists and scientists matched reasonably well with the views of the collaborating smallholders, but the incorporation of farmers' opinions into the research agenda highlighted some differences with the 'expert' opinions and necessitated some changes for collaboration to be effective.

Source: Rees et al. *(1997a).*

5.3 EXPERIENCES FROM NGO PROJECTS WITH A COMMUNITY-BASED MANDATE

In the case of the Intermediate Technology Development Group (ITDG)-Chivi Food Security Project, there is considerable emphasis on understanding and developing local community institutions and structures through which to apply a participatory technology development approach. The context is one in which the NGO is establishing relations with the targeted communities, and has the opportunity to partner local government extension services and a conservation tillage research and extension project already working in the area which is also interested in working in a more participatory way with farmers. Rather than spend a long time in initial diagnosis and description of the farming system, this project went directly into identifying problems with the community and working back to develop a research agenda based on a deeper analysis of these problems.

CASE 5.5

ITDG-CHIVI: FARMER PARTICIPATION IN RESEARCH AGENDA/PRIORITY-SETTING

Towards the end of the Intermediate Technology Development Group-Chivi Food Security Project's first year of operation, a planning meeting was held with representatives of the selected institutions and community leaders. This planning meeting prioritized needs and agreed future plans. By this stage, the increasing participation of key community leaders in decision-making was becoming apparent.

Priorities that emerged were:

for field crops

- water
- draught power
- suitable seed varieties
- lack of co-operation
- lack of knowledge and skills
- landlessness

for gardens

- water
- pest management
- limited crop diversity
- lack of knowledge and skills
- lack of co-operation
- access to agricultural inputs

At the planning meeting the decision was taken to focus on water and pest control. There was recognition of the need to foster increased and improved co-operation within and between institutions, households and individuals.

At first there was no easy consensus on the relative priority of a multitude of problems. To enable farmers to reach a consensus, the cause–effect relationships between the prioritized problems were analysed. This analysis made it easier for farmers to recognize how these problems were linked, and how solving one problem could make it easier to solve others. The linkages were illustrated in the form of a problem tree, which was relatively easy to develop into a solution tree. The project staff assisted in identifying possible solutions by facilitating exposure to a wide range of options. This approach enabled each farmer to select ideas that appeared useful and sensible for him- or herself. This also made it easier for farmers from different wealth ranks to join the groups, because they all knew there was a good chance of something appropriate for them. In addition, the fact that the selected solutions were building upon local knowledge made it easier for farmers to participate confidently, because they felt they had something to contribute and their own skills and knowledge were being recognized.

Source: Croxton and Murwira (1997).

Unlike the ITDG-Chivi project, the Farmer Participatory Research Project (FPRP) did not start in a new area, but applied a farmer participatory research approach to existing farmer groups who were already involved in the ongoing agricultural development programmes of ActionAid Uganda. This involved sensitization of both ActionAid field staff and farmers to what was involved in participatory research, and how it differed from the previous project activities.

CASE 5.6

FPRP: FARMER PARTICIPATION IN RESEARCH AGENDA/PRIORITY-SETTING

Guidelines in the project document

The original Farmer Participatory Research Project framework states that, through discussion between field workers, researchers, farmer groups and interested individuals covering a range of household types and resource levels, a prioritized research agenda was to be produced. The framework specified that farmers' knowledge and experience were to be used in planning and designing the research. Topics needed to be amenable to research. A dynamic and flexible approach was to be followed to allow redesign, where necessary, in response to changing agricultural situations and shifts in farmers' priorities. An aim was to develop dialogue as a continuing process of explanation and reflection in research.

The project framework noted the risk/assumption that farmers would need to be motivated to perceive the value of research discussions without material incentives. There was also a concern that farmers' and scientists' perceptions would need to be compatible and lead to an agreed research agenda.

Experience

There was very encouraging farmer participation during the agenda-setting stage of the process in terms of numbers participating, the gender balance, and the effectiveness of the work done. The research agenda, including the prioritization of community issues for investigation, was developed by undertaking a programme of PRA, involving wealth ranking, problem ranking and transect walks, as well as a variety of semi-structured interviews. This process worked acceptably well with no major problems. This PRA process, in the very first instance, involved more women than men because of the project's concern to create a gender balance by identifying several women's groups. However, the initial meetings were village-wide and some attracted over a hundred participants. This demonstrates community willingness to participate, but not necessarily the effectiveness of the exercise, because it is usually easier to work with smaller numbers. Nevertheless, useful outputs were obtained that shaped the research which followed. Men and women contributed and interacted during this stage.

Farmers and the team interacted well in discussing and prioritizing potentially feasible solutions to the selected problems. The team attempted to encourage farmers to share their own local knowledge about the identified constraints. With regard to soil fertility, farmers and scientists exhibited a similar understanding of the issues. With African cassava mosaic disease (ACMD), this was less so. The investigation of local knowledge is important in guiding thinking on how to approach the identification of appropriate solutions, and who to encourage to participate. There may be more than one 'understanding' of an issue, and it is important to clarify this and then to create the space to fit together the understanding of farmers and scientists, in order to tackle the issue at hand in the most appropriate manner.

Formal researcher participation was minimal at this stage. This was regrettable, but good reasons exist. With hindsight the design of the ACMD trials, in particular, could have benefited from greater researcher involvement. The nature of ACMD is highly complex, and the early trials were ambitious and not very well thought through. Farmer participation was effective in terms of numbers taking part in designing the cassava trials, but greater guidance would have been sensible on selecting local materials and on systematically checking the status of the infection.

As far as priority-setting was concerned, farmer participation in all respects was very positive. A greater number of prioritization and agenda-setting meetings and discussions would have helped generate a more comprehensive and persuasive data set. Scant data on target-group characterization made it difficult to assess who exactly was participating, but at the time the team did not sufficiently recognize the need to know this. The larger group meetings inevitably did not involve all participants equally.

Source: Salmon and Martin (1997).

5.4 EXPERIENCES FROM TECHNICALLY FOCUSED RESEARCH PROJECTS

The final two case studies are on projects designed on the basis of needs assessment conducted prior to project design. Thus they both had a clearly defined technical focus from the outset. The Larger Grain Borer (LGB) Control Project illustrates a clear awareness of the arguments in favour of farmer participation in setting research agendas; inherent technical limitations when this involves a new problem; and the value of researchers attempting to enter the farmers' world and trying to understand technical and related socio-economic issues from the farmers' perspective.

CASE 5.7

LGB: FARMER PARTICIPATION IN RESEARCH AGENDA/PRIORITY-SETTING

Background: a new and difficult problem for farmers

The nature of the larger grain borer (LGB) problem (a devastating new pest which directly threatened food security), the lack of indigenous knowledge, and the complex and potentially hazardous nature of some of the potential technologies involved (e.g. pesticides) meant that there was a greater role for project researchers in agenda-setting than in the case of some other participatory technology development (PTD) projects.

Some PTD practitioners feel they should limit themselves to giving farmers the knowledge to conduct their own experiments, and to facilitating farmer-to-farmer extension. However, our experience was that, although experimentation by individual farmers generates many useful ideas and techniques, it can also be a slow and risky process for farmers where pest control is concerned. The risks are particularly noticeable in storage as, unlike growing crops where small patches can be devoted to experimentation, farmers normally use their entire maize store as an experimental unit. Although farmers in the project area actively experimented with pest control techniques (Box 5.1), most viewed their attempts less as an interesting and enjoyable activity than as a desperate search for a way to limit the severe damage caused by the new pest. Over 60% of farmers visited in village studies had made at least one change to their storage practices within 2 years of first experiencing LGB damage (Motte *et al.*, 1995; Magrath *et al.*, 1996). Control failures were common, and were sometimes penalized by heavy losses to pests. In particular, indiscriminate farmer experimentation with unsuitable pesticides often wasted money as well as posing a health hazard.

For these reasons, the Larger Grain Borer Control Project saw the collection, discussion, testing and improvement of farmers' ideas and experience as providing a useful service to farmers. In particular, the project could contribute entomological and pest control expertise, especially concerning pest ecology, insecticides and biological control; help with cost–benefit analysis (a need felt by many farmers); and help in assessing the risk of attack by LGB, a sporadic pest which is difficult for individual farmers as it requires an epidemiological approach. The project also made it a priority to provide information (via extension) to farmers about unsuccessful and/or potentially dangerous pest control methods.

Exploratory discussion meetings

Exploratory meetings were held with farmers from each agroecological zone affected by LGB before each season's trials. Extension field workers were asked to invite maize farmers with experience of LGB to the meeting. They were encouraged to look for experimental farmers who had already tried out some new ideas. The turnout was generally high, and several smaller groups of 5 to 15 farmers were formed, including all-women groups in some cases, in order to encourage full participation. In the meetings, farmers were asked to describe their experiences in maize storage and to offer any ideas that they had tried, or heard of, for controlling damage in store. Having heard farmers' ideas, the team then presented some of their own for farmers' comments. Finally, farmers were asked to rank their preferences for control methods, including those suggested by farmers and those from the team. The ranking was illustrated with a diagram on the ground, using local materials (leaves, palm nuts, etc.) as symbols for the different options (Magrath *et al.*, 1997b).

Who should participate in such meetings? Working with 'expert' farmers is recommended for participatory research (e.g. Okali *et al.*, 1994), but identifying them takes time. Although the team had invited local farmer 'experts', in practice the meetings were open to all who were interested, and this diluted the quality of the information obtained (Magrath *et al.*, 1997b).

How early should ideas be screened? The team felt it was important to obtain feedback from farmers on ideas for control measures as early as possible, to avoid wasting resources on options that would not be readily accepted. However, the earlier ideas are discussed with farmers, the less information both the team and farmers have about the options. Some farmers found it hard to comment on practices they had not tried or observed, and the team had only limited information on their cost-effectiveness or possible disadvantages (Magrath *et al.*, 1997b). In many cases, farmers said frankly "I like the sound of this option ... as long as it works well and is cheap!" (information they often hoped researchers would collect for them). This is not to say that ideas should not be tested early. Rather, farmer meetings should be repeated as trial work progresses and more information becomes available about the options.

Risks of rejecting potentially useful options. Similarly, by subjecting new ideas to a 'popularity contest' based on very little farmer experience, researchers also risk the rejection of options that may prove popular later. Two examples from this project were: (i) use of a local insecticidal plant (*Chromolaena odorata*) – a species rejected in farmer meetings as too toxic, but more recently tried by researchers in another institution and showing some promise; and (ii) shelling and treating maize with insecticide – an option emphatically rejected by the majority of farmers in meetings, but introduced through the extension services and recently becoming ever more popular, although it involves an extra investment cost and a major change in storage practice.

Short village stays/participant observation studies

A small team of two or three project staff stayed in each of seven villages for a week at a time during the first harvest period of the project's life, helping with harvest and storage of maize, and observing farmer practices (Magrath, 1993). Through meetings and discussions with farmers during the week, the team also investigated the social profile of the village, storage practices and their constraints, and possible control options and constraints.

Staying in the villages helped the project to gain the trust and confidence of the farmers for later project activities, although it could also cause some difficulties; for example, in at least one case the relationship between the farmer who agreed to host the team and others in the village influenced the initial reaction to the researchers. Observing farmer practices closely also taught the team much more than simply asking farmers how they did things in meetings. For example, the issue of delayed female access to labour for harvesting, which was strikingly obvious to the teams participating in the harvest, was not mentioned in any meeting (late harvesting leads to weevil and earworm infestation in the field, which in turn means that women's grain stores are nearly always more badly insect-damaged than men's). Important technical points observed included the way water was applied in stacking the maize cobs on the store, and the way farmers selected cobs before stacking. Finally, the overnight stays meant that wealth ranking and other discussions could be held at a convenient time in the evenings, and this increased participation, especially of women.

A more recent post-harvest project in Benin has taken participant observation much further, with researchers staying in one village for long periods (a year or more) and working with farmers to solve their maize storage problems, largely through the application of technologies already developed elsewhere. Clearly, there are trade-offs between geographical coverage and intensity of investment in a single location, so the results of this project are awaited with interest.

Collecting and documenting farmer experience

The following LGB project activities aided the collection of farmers' experiences.

- Frequent visits to villages and observation of stores which made farmers aware of researchers' interest in and respect for their ideas, so that they regularly volunteered information. Focusing on a single problem made it easier to collect farmers' experiences, as many farmers and extension staff quickly became aware of researchers' interest in storage and pest control techniques, and that any ideas and observations they had would be followed up.
- One-week stays in villages at critical times (harvest and store-filling).
- Exploratory group meetings with farmers to solicit opinions about proposed storage methods. At times these were rather theoretical, and the discussions held in conjunction with the farmer evaluation of station trials

were often better focused as there was something to look at. The project did not restrict such meetings to experienced and experimental farmers, which diluted the quality of discussion. Perhaps open meetings should have been seen as a necessary first stage, followed by meetings with the most experienced farmers focused on discussion of a narrower range of control options.

- Monthly project meetings included a time to share interesting field observations between all project staff. Attempts to persuade individual project staff to write down farmers' experiences, either in notebooks or on forms designed for the purpose, were much less successful than the verbal sharing of observations in meetings, which could be documented as part of the minutes. However, the quality of the information shared in meetings depended both on other staff taking on the role of active listeners and probing for more details, and on the patience of the chairperson who had to strike a balance between finishing administrative business and eliciting interesting observations.

Source: Compton and Motte (1997).

The Cashew Research Project (CRP) illustrates a somewhat different project story. Rather than starting with an awareness of and commitment to participatory research approaches, the CRP moved towards greater farmer involvement in the research process, leading to increased scope for farmers to influence the research agenda. This was facilitated by newer team members whose terms of reference addressed issues of increased farmer–researcher communication.

CASE 5.8

CRP: IS ASKING FARMERS TO EVALUATE TECHNOLOGIES NOT SETTING THE RESEARCH AGENDA?

It would be fair to say that the signing of the bilateral agreement was the last of any discussion on agenda and priority-setting within the Cashew Research Project. However, there was scope, even within the bounds of such a well defined project, for farmers to contribute to outputs. First, the project did make funds available for research on other crops or livestock through the Farming Systems Research Section of Naliendele Research Institute. Second, within the cashew research programme there was scope for farmers to alter the course of research. Thirteen of the 19 natural science researchers at the Institute were working on cashew-related problems. The discussion here focuses on the problems cashew researchers and farmers faced in setting agendas and priorities.

Although it is true that agricultural research scientists have preconceptions of the type of interventions that might be appropriate to farmers, farmers also have preconceived ideas of what scientists can and should do. In the case of the CRP, setting research agendas was not an issue of control over resources. The issue was the extent to which researchers had focused on developing packages, as opposed to interventions based on knowledge and information. (A working definition of 'package' is a combination of a tangible product with a minimum of attached information, the information being either printed on the back of a packet, or instructions passed on by an extension agent.) This over-emphasis on developing product-based interventions had left a host of development opportunities based on knowledge and information untapped. This also influenced where the line between the role of the researcher and that of the farmer was drawn.

Researchers, encouraged by the existing system of extension, presented science in a very simplistic way. Trapped by the notion that they had to develop packages for farmers, they saw the significance of much of their knowledge and information only as a means to developing packages, not as ends in themselves. The idea that the same knowledge and information may help farmers develop their own solutions was not considered.

Researchers were effectively depriving farmers of the chance to come up with their own location-specific solutions, in favour of developing generalized products which, by their very nature, could not possibly fit equally well in the many and varied environments farmed. This problem was not unique to researchers at Naliendele. The tendency for research to be product-oriented is understandable. From hybrid maize to agrochemicals, the status that researchers have managed to accrue has been through their ability to turn knowledge and information into designed, distributable products behind closed doors.

Farmers' preconceptions had come mainly from watching researchers. Farmers had concluded that the role of researchers was to bring things – improved seeds, blowers and fungicides – a logical conclusion from the empirical evidence they had to hand. With these self-reinforcing perceptions of each other, it is only natural that meetings between farmers and researchers focused on material things rather than knowledge and information.

If farmers were going to become partners in research, they first needed to understand at least some of the biological and ecological knowledge from which researchers were deriving their technical packages. Without this understanding, farmers would not have been able to adapt the technical packages, which would have remained 'sealed boxes'.

When the Integrated Cashew Management (ICM) Programme started, researchers tried hard to break away from the package-oriented discussion that had been the norm. At first, attempts to address issues of knowledge and information were often distorted by farmers' underlying strategic interests in inputs. Only persistence on behalf of the researchers could overcome that problem.

The initial ICM meetings between farmers, extensionists and researchers were held in 11 villages. The meetings brought researchers, extensionists, farmers from other villages already working in research groups, and local farmers together in a multilateral appraisal process. There was appraisal, analysis and presentation from all sides. Local farmers covered village history, local institutions, mapping, cashew production problems, and how wealth was differentiated. The visiting farmers explained how they had come to set up a research group in their village, what it had led to, and problems they had encountered. Researchers and extensionists explained what they knew about cashew and cashew production problems, showed villagers powdery mildew through a microscope, and played games to illustrate the logic behind cashew field upgrading strategies.

When farmers were looking at cashew powdery mildew spores through microscopes, one woman exclaimed "Eggs! The white powder is lots of little eggs". Researchers had explained that powdery mildew was a living thing, but many farmers also thought mist was a living thing. Bringing the word eggs into the conversation lifted powdery mildew from being merely a living thing, to being a living, reproducing thing. Understanding basic biological ideas such as the life cycle of powdery mildew enabled farmers to make sense of their environments differently, and so opened up new opportunities for them to explore. It was this added knowledge that gave farmers the opportunity to develop a new research agenda of their own.

Having understood what powdery mildew was, farmers tried a whole range of ways to beat it: different cultural methods of control; applying fungicides at different rates and intervals; trying combinations of fungicides (e.g. first organics and then sulphur). Powdery mildew is hard to quantify, and farmers needed more feedback on how their experimental management techniques were influencing the rate at which the disease built up. This was achieved by making changes to the way research data were used. To explain these changes, a brief description of how the technicians worked is needed as background.

Before the ICM Programme, teams of technicians had been employed to manage the on-farm trials. The technicians' job was to apply treatments as set out by researchers, to sample powdery mildew on trees in farmers' fields, to record the data on sheets, and to return them to the research station on a regular basis. Results were entered on a computer and analysed at the end of the season. By changing the role of the technicians, raw data flowing through their hands was converted into a valuable source of information for experimenting farmers, a window into powdery mildew epidemiology. The technicians were taught how to summarize the data on the disease and plot it on graphs representing each of the 20 fields from which they were collecting data. This information was plotted each week on billboards, providing a focus for weekly discussions with farmers.

This window of scientific information helped farmers in two ways: first, as feedback to assess the management methods they had chosen to control powdery mildew; and second, as an aid to deciding if and when to apply fungicides.

The combination of knowledge about the life cycle of powdery mildew and a means of monitoring the disease established a learning cycle in which farmers could evolve their management methods. The two components of the learning cycle were a new perception of the environment to spawn a diversity of ideas (differentiation), and hence new research agendas; and a feedback mechanism to assess which ideas or combinations of the ideas worked (evaluation).

Other examples of research opportunities created through farmer–researcher interaction

- During the course of the ICM Programme, researchers spotted other opportunities for farmer experimentation. Although many farmers had learnt to graft, few understood the reason for grafting. Many farmers thought the act of grafting itself created a more productive tree. Understanding that it was possible to capture desired tree characteristics by grafting encouraged farmers to look for good trees in their own environment.
- Farmers explained to researchers that the powdery mildew monitoring system was interesting, but the May–October time frame was too short. Researchers responded by extending the monitoring period and added a plot of nuts set per square metre of canopy.
- One farmer explained that he thought he had learnt something about the nature of cashew trees. He was watching cashew trees to see if applying fungicides during the first flush of new growth affected the intensity of the second flush. He had concluded that even a thin nut-set in the first flush would prevent trees flushing for a second time. Could researchers confirm this and explain why? The question was taken on by a pathologist as part of his PhD work.

Source: de Waal (1997).

5.5 CHALLENGES AND LESSONS

Situation analysis and agenda-setting as a process

Understanding situations and setting research agendas is a process in which power relations, false expectations and limited capacities each plays a significant part.

With regard to power relations, as the above cases indicate, it is largely researchers who are powerful in terms of initiating and facilitating the research process and deciding how project resources are used. At the start of the process it is most likely that researchers and farmers will have different agendas (Long and Long, 1992). Negotiation and trade-offs on both sides will be required for effective participation in developing a research agenda that meets the interests of both. Farmers usually start from a position of comparative weakness.[1] If they are new to agricultural research they will be unsure about what is on offer, or what the implications of refusing to collaborate will mean. Researchers start from a position of relative strength. Very few will enter into a dialogue with farmers without an agenda: their own ideas about what the problem is, what is needed, and perhaps specific technologies they believe will work in a local situation.[2] They may even have a research paper in mind before they begin to talk to farmers.

The expectations farmers start with will depend on their past experience. Farmers without experience of formal agricultural research may view researchers as representatives of development agencies bringing them inputs and credit as well as new products. As the CRP showed, these expectations may inadvertently be fulfilled by researchers, who are anxious to promote particular technologies and win favour with farmers. Researchers may also expect farmers to freely express their views during early meetings and to desire involvement in formal experimentation. They may become disappointed when they think they have been given misleading information by farmers, or when they think everything has been discussed and agreed, only to discover later that there was only token agreement based on limited understanding and due to farmers not wanting to appear impolite or unwilling to their visitors.

Limited capacities, of both researcher and farmer, have a major bearing on the extent to which power relations and false expectations hinder the situation analysis and agenda-setting process. Researchers may be new to participatory research, as was the case with the early ARPTs and the FPRU and, therefore, unskilled in communication with farmers and in facilitating dialogue. Younger researchers may also have limited technical capacity. Farmers may regard these researchers as 'experts', able to answer all technical questions, while the researcher may have knowledge of only a specific technical area, and very limited experience of applying this knowledge in field situations. Farmers' capacity to become involved in the research process may also be limited, due to either limited experience, poor understanding of what is involved, or resource limitations.

If situation analysis and agenda-setting are viewed as a process rather than an event, the issues of power, expectations and capacity can be worked on over time as relations of trust and mutual understanding are established. The lesson to be learned from the cases is that it does take time. Once both researchers and farmers have passed through a cycle of PRA, planning and experimentation together, they have a clearer picture of what is required, and what to expect in the future. As demonstrated with FRGs in DAREP and ARPT, such groups were able to put forward suggestions at trial planning meetings (Mellis, 1997) and, with facilitation from a frontline extension worker, can meet without any researcher to discuss research agendas (Sikana, 1994; Sutherland *et al.*, 1997c).

Influences on situation analysis and agenda-setting

There are important potential influences, both from farmers and researchers, during research agenda-setting. Researchers' awareness of these influences will improve their facilitation of dialogue during agenda-setting.

Project mandates, objectives and resources. A researcher involved in situation analysis and agenda-setting may have an open mind, but nevertheless may be constrained by a predetermined research mandate about what type of research to undertake. The project time scale, budget and technical capacity are also very likely to influence the research agenda. Three-year projects such as DAREP and NARP II (Cases 5.3 and 5.4), with time-limited budgets, are unlikely to stimulate exploratory and in-depth technical research into complex issues. Community-based NGO projects such as ActionAid FPRU and the ITDG-Chivi Project starting a participatory agricultural research initiative are likely to have limited human resource capacity to handle the broad range of technical research topics generated by an open-ended participatory approach to situation analysis (see Cases 5.5 and 5.6).

Past experience of farmers. The agendas farmers bring forward during early meetings with researchers are heavily influenced by their experience of previous projects, as illustrated by the challenging PRA experience in DAREP (Case 5.3) and that of other projects such as the Farmer Participatory Research Project in southern Ethiopia (Ejigu Jonfa *et al.*, 1998). Because previous projects have usually been oriented to delivering development and technical packages, farmers tend to pressure for product-based interventions rather than information-based ones.

Farmers' immediate circumstances. An important influence is the immediate circumstances and time horizons of farmers. Poverty and insecurity of livelihoods are likely to bring immediate problems, such as the need for food and cash, to the forefront. Longer-term problems such as deforestation, soil erosion and soil fertility decline are likely to be overlooked during situation analysis. In the discussion of what can be done to address identified problems, research may not appeal to many farmers, who may demand more immediate solutions that they know about.

Knowledge of alternative options. As illustrated in Cases 5.6–5.8, farmers' agendas are also influenced by the extent of their knowledge of alternative opportunities. Specialist knowledge on the biology of a particular pest or disease, or the future market prospects for a particular commodity, may not be accessible to farmers. In addition, the ability of researchers to access farmers' local knowledge is likely to influence researchers' inputs into searching for technical options (Drinkwater, 1994; Marsden, 1994; Warburton and Martin, 1999). Related to this is the value farmers place on their own technical knowledge during discourse with researchers. If farmers place a low value on their own knowledge relative to that of outsiders, they will be less likely to share it. Similarly, if ownership of specialist knowledge is jealously guarded, this will limit contributions during meetings. In such cases additional effort may be required to access specialist knowledge, as illustrated by the DAREP research into animal health issues (Sutherland and Kang'ara, 1999).

Increasing farmers' influence on agenda-setting

How to practically increase farmers' influence over public sector research agendas remains a challenge to research institutions and projects targeting small-scale farmers (Biggs, 1989; Okali *et al.*, 1994; Farrington, 1995). As illustrated by the ARPT (Case 5.1), the early farming systems research programmes left the task of deciding on the research agenda largely to the researcher. The introduction of more participatory approaches into ARPT, including PRA and FRGs, challenged this practice. These more participatory approaches have been illustrated in the cases in this chapter and those outlined in Chapter 8. They include PRA tools for ranking, problem analysis and seasonal calendars, FRGs, farmer planning workshops, technology fairs, and farmer study tours. While these newer approaches have a valuable contribution to make, each also has certain limitations or potential pitfalls, summarized below.

Avoid using PRAs for 'rubber stamping'

The case-study experiences show that PRAs conducted early in the life of a project provide a very useful way of consulting farmers before deciding which trials to conduct. They can be conducted over a wider area than that planned for research trials, facilitate dialogue between farmers and between professionals, give fast and fairly reliable information, and allow the project to focus on representative villages and key researchable issues. One limitation arises from the power imbalance during PRA. It is the researcher who usually draws up the initial checklist, asks the questions, orchestrates the discussion and analysis, writes up the results, and selects from the results in order to justify a particular course of experimentation. The risk is that a research scientist may use a PRA as a 'rubber stamp'.

Results from surveys/PRAs become 'timeless truth'

A further danger, illustrated in the ARPT case, is that once a diagnostic survey or PRA has been undertaken to guide research priority-setting, the results are seen by researchers as 'truth' and become the basis for justifying all experimental activity for the next 5 years or so. It is important for research scientists to realize that the rural environment is dynamic. Demands and problems are changing or becoming modified as populations and influences change. PRAs are usually conducted at a particular time of year or season, and perhaps in a year/season which is not typical. The content of the investigation is usually strongly influenced by the ideas of the professional team implementing the PRA. In some cases distorted information is provided on purpose by farmers, and the true picture may come out only slowly as a relationship of trust is built between researchers and farmers.

Rigid or mechanistic implementation of PRA

The cases described in this chapter illustrate clearly the fact that the scale, scope, timing and style of PRA and other needs assessment may vary, depending on the scope of the project. The ARPTs, NARP II, KFSRE and DAREP had a broad technical mandate, and the content of needs assessment was shaped by the researchable priorities of natural resource users, along with the interests of the researchers involved. The LGB and CRP projects were more focused, and the extent of situation analysis was limited to the narrow technical scope of these projects. Moreover, regardless of the technical scope of the project, the greater the variability and complexity of the farming system, the more skill, time and effort is required for situation analysis and developing research agendas with farmers.

Output demands from donors

The cases document that obtaining an accurate understanding of needs and priorities can often be difficult and time-consuming, and requires several phases of discussion with farmers. There may be an inherent conflict between the time and resources needed for an effective situation analysis and the demands by donors and recipient governments for outputs from participatory research. This may pressurize project staff into mechanistic or superficial situation analysis.

Farmer workshops

One or more workshops at community level, with well facilitated dialogue centring on farmers' problems and interests, can often achieve verbal agreement between farmers and researchers about an agenda for conducting on-farm trials. This was illustrated in the two NGO cases above, and has been documented elsewhere (Neilsen *et al.*, 1997; van Veldhuizen *et al.*, 1997).

Farmer representation

Another option is that the farmers should be represented on higher-level research decision-making bodies. The KFSRE project attempted to promote this idea, but with limited success (Case 8.8). This concept is discussed further in Chapter 8 (section 8.6).

Farmer research groups

A more immediately workable option for involving resource-poor farmers in decision-making on research agendas is the FRGs, documented in some cases described here. This option is discussed in Chapter 8 (section 8.3).

Stakeholder meetings

A more recently tried option is to hold stakeholder meetings to discuss research priorities. Which stakeholders should be involved will depend on the context of the project. For example, in a national agricultural research system setting, further discussions and consultation with other specialist researchers on the extent of the problem and what can be done about it may be required after the needs assessment (Tripp and Woolley, 1989; Sutherland, 1997). Stakeholder consultation provides an opportunity to include others who have not been involved in the situation analysis, as the DAREP case on tools and tillage research illustrates. Alternatively, as the case of NARP II illustrates, stakeholder meetings can be held prior to situation analysis through PRA, to enable the rapid formulation of an initial adaptive research programme. The LGB project involved traders in discussions relating to situation analysis and research agenda (Case 5.7).

Advertising research solutions

The KFRSE, DAREP, NARP II and ITDG cases document the practice of advertising available technology options to farmers. In the KFSRE project a technology fair approach was used. DAREP used farmer open days and tools shows. NARP II used meetings with farmers, and ITDG used visits to a research station. These all provide a means of developing an initial research agenda through a more supply-side approach, avoiding long delays in responding to farmers' interests, and starting with what researchers have at hand.

Further convincing farmers on technical options

At times, solutions may be identified and promoted by researchers but farmers need to be further persuaded or convinced to undertake experimentation on-farm. If researchers are convinced but the collaborating farmers are reluctant, it may be worth organizing a farmers' tour to visit an area where this technology is being practised, as the DAREP case of soil and water conservation above illustrates (Case 5.3).

Local people should be encouraged to develop their own ideas and variants, and it may be useful to discuss ways in which they have already tried to tackle the previously identified problem, and what effect this has had. As a rapport is built up on a particular topic, discussions should also screen indigenous technical knowledge and previous experimentation by villagers. There may be recognized specialists in that topic within or near a community, and it may be worth identifying any and inviting them to join in discussions, or making later visits to them for more in-depth discussions (Case 5.2).

5.6 CONCLUSIONS

In analysing situations and developing a research agenda with farmers, projects should start with an awareness of the factors that are likely to help and hinder the process. These are summarized in Box 5.2 below.

The number of hindering factors compared with helping factors serves as a reminder that this aspect of participatory research is particularly challenging. The risk of using PRA and farmer meetings for largely extractive purposes will be reduced by careful consideration of likely hindering factors prior to the initiation of PRA. There are many useful guidelines and manuals for situation analysis (e.g. van Veldhuizen *et al.*, 1997). Boxes 5.3 and 5.4 contain a few tips which may also assist in this endeavour.

NOTES

1. One case-study author notes that it is "best to develop a research agenda over a period of 2–3 years. When the researcher 'aura' is diminished – farmers have better self-confidence. Moreover this is best developed after trials have been undertaken. Farmers will have a clearer idea of what you are talking about and what is required." This assumes that the project has sufficient time to adopt a longer-term approach to agenda-setting.
2. The same case-study author also notes "and it is for this reason that the research agenda should not be done by a scientist – best is extensionist, who can articulate the farmers view to researchers."

Box 5.2 Factors helping and hindering farmers' participation in setting research agendas

Helping	Hindering
Existing farmer research capacity on which to build farmer–researcher dialogue and research agenda review with farmers	Projects with limited time and/or large area mandates and pressure for fast results, making it hard to build dialogue, farmer capacity and institutions for reviewing research agendas
Social scientist team members with experience of agricultural research and participatory appraisal approaches	Limited exposure, experience and skills of technical researchers in participatory research philosophy, methods and facilitation skills
Natural science team members with experience of participatory methods and who want to understand relationships between biophysical and socio-economic issues	High dependence on co-operation with national research staff who are both busy, and geographically and organizationally remote from the project area
	Institutional structures making it more difficult to draw researchers closer to farmers, such as national research staff in commodity-based divisions and extension staff in regionally based divisions
	Unsupportive national policies, such as a research strategy that does not specifically require farmer participation in setting the research agenda

Box 5.3 Some basic principles of rural fieldwork, including PRA/diagnostic exercises

- Be sensitive and respectful to local cultural traditions and protocol.
- Minimize translation – use the vernacular as much as possible.
- Involve a wide range of stakeholders (extension staff, national commodity and specialist researchers, NGO staff, agribusiness representatives) in the planning and implementation of participatory diagnostic activities.
- Have at least one team member with positive and in-depth experience of PRA.
- Aim for a good gender and disciplinary balance in the PRA team.
- Start with an honest explanation of the project's intended work, giving a community the chance to decline the offer to participate.
- Address potential bias by carefully selecting a cross-section of key informants (e.g. from different gender and age groups) to take account of different perceptions, and holding separate discussion groups with these if necessary.
- Limit discussion group size to no more than 20–30 farmers for general group discussions in order to maximize effective participation.
- For more focused group discussions, limit numbers to 5 to 15 people, to cultivate effective participation and create opportunities to explore issues in greater depth.
- Use a mix of methods to try and maintain participants' interest.
- Give farmers the opportunity to take on responsibilities in meetings.
- Avoid busy times of farmers' days and agricultural calendars.
- Don't make meetings too long – you can revisit issues in later meetings.
- Be flexible enough to work round specific situations and make the most of opportunities as they arise.
- Don't pressurize farmers into making contributions during meetings.
- Acknowledge team shortcomings when they arise.
- During analysis with farmers it is important to identify the underlying cause of the problem, rather than just the symptoms.
- Asking farmers to rank problems or priorities, starting with the most serious or important, provides more information than simply making a list, and reduces the risk of researchers distorting farmers' views to fit their own priorities.
- Do allow plenty of time to share information gathered in the field within the team and to reflect on the implications.

Box 5.4 Some tips for setting research agendas with farmers

Do:

✔ Consider stakeholder analysis as an early part of the agenda-setting process, so that the interests and perspectives of different groups are incorporated.

✔ Try and achieve geographical and topical focus early in the on-farm research process; focusing on a few strategically located target areas will maximize opportunities for researcher–farmer meetings and dialogue.

✔ Invest early in training frontline staff in participatory approaches and methods, such as training for transformation, and expose technical researchers to participatory research philosophy and methods early in project implementation.

✔ Provide farmers with training in a range of skills, both technical and those relating to empowerment and conflict management, to increase their confidence.

✔ Explore options for representing farmers' groups at district, regional and national levels to better link local farmers and extension with commodity-based researchers.

✔ Consider forming focused FRGs to develop dialogue and a mechanism for seasonal research agenda review by farmers.

✔ Cultivate a sense of realism in relation to what the project can deliver during dialogue about a research agenda.

✔ Develop the agenda through negotiation with farmers, rather than during one-off consultation meetings.

✔ Be sensitive to gender participation, and develop strategies to include both representative and targeted participation in planning activities.

✔ Avoid long delays from researchers during negotiations, as this damages their credibility with farmers.

✔ Draw on a range of methods to sustain dialogue and develop an agenda, including visualization techniques, cross-visits, technology markets, community and farmer group meetings, farmer workshops, farmer representation at research planning meetings, or advocacy on behalf of farmers at these meetings.

✔ Make use of willing farmers for setting up meetings and mobilizing local people.

✔ Identify and cultivate key local people as the research proceeds.

Don't:

✘ Communicate messages and signals that unnecessarily raise expectations among farmers and other collaborators.

✘ Adopt domineering and dictatorial attitudes that will put farmers off.

✘ Over-stretch the team so that it cannot effectively cultivate relationships and dialogue with farmers at earlier stages in the process.

✘ Make commitments to farmers that cannot be honoured.

Experimentation with farmers

6

This chapter starts by examining the concept of experimentation, and the reasons for farmer participation in formal experimentation. It then describes how projects have involved farmers in experimental activities, from design through to evaluation and redesign. A discussion of issues and lessons relating to experimentation with farmers follows. Some of the helping and hindering factors are identified, together with tips for improved practices.

6.1 WHAT IS EXPERIMENTATION?

As documented in Chapter 5, agendas for research may be identified with farmers at the end of a participatory rural appraisal (PRA), or as the result of a series of meetings between researchers and farmers. A research agenda in participatory agricultural research often consists of further investigations into one or more prioritized problems or opportunities. These investigations may include further exploratory activities in order to gain a better understanding of a particular problem or opportunity. More often, however, they involve the application of 'new'[1] knowledge and technology in a attempt to solve a problem or exploit an opportunity. The process of testing new knowledge and/or products in a local situation, using some form of controlled comparisons to assess efficacy, can be termed 'on-farm experimentation'.

Experimentation in agricultural research usually refers to systematic efforts to compare and contrast technology performance, and also to further investigate biophysical relationships. The process of experimentation includes design and planning, implementation, evaluation and redesign:

- design and planning in this context includes deciding what to test, how and where it should be tested and who should be involved in the process
- implementation includes the conducting of the experiment, and particularly refers to implementation of the agreed plan for the experiment
- evaluation can be seen as part of implementation: it describes the process for assessing the efficacy of the experiment in addressing the identified problem (assessment covers evaluation of the technologies as well as of the methodological and practical aspects of experimental implementation).

This type of evaluation provides important information to assist with the redesign of an experiment, should there be a need to continue it with modifications based on previous experience and reflection.

6.2 DO FARMERS EXPERIMENT?

That farmers everywhere undertake their own informal experimentation is well established. However, little has been documented on farmers' own experimentation (Okali *et al.*, 1994). Farmers' approaches to experimentation may have some similarities to those used by researchers, but there are also likely to be significant differences. Some differences between the way researchers and farmers go about experimentation have been highlighted in the literature (Richards, 1989; Salas, 1994; Scoones and Thompson, 1994). For example, farmers tend to weave experimentation into their farming practices rather than have separate experimental plots (Stolzenbach, 1997), and to innovate through pragmatic responses to new situations (Scheuermeier, 1997). Researchers systematically plan, analyse and make a clear distinction between farming on the one hand and research trials on the other. Farmer experimentation is much less formal in approach, and is not constrained by statistical and documentation procedures. Farmers often have the advantage of long experience of a particular environment and enterprise which enables them to make well informed, qualitative assessments of technology performance, potential and suitability under their local conditions.

Farmers are not accountable in the way public sector researchers are, in that their experiments are not funded, and they do not have to justify what they do and how they do it to their colleagues. In fact farmers may be very secretive about any experimentation they do, and only share information when they have impressive results. The research station and the laboratory provide researchers with a measure of privacy. However, when researchers commit themselves to undertaking research with farmers they are exposing themselves to careful observation by farmers, and usually committing themselves to a greater degree of openness about the research process. Similarly, farmers who agree to collaborate with researchers will be exposing themselves to increasing scrutiny from the researcher, and also other local farmers involved.

6.3 WHY SHOULD FARMERS PARTICIPATE IN RESEARCHERS' EXPERIMENTS?

Chapter 5 began with a justification for involving farmers in situation analysis and setting formal research agendas. It was argued that this will make formal research more effective, increasing the likelihood that it will address the real needs of farmers. Farmer involvement in the formal research process continues in the design, implementation and evaluation of experiments to address the research agenda. Having participated in defining the research agenda, we would expect farmers to contribute to the process of experimentation. Farmers have a lot to contribute and to teach researchers about experimentation under their conditions, as well as something to learn. Being highly knowledgeable of their local environments, and of the consumption preferences and production constraints within their communities, farmers are well placed to offer guidance to researchers in the design of research trials conducted on their farms. The case studies below, covering a wide range of technologies and agroecological conditions, are practitioners' accounts of involving farmers in their experiments.

6.4 PRACTITIONER NARRATIVES OF MORE PARTICIPATORY EXPERIMENTATION

The cases below illustrate a range of approaches to involving farmers in researchers' experimentation, in both on-station trials and a range of on-farm trials. Some also document efforts to encourage farmers to undertake their own experiments, supported by inputs from researchers. All the projects used a mixture of approaches to experimentation. However, many gave comparatively more weight to the farmers' own assessment of the technologies being developed and tested than to the statistical results of the trials. Some other projects continued to attach importance to statistical results in addition to farmers' assessments. We start by looking at the projects in which relatively more importance was attached to experimentation in which farmers played a lead role in trial design and evaluation.

The Intermediate Technology Development Group (ITDG)-Chivi Project, through a partnership with an established conservation tillage research project, actively worked to persuade farmers to play an active and creative role in on-farm experimentation.

CASE 6.1

ITDG-CHIVI: EMPOWERING FARMERS IN EXPERIMENTATION

Participation in experimental design

Between 1991 and 1992 the conservation tillage project, working in association with the Intermediate Technology Development Group, had enjoyed limited success with adaptive on-farm trials. One problem was that farmers did not, in the main, feel empowered to undertake their own modifications to researchers' experiments, and also that the frontline staff had, contrary to instructions, been telling farmers to follow their instructions to the letter. Following this, training for transformation and participatory planning meetings were held in order to further empower farmers and frontline extension staff in participatory approaches.

Once the areas of technical focus had been agreed with farmers in the participatory planning meetings (Case 5.1), the next stage was to undertake studies of traditional and current practices in soil and water conservation and pest control. This process was accompanied by a series of feedback meetings to discuss the strengths and weaknesses of different practices. For many who attended these meetings, this was the first time outsiders had sought farmers' opinions on such technical issues (instead of simply teaching farmers).

The project team now expanded to include a second full-time staff member, who had agricultural extension experience. In addition, the rapid growth in activities soon meant a full-time administrative assistant was required. However, the growing feeling of ownership of the whole process by community members meant there was little risk of the additional project staff upsetting the development of greater community decision-making and control.

After farmers' knowledge and experience of soil and water conservation and pest control had been explored, the next stage was to explore and experiment with technology options. Effectively, two parallel sets of trials using two rather different approaches developed in Chivi.

On the one hand, research station staff were conducting their own trials in farmers' fields (the more conventional model of farmer participation in on-farm research). At first, researchers were very rigid in trial design and did not allow any input from farmers. This experimentation resulted in an interesting development, as non-trial plots consistently outperformed trial plots. The difference being that, left to their own devices, farmers adapted ideas to suit the particular microenvironment of an individual field (or part of a field). The researchers, by contrast, adopted a blueprint design and prescribed rigid management practices.

During the first year of the project, researchers conducted the on-farm trials in their usual manner. Before moving into the second year of trials, a review was carried out to assess the performance of the first year's trials. This is when farmers were able to bring up their concerns. They pointed out a number of important issues: that the area of research being emphasized was not currently a priority problem of theirs; that the resources being used by researchers were not appropriate because most farmers could not obtain them; that the trial design was too complex – the host farmer could not remember the treatments on each plot and share them with other farmers; and that farmers were not allowed to carry out certain activities without first consulting the researchers. Farmers felt that they had no control over what was happening.

Farmers then persuaded the researchers to allow them to carry out trials in a way that utilized their own knowledge of crop and water management. The farmers' club's Area Committees organized meetings where villagers selected two farmers from each village to conduct the trials. Further workshops for farmers and researchers were organized at the end of the season to review and evaluate both the management of the trials and the results. This new form of collaboration produced more successful results. Trials have included new varieties of maize, sorghum and cotton, and soil and water conservation techniques.

The project also tried always to ensure that concerns from both sides were brought up in a forum and debated as openly as possible. As a result, farmers and researchers developed a more productive approach to testing and modifying technologies. For example, researchers introduced a high-wing ridger, but farmers ended up substituting a modified single-mould board plough.

The second set of trials were initiated by farmers themselves. Here, for example, millet varieties obtained (through the project) from farmers in another part of the country were tried by a number of farmers, with the farmers' club's Area Committee organizing the distribution of seeds. In a similar fashion, farmers modified initial designs for tied ridges developed by researchers, but also went ahead to initiate new technologies such as infiltration pits to improve the management of water in crop fields, particularly in the semi-arid areas.

After recognizing the need to focus on a small number of farmers and gardeners for initial experimentation, community meetings were held to select two farmers' clubs and two garden groups for pilot project activities. This process allowed the community to make the final decisions on selection. It also provided a transparent selection process which everyone understood, and so mitigated against jealousies building up amongst those who were not taking part in the pilot work.

Exposure visits were the key activities in the initial development of pilot experimental work. Research institutes and other NGO field projects were visited, and a few particularly innovative farmers were also identified and their farms visited. These visits were organized by ITDG, but made by representatives of the pilot groups. The visits were followed by community meetings where those who had made the visit fed back their findings. Then the pilot groups selected technologies and techniques to try out in their own plots.

Evaluation of technology and review of experimental agenda

All evaluation of technologies and techniques was (and still is) done by farmers and gardeners. The pilot groups were trained in the technologies they had selected, either by research station or other NGO staff, or other innovative farmers. They then tested these in their fields or gardens. Activities included subsurface irrigation; pest management; water harvesting; crop diversification; and shallow well improvement.

An important part of this process was field days for options. At these field days, farmers who had been on exposure visits (and sometimes researchers from the institutions that had been visited) reported on techniques they had seen. Some of these were demonstrated in farmers' or gardeners' plots. These field days provided an opportunity to expose a wider cross-section of the community to new ideas. This in turn enabled people to choose certain techniques with which to experiment, combine with their own techniques and/or modify with their own ideas.

Encouraging pilot groups to adapt basic principles to their own plots, rather than using exact copies of particular designs or techniques, contrasted with the conventional, highly prescriptive approach to extension. Typically, the conventional approach discouraged experimentation and did not acknowledge farmers' own skills and knowledge. For example, farmers were prohibited from making any changes in the design specifications of recommended soil and water conservation structures.

Regular mini-reviews by pilot groups and other village members were (and still are) the main means of sharing information and analysing progress and problems. Once the basket of techniques had been tried out by a number of farmers and/or garden groups, demonstrations were organized which were attended by other farmers/gardeners and research station staff. These demonstration days allowed widespread sharing of the results obtained, and also provided the opportunity for modifications to particular technologies to be explored, compared and contrasted.

In addition, community reviews held with representatives from the selected villages were the fora for obtaining an overview of progress and planning activities for the coming year.

A sustainable learning cycle

The projects approach to planning and evaluation has been based on an iterative cycle which repeats a cycle of planning–action–review–planning, and so on. Part of the benefit of this process is that it has been successful (combined with leadership and specific technical training) in building the capacity of the partner groups (and, to an extent, the wider community) to plan, act and review independently of ITDG. Not only do group representatives plan together, but they also feed back to group members in order to both share decisions and have these decisions ratified. There is a combination of improved management skills and increased democratization of groups that builds capacities beyond the specific technical skills associated with a particular technology. This provides a major foundation for a process of experimentation that can be sustained without continual external support.

Sources: Croxton and Murwira (1997); Hagmann et al. *(1997).*

The Farmer Participatory Research Project (FPRP) in Uganda started experimentation with farmers in a less favourable institutional environment than ITDG-Chivi in Zimbabwe. It lacked a close association with an ongoing technical research project with similar aims, and was staffed by a team lacking in-depth experience of farmer participatory research and also of mainstream technical research. While designed as a community-based project that would develop links with mainstream research programmes, in common with ITDG-Chivi, the FPRU project attached importance to empowering farmers and, as far as possible, harnessing their indigenous knowledge and skills in the research process.

CASE 6.2

FPRP: AIMING FOR COLLEGIATE EXPERIMENTATION

The original Farmer Participatory Research Project framework states that a methodology including trials and experiments was to be planned and designed with groups of smallholder farmers, individuals and scientists.

Farmer participation in experimental design

The team aimed to facilitate collaborative and, if possible, collegiate participatory research. Therefore the team, with the participating farmers, developed several guidelines regarding experimental design, but the farmers were left to make their own decisions about how to proceed. This was a deliberate policy to build farmers' confidence as experimenters, rather than depending on agricultural 'experts'. Farmers could choose whether or not to use a control and whether to replicate within their own farms. This process was facilitated by the team, but participating farmers entered into a serious dialogue with the team, rather than being superficial and merely polite.

A trial process began which continued throughout the project, with encouraging levels of participation from the farmer groups and individuals, and in the latter part of the project a cluster of neighbouring farmers also took part. Both men and women participated. Some of the husbands of members of the women's groups developed an interest in the trials and assisted their wives, and some began their own trials.

Initially, some participating farmers wanted to establish one big plot for their group which would have been managed jointly by the group members. In practice, the farmers decided to favour individual plots because of previous problematic experiences with group management of gardens.

Those farmers willing to participate also showed themselves willing and able to design and implement trials. Farmers undertaking the soil trials generally included control plots because this required only a small amount of additional land. Lack of planting material influenced decisions about control plots for the farmers participating in the cassava variety trials. Farmers also decided on the number of treatments, also influenced by the availability of planting material and seed as well as land. Farmers were usually willing to share cutting material with other farmers.

Overall, the farmers demonstrated considerable commitment to their trials, even if the cassava trials could have been designed more effectively. Greater assistance from formal cassava scientists could have been very useful at this stage. There were, not surprisingly, cases where participants did not continue with the trials, either temporarily or permanently. Table 6.1 sets out factors helping and hindering farmer participation in trial design in FPRP.

Farmer participation in the evaluation of technology

The project framework concentrates on the evaluation of the effectiveness of participatory methods. The project document states that the team should explore simple methods of involving farmers in recording and evaluating trial results. There were to be seasonal reviews by all participants.

Table 6.1 Factors affecting farmer participation in FPRP trial design

Promoting factors	Hindering factors
Treating the participants as partners	Farmers have too much work on other, higher-priority tasks
Provision of reassuring and encouraging support	Destruction of the plot by domestic/wild animals
Display of a positive attitude towards participants	Reduction in labour availability due to illness of participant or other family member, and/or death in the family
Sensitivity towards the circumstances and culture of the participants	Migration to another area
Support for farmers' own experimentation leading to greater farmer confidence	Achievement of objectives in participant's view before the end of the research project
	Final realization that free inputs/hand-outs will not be forthcoming
	Inadequate land/resource availability
	Perceived degree of threat to the livelihood of an individual posed by the problem being investigated
	Farmers considering the problem is too complex

The project team instituted group evaluation meetings at the end of each season (twice a year), during which a range of issues were discussed. The intention was to try and systematize the evaluation of the trials, and to bring together evaluation criteria of farmers and researchers (and in so doing try and increase shared understanding and create a platform for developing ongoing plans for further experimentation). Thus the meetings aimed to look at the progress of the trials, formulate plans, and address the research process (methodology) itself.

Participatory evaluation is difficult and relies on the effectiveness of ongoing collection of monitoring data. This also proved difficult to develop, partly due to a lack of awareness in the project team over the importance of exploring monitoring options. However, several very useful evaluation meetings were held. These involved many of the participating farmers, as well as some non-participating farmers. Researchers were also invited. Agendas for the meetings were agreed at the meetings by the participants. The team organized and facilitated the meetings, although some willing farmers effectively co-ordinated the arrangements in the village – one even drew and displayed posters advertising the meeting.

The meetings consisted of a mixture of small group and plenary discussions in which a high level of discussion and interaction always seemed to transpire. Farmers, both men and women, had the confidence to share their thoughts and experiences. Men and women reported back to the plenary sessions and sometimes facilitated a plenary discussion.

The team altered the approach to meetings away from field-site reports from individuals and towards encouraging discussion about different issues, problems and achievements. This was intended to allow comparisons between common aspects of the trials, and aimed to assist the production of conclusions during the meetings. The participants could take these away with them, and they could be reassessed at subsequent meetings. Some non-participating farmers who attended these meetings entered the trial process as a result. Participating farmers sometimes helped new participants with planting material.

The project held separate evaluation meetings for the different trial types: soil fertility and African cassava mosaic disease (ACMD). Meetings were held with local concentrations of farmers, as well as some meetings for all farmers participating in a particular trial. The latter were especially appreciated by farmers for providing an opportunity to share ideas with co-participants they would not normally meet.

Farmer participation may well have been enhanced if a more successful monitoring process had been developed. The data from this could have fed into the seasonal evaluation meetings. Given the nature of the evaluation meetings, farmer participation was very encouraging, and useful data (for the team at least) were generated. Only one evaluation meeting had to be abandoned when no farmers turned up (due to a severe threat of rain and a burial in the village). Other meetings started frustratingly late. On one of the few occasions researchers came to one of these meetings it started 3 hours late, by which time the researchers had decided to leave. Farmers were late because a storm the previous night had badly damaged their banana plantations and the farmers had to rescue the bunches and deal with damaged plants. Researcher input was disappointing. This was partly due, at least, to difficulties of co-ordinating such inputs, as well as the competing schedules of researchers whose participation had not been formally agreed (Table 6.2).

Table 6.2 Factors affecting farmer participation in trial evaluation

Promoting factors	Hindering factors
Make evaluation meetings as participatory as possible	Time needed for co-ordinating and organizing meetings and sending reminders to farmers
Offer individuals responsibility in the meetings	Rain/threat of rain
Ask farmers to choose the location and time of day for meetings	Local burials and illness
Provide a snack or lunch if meetings run over a meal time	Storm damage
Assist farmers with transport to and from meetings	Lengthy meetings due to volume of information wanted by the team
	No refreshments provided
	Distances some farmers have to travel to get to a meeting
	Other competing interests such as a market in a neighbouring village
	Follow-up meetings to discuss overspill issues from the first meeting

The Dryland Research and Extension Project (DAREP) illustrates greater plurality in experimental approaches within a public-sector research organization. The differences are reflected both in the challenges and opportunities relevant to the various technical research components, and in the different approaches of the individual scientists leading these research components. Case 6.3 focused mainly on the approach used by researchers involved with soil and water conservation experiments. Contrasts are also drawn with other approaches used within the project team. The DAREP was in a unique position compared to the other projects described, in that it started with an established infrastructure of trial sites located within local communities, and with locally recruited staff who were trained in experimental layout, management and data collection. This capacity for conducting formal experimentation within the local community, but without the local community carrying the associated costs and risks, allowed the project easily to display new technologies to local farmers, who could select from among those displayed in order to undertake experiments on their own farms.

CASE 6.3

DAREP: USING A PLURALITY OF APPROACHES FOR EXPERIMENTATION

Experimental design

No guidelines were given in the Dryland Research and Extension Project document on how farmers should be involved in experimental design. Terms of reference for technical researchers emphasized researcher-designed, farmer-managed experiments. The project document suggests that the team's social scientists should consider and advise on how to incorporate farmers in evaluation. In practice, each technical researcher developed their own approach over time, with support and comments from social scientists and other colleagues within and beyond the project team, and influenced by their interactions with farmers during implementation. The social scientists played an increasing role in the on-station and on-farm programme for new crops and new crop varieties after the project agronomist left for further studies a year into the project. This case starts with a detailed account of the soil and water conservation experimental programme, before taking a brief look at experiences from the other technical components of the project.

Planning tools and tillage experiments

The tools and tillage research included farmers in the initial design, and later added ideas from elsewhere. The planning of experiments and dissemination activities involved a range of methods, including literature reviews, the final stage of problem analysis during PRAs, consultation with other professionals, study tours, planning workshops, and planning by and with focused farmer research groups (FRGs). Ideas on opportunities for soil- and water-related interventions within the Tharaka and Mbeere farming systems were obtained mainly from the surveys. By identifying farmers' indigenous knowledge, researchers and extensionists were able to build on the farmers' experience with their own specialist knowledge and ideas in the literature.

Literature from various sources was reviewed to identify possible technologies to address the constraints in land preparation, planting and weeding. The reviews were semi-continuous, but focused on two stages: after the first diagnostic PRA in June–August 1993, and before the professional research planning meeting in February 1995, just prior to the two main phases of planning trials.

In order to develop the exploratory on-farm trial programme, the FRGs first met in September 1993, in good time before the rains expected in mid-October. Having introduced themselves during a participatory mapping exercise describing their soils and tools, the farmers were asked to examine, add to and rank the suggested constraints to production. Technical options to address these constraints were presented to farmers by researchers using photographs, drawings and, in some cases, examples and models. Farmers then discussed the options, and individuals selected which they would like to try out on their own farms. After the selections had been made, further discussions were held about how these solutions would be tested – the design of the trials. During these discussions the idea of a control treatment was introduced by the researcher, in order to facilitate comparison and some kind of objective measurement of differences. The farmers accepted this idea, and it was agreed that the researcher would return later to discuss further details of the trial design. Researchers encouraged the use of controls through farmer-to-farmer trial competitions, where the quality of control is one of the criteria in judging. The lack of a control makes it difficult for a researcher to collect quantitative data and, therefore, the interest of the field assistant in the trial may also wane. Often the field assistant can find an area of similar management practice somewhere on the farm, but this may mean soils and slopes vary. However, farmers without controls often adopted the techniques on a much wider scale and become popular as demonstration farmers. Some farmers preferred to compare different techniques without a control – they were interested in comparing various dimensions or manure levels or crop combinations, rather than in comparing with their normal practice.

The FRG planning meetings were conducted before each season, sometimes as the second part of the end-of-season evaluation meetings and sometimes separately. Separate meetings for planning have been found to be more effective because conducting an effective evaluation usually takes the good part of the day, and thus adding on planning for the next season tends to squeeze the programme too much. When planning meetings are held on a separate day, reference is made to the findings of the previous evaluation meeting, and one of the farmers may be called on to present these findings. A further advantage is that new farmers who are interested can attend and contribute, and farmers who do not want to continue can exit more gracefully.

Only one expert research planning meeting was held some time after the FRG planning meetings had been initiated. Acknowledged national experts in soil and water conservation attended a workshop where a progress report was made and the results of the diagnostic PRAs were reviewed along with the overall research priorities and content. Research issues identified were discussed and prioritized in relation to their perceived importance and the capacity of DAREP to undertake them. Topics outside DAREP's capacity could be referred to other research programmes. A number of new topics were proposed, including grass strips and weeding with oxen. However, the DAREP team was constrained in following through on these by the recommendations of a mid-term review conducted 4 months later which, following instructions from the donor, advised the project not to undertake any new technical research activities.

Trial implementation and evaluation

In the exploratory trials, the areas to be used for the different conservation techniques were marked out and the farmer was left to implement in the presence of the on-farm field assistant (OFFA). The OFFA attempted to be present so that he could record the labour inputs. If it was a tool being tested, it was usually tested in the presence of the researcher and OFFA.

The use of FRGs facilitated a group approach not only to planning trials, but also to their implementation. The tillage tools were mostly tested by groups of farmers, which allowed for discussion during the testing. Appointed days for testing were agreed by the FRGs, and this enabled the researcher and OFFA to monitor the testing process. The laying out of the new set of water-harvesting structures was a group activity that allowed FRG members to learn about the new techniques as the process went on. While usually only one technique was tried per farm, the researcher requested the farmer to have a control area which could be used as a means for assessing the effectiveness of the new structures. As this was done during the dry season, this activity generated considerable interest from neighbouring farmers, some of whom went on to join the FRG during the same or subsequent seasons.

Evaluation of the on-farm trials has been undertaken through close collaboration between the FRG members and also the OFFA and researcher. Joint implementation of some trial activities by FRG farmers generated an interest in following up the results on each other's farms. For the tools testing, much of the evaluation took place during the testing process and so conclusions were quickly reached. However, while there was often consensus, in some cases farmers had different opinions about the efficacy and relevance of particular tools. Evaluation of the water-harvesting structures took longer, and required farm visits during the course of the season to monitor the results. Partly to facilitate the process, FRG tours of each other's trials were initiated during the April 1994 season, with the researcher taking an active role including the provision of transport and lunch during the tours. While these tours were very effective, they did depend on transport as the distance between the group members' trials was often very great. In an effort to make the approach more sustainable, FRG members were grouped into clusters with the idea that cluster members could visit each other's fields easily during the seasons. To encourage this kind of interaction between farmers, a farmer-to-farmer trial evaluation tour programme with a competitive element was introduced in 1995 (April rains). Within each cluster, farmers and field staff visited each other's trials and farms and judged the trials according to set criteria, selecting a winner from among their cluster. The next stage of the tour involved visits to the winning trials in each cluster, and further judging to determine the overall winner who received a prize at the next farmer open day. Usually an 'outsider', such as another researcher or extension specialist, was requested by farmers for the overall judging to ensure impartiality. This arrangement has proved very effective in several respects: improving motivation for participation in the on-farm trial programme; training farmers in basic formal research procedures; and encouraging farmers into the habit of visiting each other's trials. The idea of using clusters has, however, had a drawback in that not all farmers see all other farmers' trials, reducing the potential opportunities for learning from each other, which was possible during the whole-FRG tours when transport was provided.

Quantitative versus qualitative evaluation

Evaluation of trials by farmers and other FRG members was largely done using qualitative methods, with ranking and scoring techniques being used in order to quantify farmers' opinions. This type of evaluation was complemented by the collection of crop performance data, including yield, and by the measurement of soil and water biophysical data.

Presentation of yield data to farmers was difficult in that they did not easily relate to graphs, numbers, or even pictures of bags of maize. Farmers learned best by actually examining the crop in the field, where they could see what conditions it was grown under. This helped to put the yield figures in context, which is very important due to the highly variable biophysical and socio-economic conditions on-farm. Farmers were most impressed, for example, when seeing that an old lady had prepared a large area of pits and furrows on her own, and had got a good crop as a result. Even when farmers presented their results verbally at meetings, there was not as much impact as when they saw it in a farmer's field. Farmer-to-farmer tours were thus essential in giving feedback of trial performances to farmers.

Evolution and adaptation of trials

Once the farmers had come up with some preliminary recommendations regarding the surface water-management techniques by March 1995, they requested that these techniques be demonstrated at the local station for other farmers to see. The researchers also felt it would be good to collect some carefully controlled quantitative data on the techniques, to verify the farmers' recommendations. Thus a replicated trial was designed for the project field site for the April 1995 rains. As the researchers' attention was now divided between on-farm and on-station, there was less researcher input to on-farm trial design and, by default, more scope for farmers' adaptation. Farmers were left to adapt the techniques to suit their farming systems, usually with assistance from the OFFAs and local extension technical assistant at Mutuobare. Following the tour to Taita Taveta, there was a big increase in the number of techniques that farmers were trying, and also an increase in the number of farmers with an interest in surface water-management structures. The dimensions of the Taveta structures have remained fairly constant, but farmers have been experimenting with varying management practices. These include different crops, different manure levels, different times of preparation or repair, etc. Regular visits to each other's farms, discussion between FRG members, and presentation of trial results have also encouraged other farmers to take up trials, as shown in Table 6.3.

Table 6.3 Trial uptake pattern for soil and water conservation structures over three seasons

Structure	November 1993	April 1994	November 1994	April 1995
Planting pits	5	6	2	3
Contour furrows	0	7	0	2
Tied furrows	0	1	7	13
Cambered beds	0	0	3	4
Earth basins	0	0	2	3
External	0	0	5	5

Experiments on crops, livestock, agroforestry and soil fertility

On-station trials. Farmer open days at local research sites provided an opportunity for farmers to observe and evaluate new technologies displayed in trials, including new crops, new crop varieties, pest control, soil fertility management, intercropping, agroforestry technologies, vegetable preservation and food processing, as well as new tools and soil- and water-conservation methods (Njiru *et al.*, 1997). Detailed recording and analysis of discussions with farmers on the technologies displayed allowed for the crop-related experimental and demonstration programme to be modified on a seasonal basis. Matrix ranking was introduced in 1994, and this helped systematically to record and rank farmers' evaluation criteria, to try and quantify these for particular technologies, including new crop varieties. To introduce more rigour and a higher level of farmer participation into varietal evaluation and screening, expert farmer panels were introduced in 1995 to facilitate the evaluation of new varieties of sorghum, pearl millet and cowpea (20–30 entries for each crop).

The panels were popular with farmers, and also served as a means of encouraging interactions between interested plant breeders and farmers. In crop utilization, farmers were involved in a workshop to develop and screen recipes for utilization of dryland crops and dried cowpea leaves (Kang'ara *et al.*, 1997b). The workshop was held in an on-station setting. In agroforestry propagation experiments, workshops were held with farmers in order to evaluate various propagation methods and train farmers in these technologies as a basis for subsequent on-farm propagation experiments (Kidundo, 1997a,b).

Variety trials

A 'pick-and-mix' approach to new crops and varieties. At first an agreed number of specific varieties were used in the variety trials, to allow for comparisons within and across sites using fairly conventional designs. The approach changed, influenced by the social scientist on the team. Farmers made their own selections of new crops and varieties based on displays growing at community-based stations, and were free to select any variety of any crop to test, using controlled comparisons with other varieties (including any local variety of their choice). Evaluation on-farm was done mainly using superimposed experimental designs to fit with the local farming systems and farmer preferences for testing new varieties. A general-purpose evaluation form was developed based on farmers' evaluation criteria developed during matrix ranking at farmer open days. Farmers discussed the new crops and varieties with the field assistants and with their neighbours during farmer-to-farmer evaluation exercises. The possibility of a prize at the end of each season for the best managed on-farm trials motivated farmers to participate in technology evaluation, and provided effective informal training in conventional experimental methods. The unbalanced data generated from this more open-ended approach to on-farm variety trials could not be analysed using more conventional packages for on-station experimentation. Instead, Statistical Package for Social Sciences (SPSS) was used to provide a quantitative assessment of the performance of the new varieties and new crops under on-farm conditions. While these statistical results were reported, the whole question of experimental design and data collection for on-farm crop variety evaluation remained a debatable and open question within the project team.

An alternative to variety trials. The project had over 30 new cowpea varieties which were bulked up at the local research sites for on-farm testing by farmers. There was much interest in these new varieties, and the number of farmers who wanted to try them out was far more than the project was able to monitor using controlled comparisons. The local site committees decided to sell the surplus seeds to the local farmers, and kept a record of who had purchased seed and which village they came from. After three growing seasons, a survey was undertaken in five of the DAREP sites to find out what had happened with the seeds (Sutherland *et al.*, 1997d). A number of the varieties had not done well, but a surprisingly large number of the new varieties were still being planted after three seasons and seed from these had been passed on to friends. In comparing across the sites, there was a lot of variation in terms of which varieties were retained and passed on to friends. This approach to testing varieties was a low-cost alternative, or supplement, to more formal variety-selection approaches.

Livestock challenges

In a livestock experiment on mange control, a formal experimental design and a range of quantitative data parameters were used to assess efficacy of the various treatments (Kang'ara *et al.*, 1997a). However, particularly in the later stages, farmers' preferences through their own informal evaluation of the different treatments were important. Some farmers did not want to keep treating animals with remedies they had less faith in. Farmers' assessments, therefore, served as the main criteria later, when the trial farmers were involved in demonstrating the new remedies and making recommendations to other farmers. In another livestock trial screening herbal de-wormers on-farm, some difficulties arose when one collaborating farmer sold the experimental animals without first discussing this with the researcher.

Agroforestry diagnostic and statistical lessons

Farmers were provided with a range of tree species from which to select, and they were free to plant and manage how they liked, provided they were happy to have their activities monitored as a basis for diagnosing further constraints and opportunities in dryland agroforestry. The on-farm diagnostic tree-planting experiment provided an effective means to monitor and assess farmers' tree-management practices and to make comparisons between different practices. While farmers did this in a largely unconscious way, the approach was an effective way of enticing farmers into the agroforestry experimental process (Kidundo, 1997a,b). A learning experience on trial design came with a woodlot design for the on-farm termite-control trial which the farmers did not like. They would have preferred boundary planting, but this was rejected by the researchers advising on the trial design, mainly for statistical analysis reasons. As a result some farmers did not show much interest in managing the trial, and the trees were damaged by domestic animals and fire in some cases.

Soil fertility and farmer compensation

Soil fertility-related experiments on-farm were a challenging area. Some new varieties were evaluated for their performance under higher and lower fertility across a range of sites involving a large number of farmers, using farmers' local knowledge of their fields (Sutherland *et al.*,1997). More complex trials, conducted with a much smaller number of farmers and investigating some basic questions about nutrient recycling and uptake, were conducted under controlled conditions with a limited number of interested farmers. One farmer tried to use this trial to extort money for labour and extra gifts from the researcher, after realizing that the results were very important to him – the trial was undertaken as part of a PhD and, therefore, required particular rigour and control. Aware of the special attention being paid by the researcher to this trial, the farmer demanded high payments for her labour and other labour hired to scare birds and wild animals, and apparently chased away labourers hired by the local field assistant to help with establishment of the experiment. This was a tricky issue to handle because it created a potentially unsustainable precedent relating to payments to trial farmers. In all the previous on-farm trials, farmers had not received any form of compensation for their additional labour. When some other farmers heard that the project was hiring labour for scaring birds and wild animals from the trial, they started to demand similar payments. The project staff had to visit them and explain that this trial had very different requirements from the previous ones in which they had been involved.

Sources: Irungu (1997); Kangara et al. *(1997); Kidundo (1997a,b); Mellis (1997); Sutherland* et al. *(1997a).*

The next case, the Adaptive Research Planning Teams (ARPTs), further illustrates the importance of bringing new perspectives, both individual and disciplinary, into the experimentation process.

CASE 6.4

ARPT: RINGING THE CHANGES IN EXPERIMENTAL METHODS

One of the interesting shifts that took place during the years of farmer collaboration was in the attitudes and methods of Adaptive Research Planning Teams' farming systems agronomists. In the early years their field-level relationship with social scientists on the teams was mainly with agricultural economists, who were responsible for most of the early diagnostic work and objective-setting. From the mid-1980s, the economists began to move upstream and increasingly to deal with policy-level issues, for instance on the impact of structural adjustment on marketing systems and prices, and on the types of profits small-scale farmers were showing for different crops. As sociologists, anthropologists and nutritionists moved in at the field level with more participatory methods and a food security perspective, so the pressure on agronomists to adjust their methods also increased. Some of the more innovative agronomists began to accept that they would never produce quantitative experimental research results which other scientists would accept easily. However much the agronomists tried to replicate uniform conditions across trial sites, others would not believe they had sufficient control over the trial process to produce credible comparative results. Moreover, the philosophy behind the promotion of participatory approaches was to be able to cope with variability, not produce uniformity. The use of farmer evaluations quickly showed all involved the significant differences in farming system circumstances across trial sites, and thus the futility of trying to claim that across-site comparisons of a rigorous, quantitative kind could be made.

One of the other techniques introduced by farming systems agronomists was to utilize local crop varieties in trials, as well as improved or hybrid varieties. One result in the Copperbelt, for instance, was to show that the very first improved maize variety introduced, Hickory King, originally introduced in the late 1950s, would certainly win the award for the most enduring and versatile maize variety introduced in the past few decades. Hickory King, which is now a local maize variety, was the only variety in trials that could produce an acceptable yield with no fertilizer (as it is usually grown), but at the same time show a highly significant fertilizer response, on good soil producing yields comparable to the longer-season hybrid maize varieties.

At the end of this first season, and in the lead-up to the next, two new methods were introduced with the farmer research groups, both of which had substantial implications for the way trials and their results were viewed over the next few seasons. The first method was a visual ranking carried out with the research groups to evaluate preferences for different crop varieties. In evaluating a crop such as beans, two major lessons were learned quickly. First, that farmers use a wide range of factors to assess a crop. This was a lesson for the Central Province team, as they had uniformly been promoting Carioca, a high-yielding, brown bean variety, over the past five seasons, without comparing it against other varieties or finding out whether yield was indeed the characteristic farmers valued most highly. Yield was found not to be the most important quality, but it did play a role. A range of other characteristics were also identified as being significant, including length to maturity, cooking time, taste, richness of gravy made, marketing potential, yield, susceptibility to disease, and appearance. The second lesson learned was that farmers want not just one variety, but rather a portfolio which, taken together, maximizes the range of assessment criteria and spreads the cultivation risk. Whereas Carioca ended up being generally a third- or fourth-ranked variety in terms of preference, it was not dropped by farmers because it was high-yielding and highly marketable (as the one commercially released bean variety). In seasons when other varieties did not feature too well Carioca was, therefore, a good fall-back.

An additional factor was that scientists in other commodity-research teams were generally more interested in farmers' views of trials than in the farming system agronomists' attempts to produce statistics. Some conflicts were inevitable – one of the most lively being the rejection by farmers of hybrid sorghum varieties in the Central and Copperbelt areas for which they had been bred. Commodity research teams such as the food legume team and the open-pollinated maize team were, however, intensely interested in high-quality feedback from farmers, and subsequently came to make several decisions on varietal releases from this feedback. Bean, groundnut, finger millet, rice, open-pollinated maize and cowpea were all crops for which some varietal release decisions were based on farmer evaluations.

Consequently, some of the farming systems agronomists shifted their view of the evaluation process, and saw their more formal evaluations as complementary to those of farmers. In this vein, the question they now asked was, what could they do to add value to the FRGs' evaluations? One of the most promising techniques introduced was the use of regression analyses by agronomists in Copperbelt and Western Province in order to look specifically at variability. The regression analysis would examine, for instance, variability in the performance of different varieties on different soil types and at different management levels (such as variations in the levels of fertilizer applications). The resulting graphs would plot variety yields against these different factors, and show which varieties performed better under which conditions. One immediate outcome was that, for most areas, the different soil and farmer types meant that at least two or three varieties of a single crop needed to be recommended, as each outperformed the others for a certain band of conditions.

Source: Russell and Drinkwater (1994); Drinkwater (1997).

Case 6.5 documents the evolution of farmer participation in on-farm experimentation in Namibia. In this institutional setting the idea of involving small-scale farmers in experiments was a completely new approach, both for farmers and for the national research and extension staff involved.

CASE 6.5

KFSRE: EVOLUTION OF AN APPROACH TO EXPERIMENTS

Starting

At the start, the Kavango Farming Systems Research and Extension Project undertook a series of participatory appraisals to identify the principal issues confronting farmers. This exercise also helped to place these issues into their proper context. In addition to the results of these appraisals, the project recognized two institutional criteria as important: the need to find an experimental topic on which to engage researchers, and the need to recognize that no Namibian member of the extension service or the project team had any farming systems experience.

Analysis of the rapid rural appraisal survey and discussion with extensionists, researchers and farmers identified diminishing seed diversity: preferred seed types were disappearing because of successive droughts and poor harvests. It was further concluded that on-farm trials for different crop varieties were the optimal way forward. The initial focus on crop varieties naturally led to research on soil fertility and land preparation using draught animal power. These were all areas in which farmers were interested.

In the first season two farmer interest groups were established. The initiative for this came from the project. Later, selected local village extension technicians were encouraged to establish farmer extension development groups, centred around the particular problem of crop varieties. The on-farm trials were initiated at a technology fair where researchers presented what they had available to solve a problem. The project staff had briefed researchers on the problems to be addressed. Farmers were encouraged to question the researchers, which served to initiate a dialogue.

Table 6.4 Guidelines in KFSRE project document

Outputs	Indicators
Appropriate adaptations in farming systems and new technology which are accessible to resource-poor farmers and female-headed households and are environmentally sustainable identified through adaptive research.	Implementation of research activities, participatory monitoring, evaluation and reporting. Environmental impact appraisal of research technologies.

Once the technology (new varieties) had been selected, explanations were given to farmers as to what a trial is, and why trials are necessary. The project used a 'with and without' comparison design, with a plot of the farmers' local variety (or mixture of local seed, which may be a mix of three to five varieties) providing a comparison. Additional farmer plots were included to gain a comparison between the farmer's principal crop and the variety trials, as the trial was usually planted late on marginal land. This was needed because it gave a fairer comparison.

Data collection

The project collected both quantitative and qualitative information, and the two types of data were seen as complementary. Prior to the collection of data, farmers were asked how they assessed new or recently introduced crops. This set of assessment criteria was used to assess all future crop introductions. The quantitative data satisfied the more orthodox research needs (plant breeders and agronomists), whilst the qualitative satisfied the needs of the social scientists.

Field days with a difference

The collection of some of the qualitative data was through a field day. The difference was that field days were not about telling farmers what was best for them, or making long speeches, but about dialogue, particularly between farmers and researchers. The key feature was the garnering of farmers' views and opinions, in terms of their own assessment criteria and preferences. These views and opinions were systematically recorded. This type of field day was repeated in other regions so that regional farmer preferences became apparent over time. The methodology used was further refined as implementation was transferred from technical assistance staff to Namibian project staff and on to field extension workers.

Other forms of farmer participation in data collection

The use of farmer field notebooks allowed households to take control of data collection and analysis. Individual farmers' reports were used as the basis of group matrix-ranking exercises. The results were incorporated into final trial reports.

Use of farmer tours and PRA methods assisted farmers to pool their research results and carry out analysis and evaluation in the field. Farmer tours, particularly, were a useful source of information for initiating dialogue on new crops or cultivation methods, as well as a forum for discussing some of the problems faced by farmers. The project sponsored a 'seed fayre' in October each year for 4 years. Farmers were encouraged to bring as many seed varieties as possible. They were also encouraged to swap and trade their seed. These fayres were popular with farmers, leading to the reintroduction of 'extinct' varieties into some communities. It also demonstrated to seed breeders and agronomists the range of seed in the area.

Addressing gender and other imbalances

Monitoring the balance of gender, age and farmer type in farmer groups increased the project's confidence that the evaluation reflected the wider community. Mid- and end-of-season evaluations were undertaken according to gender and village, so that researchers had a basis for comparison.

A review of attendees at group evaluations showed them to be predominantly male. From the PRA, the project knew that women were responsible for the staple crops. To increase female involvement in the meetings, wives were invited, began to participate and were incorporated into the group. This greatly improved the quality of trial management and the breadth of evaluation of technologies.

At mid- and end-of-season evaluations, each farmer was given chairmanship of an assessment group. This reduced the dominance of stronger personalities.

Reporting back results

The results of the season's trial activities were reported back by project staff to farmers in each village group. This proved useful in terms of provoking discussion between farmers about contradictory data. In the case of soils data, the researchers had taken samples and provided feedback in terms of basic nutrient availability, showing quite significant differences between farms. In studying the results farmers were curious about why, in some cases, their soils lacked enough of a particular nutrient such as phosphorus, and what they or the extension service could do about it.

Some disappointments in farmer participation

- Migration of male farmers during the season meant that some individuals who were involved in planning trials were not there to see them through. Family members who had been left on-farm had a limited understanding of the aim of the trials, and were often unable to write to fill in monitoring notebooks. Use of field notebooks by the team was also poor, as the team did not know what to do with the information.
- In one riverside community, no open days were held in the community to allow other farmers to evaluate the trial results. This was due to poor rainfall, few good trials and fear of witchcraft. This problem was traced back to a previous failure to involve the community in farmer selection in the second riverside community (Case 4.2). Working in the riverine societies continued to be difficult, perhaps a reflection of the high degree of social fragmentation in these communities.
- Due to lack of decentralized planning of on-station research conducted away from the region, farmers were not involved in evaluating station trials.
- Although livestock and forest products were very important to local livelihoods, there were no on-farm trials concerning these.
- An on-farm trial on the efficacy of antihelminthics fell into disarray after the farmers worked out which group was receiving the placebo (control) and which the proper therapy. Farmers did not bother bringing the control group of animals for dosing.
- With trials on draught animal implements, when the implements were first tested and selected, farmer participation was good. Later, when the selected implements were dropped off near farmers' homesteads for further testing and sharing with neighbours, some farmers decided that the implements had become their personal property. As a result participation ceased, despite lengthy explanations by the team regarding the need to share implements and further evaluate their performance under a range of tillage conditions. Clearly, at the time the project did not comprehend the social norms concerning property acquisition and ownership.

Sources: Matsaert et al. *(1997); H. Bagnell-Oakley, personal communication (2000).*

The next case, from Kenya, documents the experience of experimentation mainly early on in the NARP II project, working through a group of scientists experienced with on-station experimentation, many of whom were new to working in more participatory ways with farmers. The NARP II project placed considerable importance in getting the results from previous on-station research, tested out with farmers under their own conditions, and with the eventual aim of extrapolating the results to other similar areas. This emphasis underlies the approach documented below.

CASE 6.6

NARP II: EXPERIMENTAL DESIGN AND IMPLEMENTATION

The design of the research trials for the National Agricultural Research Project, Phase II (Table 6.5), including the technical focus, was developed by researchers, informed by literature review, some involvement in PRA exercises, and discussions with colleagues. Most of the scientists were also involved in applied and strategic research through the national research programmes, which generally have a contractual or consultative perspective on research, as do the Kenya Agricultural Research Institute's senior managers and donor representatives. Such a multiplicity of approaches is valuable in that it ensures scientists are exposed to and involved in a wide range of activities, but it also inhibits whole-hearted adoption of a more collaborative approach within the regional research programme (RRP).

Virtually all the RRP trials conducted on farmers' fields were randomized complete blocks with single replicates per farm. The trials were mainly designed by researchers, but incorporated farmers' views on the content of the treatments. Most of the trials include a control treatment supposed to represent the farmers' own best practice. Some of the trials are repeated on the research station as back-up trials. In these cases the design is mostly randomized complete blocks with three replicates.

Management levels

The trials on farmers' fields are intended to test technologies under conditions representative of farmers' circumstances, and consequently agricultural inputs are not supplied by the RRPs, except for the variables being tested. The farmers supply their own seed, fertilizer, pesticides, weeding, etc., according to their own abilities and estimation of need for such items. As a result of this, at the end of the season some farmers required payment before they would allow the seed to be distributed to other farmers for further evaluation, on the grounds that they had provided the land, labour and inputs.

Plot layout

Plot sizes were mostly determined by farmers in conjunction with scientists; the amount of land that the farmer could afford to use for experimental purposes was the predominant determinant, particularly in the high-density areas of south-west Kenya. In many cases farmers allocated their poorer land for experimentation. Where land availability was limited, particularly in hilly areas, plot sizes and shapes were not kept uniform but were adjusted to fit the available space.

Trial implementation

Implementation was by researchers, farmers and extensionists. At most sites the frontline extension worker was the principal collaborator from extension, but in a few cases a divisional subject matter specialist was the principal collaborator. Usually all three parties were present at planting, but this was not always possible, and

Table 6.5 Summary of trial proposals developed for Kisii and Kitale mandate regions

Title	Principal objectives
Farmer participation in development of integrated pest management (IPM) at farm level (tomato, cassava, bean, maize, potato, cabbage)	Documentation of current insect and disease problems and control strategies of smallholder farmers Improved, farmer-acceptable pest control strategies identified
On-farm crop variety evaluations with farmers (groundnut, cassava, banana, potato, sweet potato, bean, maize, sorghum, millet, tomato, vegetables)	Current smallholder production practices and constraints described Improved, farmer-acceptable varieties and production practices developed
On-farm evaluation and post-harvest management of cassava varieties in Kitale mandate region	Acceptable high-yielding, disease-tolerant cassavas and processing packages made available to farmers
Relay cropping of sweet potato clones under maize/bean intercrop, weed management and post-harvest handling of maize	Suitable sweet potato clones and weed management strategies for relay cropping with maize/bean intercrops identified Improved post-harvest management for maize
Verification of pruning methods in mature fruit tree orchards	Pruning information of mature fruit trees made available to farmers
On-farm investigation into health and management constraints to smallholder livestock production	Health and management problems for livestock and their control by smallholder farmers documented and improved
Smallholder farmer management factors and anthelminthic regimes in the control of helminths in south-west Kenya	Description of smallholders' helminth control practices, and formulation of improved, cost-effective, farmer-acceptable anthelminthic control regimes
Traditional medicines used in management of livestock diseases in south-west Kenya	Documentation and evaluation of traditional medicines in use by the major ethnic groups of south-west Kenya in management of livestock diseases

in several instances (particularly evaluation of cassava and sweet potato at the more remote sites), farmers planted trials without the participation of researchers. By contrast, the researchers leading the maize evaluation trials organized the participating farmers into groups, and the groups planted the trials together on each other's fields.

Plot management has been variable – in most cases researchers have managed to be present at key times, or to give technical guidance to the frontline extension worker. In some cases where this has not been possible, farmers neglected the trial saying it was the researcher's responsibility, whilst in other cases farmers gave greater care and attention to the trials than to their main crops. The interest and organizing abilities of the frontline extension workers, and also of the scientists, was a major factor in this.

Evaluation of technology

Researchers' evaluations. Frequent visits to the sites for monitoring and evaluation by scientists and collaborating extensionists are a key element of the RRPs. Various checklists have been developed by the scientists for these visits, to systematically record information on both biological and socio-economic data throughout the season. The evaluations are carried out with the host farmer or another member of the household, and their opinions and comments are noted as part of the evaluations.

Farmers' evaluations. The farmers involved with the IPM evaluation of vegetables and tomato also monitored and evaluated the trials, and kept their own records. The monitoring criteria and reporting formats for data recording by farmers were determined by the scientists, and modified if necessary after discussion with farmers. In theory the frontline extension workers also assisted the farmers in data recording, but this was not very effective in practice at most of the sites.

Group evaluations. Group evaluations by all participating farmers have been carried out only at some sites so far, and only at the end of the season. Farmers ranked the experimental materials according to several criteria, and the responses of men and women farmers were recorded separately. This lack of emphasis on group evaluations was acknowledged as a weakness by the Kitale and Kisii scientists in 1997, who determined to form farmer expert panels and/or community research groups in the same year. By the end of the project in 1999, almost all participating researchers considered group evaluations as routine in technology evaluations with farmers.

Other issues of farmer participation

Provision of inputs. The most controversial issue of NARP II's support to the RRPs is the idea that on-farm trials should be carried out under realistic farm conditions, and that management levels should be those of farmers, not necessarily those recommended by research. This initially met with considerable resistance from all parties: scientists, extensionists and farmers. At Timboroa, north-west Kenya, the farmers initially refused to participate if blanket levels of recommended inputs were not supplied, but finally decided that they would still like to see the new materials/methods on their own farms. Even after a year, some farmers still felt that the RRP should be providing them with inputs for testing on a large scale on their farms. This is also a source of friction in the collaboration with CARE Kenya, which does provide inputs to its 'adaptive research farmers' so that they can test subjects of interest to the community under high management levels.

Participation paradigm. The government extension services are still largely committed to the training and visit system, and have had little exposure to the ideas and concepts of participating with rural people as partners, rather than as teachers. This presents some difficulties for the frontline extension workers collaborating with the RRPs, both in working with scientists and farmers, and in reporting on their activities to their superiors within the ministry. Similarly, farmers and village elders generally expected to receive instructions from researchers on all aspects of trial management and design.

Source: Rees et al. *(1999).*

The last case in this chapter documents experiences from the Larger Grain Borer (LGB) Control Project in Ghana. This case illustrates the scope for farmer participation, even in projects with a predefined technical focus. The LGB project team involved farmers in a wide range of experimentation and related research activities on-station, in homesteads and on farms.

CASE 6.7

LGB: FARMER PARTICIPATION GRAIN STORAGE PEST RESEARCH

Research station trials

Statistical design and trial lay-out were carried out by the research team study co-ordinators. However, mid-season farmer evaluation of the first season of on-station trials concentrated on improving the details of trial design. (No special evaluation method was used: two groups totalling about 20 farmers were invited to visit and observe the stores, and their comments were compiled.) Farmers pointed out a number of details; in particular the size of the experimental stores, the stacking of the maize in store, and quality of roofing, which they felt were insufficiently well done in the research station trials and might influence the outcome – for example, small stores with loosely stacked cobs are more vulnerable to insects. In subsequent seasons the researchers tried hard to follow the farmers' directions, and employed expert farmers from one of the collaborating villages to stack several trials.

On-farm trials

The Larger Grain Borer Control Project experienced the well known tension between scientific (statistical) requirements and farmer management of trials (Okali *et al.*, 1994). This was exacerbated by several peculiarities of maize storage/LGB trials. One problem is that, when dealing with typical farm stores of 0.5–0.8 tonnes, a whole store is normally used for each experimental treatment, as it is difficult in practice to split up farmers' stores in the way one can split up a field. For most farmers this means using all or nearly all of their stored maize stock, a major part of their food security systems, and they are naturally reluctant to risk treatment failure. Also, LGB is a sporadic pest, so a large number of stores are needed to be sure that a treatment works – otherwise apparent differences in stored maize quality may have arisen by chance. Finally, unlike growing crops where the farmer will normally always progress to harvest, farmers' stores may be dismantled at any time – especially if the price of maize suddenly rises or the farmer suddenly needs cash – so large numbers of mid-season drop-outs are likely from any study or trial. The project requested that participating farmers should be planning to store for at least 4 months (the median storage period in many villages), and in general they did so, but the problem of comparing maize from variable storage periods remained.

Choice of treatments for on-farm trials was done by means of farmer meetings in which treatments were discussed and each farmer who wished to participate chose a treatment to test. Predictably, the vast majority chose a pesticide – to be supplied by the project! It was more difficult to get farmers interested in testing natural materials, because the perceived benefits of free pesticides were greater. (The option of making farmers pay for the treatments was not attempted due to the uncertainty that they would work well enough in farm conditions.)

Controls. The study co-ordinators were then faced with the uncomfortable task of persuading some farmers to leave their stores as controls, or alternatively, of going without controls. The compromise adopted was to choose farmers who had just completed stacking their own stores (so were too late to use pesticide that season) and ask them to act as controls. In some cases, farmers who had two stores were asked to treat one and leave one.

Variable storage periods and drop-outs. The problem of analysing results from variable storage periods was resolved in three ways: by using farmer evaluations of the treatments; by sampling the stores on monthly visits; and by using the month of dismantling the store as a variable in the analysis.

Store management. Stores were managed by farmers according to their own usual practice. Farmers in the same village usually followed similar practices, and some compatibility between management methods was sought in pairing controls with treated stores, e.g. smoked stores were paired with other smoked stores.

Treatments. Treatments were applied by farmers and researchers together. This was especially important for pesticide application, where researchers worked closely with farmers to get the details right in terms of local measurements and means of application (Boxall and Compton, 1996).

Modification of objectives. However, the project also reduced its objectives for on-farm trials from the original idea of generating large-scale, statistically analysable data, to the idea of case studies concerned principally with getting the details of recommendations right – that is, usable and easily understood by farmers.
A group approach – or the recruitment of farmers in pairs, with a treatment applied to one of their stores at random – might have been a way around some of the design problems encountered, but was not attempted.
Could the on-farm trials have been replaced altogether by observation of the results of farmers' own experimentation? Although the project also made systematic efforts to collect and disseminate farmers' own experiences, it was felt that on-farm trials were important where a new and fairly complex technology (pesticides) was concerned.

Farmer evaluation of research station trials

Farmer evaluation of research station trials provided a more secure basis than the exploratory meetings for discussion and assessment of promising technologies and the direction of the research agenda. Once farmers had seen, handled and evaluated insecticidal materials and maize from trials, they not only had a much better basis for discussion of the technologies already under test, but were also inspired to come up with new ideas for testing.

Farmer participation in evaluation of technology

Both station and on-farm trials were subject to farmer as well as researcher evaluation. Farmers were also involved in impact monitoring of a biological control agent released by the project.

Station trials. Mid-season farmer evaluation of trials was useful in perfecting details of experimental design, as discussed above. End-of-season evaluations involved volunteer groups of 10–12 farmers from nearby villages, who were invited to the research station to inspect the trial treatments. They were presented with samples of maize from each trial treatment (the treatment was not identified until after the ranking), and were then asked to de-husk the maize, sort it as they would their own maize, then rank and score the samples. One advantage to the project was that results from farmer evaluations could be fed immediately into the next trial, whereas statistical analyses of data from researcher evaluations were not available until much later. Magrath *et al.* (1997b) discuss some of the practical problems observed with evaluations, including visual problems in ranking and scoring and group dynamics. However, in general it was felt that the farmer evaluations were a very positive experience, with farmers gaining a good understanding of the purpose of replicated research station trials and how they could be made to work for their benefit. Moreover, seeing the technologies being tested stimulated farmers to suggest new ideas or modifications.

Maize traders were also involved in evaluating results of station trials. Samples from each trial treatment were sorted into damage classes, then maize in each class was shelled. The traders priced the shelled maize samples. The data were used in cost–benefit analyses of the trials (Magrath and Compton, 1995; Compton *et al.*, 1997b).

Development of rapid proxy methods for client evaluation. Client participation in evaluation of research results can be time-consuming and costly (Magrath *et al.*, 1997a), so one way of speeding up and cutting costs is to develop rapid proxy methods for researcher evaluation according to farmer and trader criteria. Such methods will clearly not replace all client participation, but mean that scarce resources can be channelled to involving clients where their opinions are most needed, and developing criteria for assessment, rather than having them routinely evaluate every trial. Several methods were developed by the project for rapid evaluation, including visual damage scales to simulate farmer evaluation of damaged maize from trials, and damage-price equations to replace individual traders' valuations of maize samples (Compton, 1997a).

The fundamental steps in developing such proxy methods are: (i) through observation and discussion, understanding farmer/trader perceptions and valuation of commodity/crop quality; (ii) identifying predictive criteria or variables which may be visual or dependent on some other easily measurable attribute of the commodity; (iii) developing a quick method of evaluation based on these variables; and (iv) testing the predicted values against actual farmer/trader evaluations. Potential difficulties may include client perceptions that are difficult to universalize, e.g. dietary or colour preferences of a particular group, and complex factors such as taste for which simple proxy measures are unlikely to be found. One problem in our own work was that mould was not well studied, and where samples had mould as well as insect damage the equation relating damage and value did not give very accurate results.

On-farm trials. On-farm trials were evaluated by researchers and individual farmers. Monthly visits were made to trials by two team members, one responsible for the technical evaluation and the other for discussing and recording farmers' opinions of the treatment, any problems, and any suggestions as to how farmers might improve upon or adapt the option tested to fit their situation. Written records were kept by researchers, not farmers. Farmer groups did not evaluate the on-farm trials, however – a missed opportunity.

Evaluation of the trials by store owners stressed both better grain quality – several trial farmers were able to make unexpected extra cash by selling treated maize to their neighbours as seed – and longer storage periods as benefits of the pest control treatments. In a normal year, many on-farm trial farmers with sufficient maize of good quality to sell would store for longer in hopes of higher prices, while those who noticed some insect infestation in their store would sell off early to avoid further losses, foregoing some potential income. For example, in a 1994 trial only 26% of treated farm stores, as compared to 59% of untreated stores, had been dismantled by March, about 24 weeks after stacking. Insect damage was the main reason given by farmers (and confirmed by observation) in over half the untreated stores, while only one treated store was dismantled because of insect infestation, possibly due to poor treatment application (Ofosu and Motte, 1994). Thus the higher proportion of drop-outs among the control stores was interpreted as an economic benefit of the treatment.

Biological control impact monitoring

A classical biological control agent (insect predator) was released against LGB in 1994, and farmers in 40 villages were involved in the subsequent impact monitoring (Addo *et al.*, 1995). Involvement of farmers in classical biological control is rare (control agents are sometimes dropped from planes without any communication with farmers). However, farmers were very interested in the concept, and involving them in the release and monitoring had several advantages, including: monitoring carried out by trained (and paid) farmers; communities protected the insect traps; farmers reported on presence of the predator in their stores; the project team could inspect farmers' stores even in the absence of the household head (a significant practical advantage); and farmers gained increased confidence and knowledge of storage problems.

Tips on involving farmers and traders in evaluation of technology

- Pricing by traders was a valuable supplement to qualitative evaluation by farmers. Traders may know more than farmers about what the market demands.

- Developing rapid proxy methods for researcher evaluation of station trials according to farmer and trader criteria means scarce resources can be channelled to involving clients where their opinions are most needed.
- Fundamental to the process of joint evaluation of on-farm trials was the use of rapid field-assessment methods for losses and insects which could easily be understood by both researchers and farmers.
- Unlike many participatory technology development projects, payments or gifts (but not inputs) were provided to some collaborators, such as traders who valued trial maize, and this is defended as useful in cases where the benefits of collaboration accrue to the wider community rather than the collaborating individual.

Source: Compton and Motte (1997).

6.5 DISCUSSION

The cases above raise a number of issues and illustrate some important lessons for practitioners. These relate to increased farmer involvement in formal experimentation, as well as supporting farmers as experimenters in their own right.

Different goals

Are there important differences between farmers' and researchers' goals that influence experimental methods and criteria? The cases illustrate some differences in perspective. Researchers very often feel the need to generate data they can use to convince others, and to use a research approach they can defend to their colleagues. Farmers are more concerned to quickly find out what they can usefully learn from researchers, what new products they can access, and how they can benefit in other ways from being involved in researchers' experiments.

How can these differences be narrowed?

The cases contain evidence of three options, not mutually exclusive, for reducing the differences between farmers' and researchers' perspectives: training farmers; changing researchers; and supporting farmers' own experiments.

Hands-on training of farmers in formal experimental methods was part of the DAREP, KFSRE and ITDG projects. More formal training has also been successfully used as a means of empowering communities in Latin America (Bunch, 1982; Ashby *et al.*, 2000) and Mali (Gubbels, 1997). The cases show this to be largely effective, causing farmers to be more interested in collaborative research, and providing a basis for partnership in which both parties learn from each other.

Changing researchers' attitudes and behaviour is a much more difficult task than training farmers in formal experimentation. However, in the process of helping farmers to understand more formal aspects of experimentation, researchers' respect for farmers' knowledge is likely to increase, and their attitudes to more conventional research approaches to change. In the DAREP and NARP II cases, a number of technical researchers significantly changed their approach to experimentation during the course of the projects. As the NARP II case notes, after 3 years of the project, researchers had come to accept evaluation of researchers' technology by groups of farmers using qualitative approaches as the norm, whereas at the start of the project it was not common practice.

Indigenous technical knowledge as an entry point for supporting farmers' experimentation

Supporting farmers' own experimentation is less often practised in projects than getting farmers involved in researchers' experiments (Okali *et al.*, 1994). This is a challenging task, requiring substantial inputs from researchers. The FPRP and also the ITDG-Chivi cases did aim to support farmers' experimentation, largely by encouraging farmers to see themselves as experimenters and to take ideas from researchers and experiment on their own, rather than waiting for instructions on what to do and how to do it. The other cases suggest that encouraging farmers' own experimentation can also be done when verifying or improving indigenous technical knowledge. Examples include the DAREP animal health and tree propagation research, and the LGB search for local storage methods. Research undertaken by the Farmers' Research Project on controlling molerats in Ethiopia is published elsewhere (Aresawum Mengesha and Bull, 1997).

However, as some of the cases illustrate, not all situations will be amenable to building on farmers' knowledge. For example, at the start of the LGB project researchers knew much more than farmers about LGB and how it may be effectively controlled. The same was true for the FPRP in its research into cassava mosaic disease resistance.

To what extent can farmers be left to their own devices?

The project cases say a little about experiences with giving farmers freedom during experimentation. The early ITDG experience clearly showed the importance of considering how effectively to empower farmers to take initiatives during collaborative experimentation, particularly where there is a top-down frontline extension culture in operation. However, the FPRP and DAREP cases, working with farmers who were initially fairly empowered, illustrate that this approach may result in data that are very difficult for researchers to handle using conventional methods of analysis. As later chapters indicate, most farmers value interactions with researchers and value the facilitation role played by researchers, and certainly most do not express a desire to be left to experiment on their own.

A basket of choices

All the cases clearly show that farmers more often want a portfolio of new technologies (crops, varieties, control methods) than a single solution. The use of a technology fayre approach in KFSRE, and similar approaches in DAREP, ITDG and some other projects, serve as a practical illustration of how researchers and farmers can interact in formulating a research agenda, starting with researchers offering what they have. This is a significant move away from looking for a single 'best-bet' technology to address a particular problem, a characteristic feature of many of earlier farming systems research projects.

Different types of data, and too much of it?

All the case studies illustrate that two types of data are gathered during experimentation with farmers: quantitative and qualitative. Quantitative data are usually collected with the intention of undertaking some type of formal or statistical analysis. The experience of many projects is that far more of this type of data are collected than are actually analysed and used to interpret the outcome of an experiment. Qualitative data are collected through participatory methods, and serve to inform participating farmers, researchers and others involved. These data, too, may be collected without being used. As noted above, the KFRSE project used farmers' notebooks, but was not in a position to use the information collected. While some of both types of data usually finds its way into project reports and technical papers, a lesson emerging is that more time should be spent thinking about what type of data are required, why, and what will be done with the data.

How many farmers and trial plots?

A number of the cases illustrate a common trade-off that researchers face. In order to obtain accurate and reliable data, they may opt for close supervision of a small experimental programme with a few farmers. On the other hand, in order to achieve quicker impact and meet a high level of interest from farmers, they may want to have a large number of farmers and sites, and increasingly delegate their management to support staff, colleagues and farmers. Delegation of decision-making to farmers, and more 'farmer-managed' and collaboratively designed trials, involve this type of trade-off. The cases illustrate that there is no set rule, and much will depend on the trial objectives and the type of technology in the trial. On-farm variety trials, for example, allow for the involvement of a large number of farmers over a wide geographical area with few complications – in fact, often the more farmers involved the better.

Regular contact and feedback

Farmers resent it when an experiment is planted and they do not see anyone until after the harvest, and greatly appreciate regular visits and contact with researchers during the experimental cycle. Nearly all the cases emphasize the value of feeding back information to farmers about the results of research. Farmers are interested to hear about what took place on trial sites other than their own, and what the overall conclusions of the research are. Some cases, such as DAREP soil and water and ITDG, suggest this is often done effectively through cross-visits and farmer-to-farmer visits facilitated during trial implementation and evaluation. Alternatively, a meeting can be held at which researchers or nominated farmers feed back the results. DAREP remained challenged about how to effectively feed back quantitative results relating to yield, finding that writing, numbers and even pictures were not very effective compared to farmers seeing with their own eyes in the field.

Joint trial evaluation and agenda review

Many of the cases document how a cycle developed of experimental planning, implementation, evaluation and review. Participatory evaluation meetings provided farmers and researchers with an opportunity indirectly to review the trial design, and generated information and ideas for changing the trial design and, in some cases, the overall research agenda. This reflects the fact that after an initial PRA or needs assessment, trials become focal points for dialogue between farmers themselves, and between farmers and researchers.

Contribution of PRA methods

The cases illustrate the contribution made by PRA methods to technology evaluation. PRA offers some very useful time- and cost-saving tools for facilitating a more collaborative mode of on-farm experimentation. Visual ranking is extremely useful for evaluating preference criteria for varieties and other technologies. Moreover, PRA evaluation methods can often be combined with a range of conventional and newer quantitative statistical methods in order to improve the validity of information for both farmers and researchers.

On-station and/or on-farm trials?

As nearly all the cases show, the choice between on-station and on-farm trials is not an 'either–or' one, and not all participatory agricultural research involves on-farm trials. There is nothing inherently wrong with on-station trials within a participatory research programme. It really depends on the objectives of the trials, and deciding on the best ways of doing controlled comparisons while at the same time facilitating farmer participation in the research process. In the cases of DAREP, LGB and ITDG experimentation, a more-or-less parallel approach was used. On-station type research trials allowed the project to carry some of the risks in the research process and, at the same time, allowed for farmer involvement in the evaluation of the trials and helped farmers to select the most promising options to try out for themselves. The on-farm trials enabled considerable learning on all sides. Researchers learned a lot about how farmers do research, how farmers manage their enterprises, and the possibilities and limitations of on-farm experimentation in terms of statistical analysis of the results. Farmers learned much about how to experiment using more formal methods, how certain new technologies did under their neighbours' conditions, and how to work effectively in a learning group when previously a culture of secrecy had marked many of their relations with neighbours.

Extrapolation of trial results

One of the main arguments for collecting detailed quantitative data, and for careful selection of collaborating farmers and trial sites, is to facilitate more effective extrapolation of the results. The cases illustrate that in the projects based in public-sector organizations, such as ARPT, KFSRE and NARP II, this was a concern of the researchers involved. It also became a concern later on in the FPRP, when questions were asked about the relevance of the research results for other areas. At present the question being asked is: 'how would we extrapolate the results if we needed to?', rather than 'how are we going to extrapolate the results to ensure they have the maximum impact?'. Hence while many projects document successful technology development, few document how the results were extrapolated. The exception is the DAREP water-harvesting trials (Case 7.4). This issue is discussed further in Chapter 7.

Effect of the technical topic

The cases illustrate that the research topic, particularly the subject area, influences the approach to experimentation. In the case of LGB, more on-station experimentation was required at the start because the topic was quite new to the farmers. Similarly, the DAREP water-harvesting trials used a parallel on-station and on-farm format, due to the fact that this technology was completely new to the farmers involved. Again, the DAREP agroforestry programme, having a limited time with which to come up with results, and unable to afford to lose time through mistakes, opted for on-farm trial designs that would allow for statistical analysis of results. By contrast, the on-farm variety trials in DAREP were conducted with limited attention to statistical outcomes because they were on crops about which farmers were very knowledgeable, and it was felt that farmers' qualitative evaluation was, for the most part, more important and final than statistical analysis of yield data.

Incentives or payments?

Some of the cases illustrated different attitudes to providing farmers with incentives or payments during trials. The LGB project found it useful and necessary to make small payments to collaborating farmers and traders in some of the research activities. The CRP project, on the other hand, after experiencing some negative effects when collaborating trial farmers are motivated by hand-outs, took a stand against any form of input provision to farmers connected with a trial. The other projects tended to take the line that they expected researchers to provide some inputs, and farmers other inputs. The inputs provided by researchers in most cases did not compensate farmers for the amount of time and other resources absorbed through having trials on their farms. On the other hand, most farmers continued to collaborate because of the learning involved, or because they enjoyed the process, rather than because of the immediate physical benefits. Some farmers will lose interest and drop out after realizing that free inputs/hand-outs will not be forthcoming.

Alternatives to experimentation

A useful question for a project team to address is 'When is an experiment required?' The cases illustrate that once a participatory research project has been agreed, experimentation (usually on-farm experimentation) is assumed to be required. However, there may be solutions that can be implemented without following a rigorous process of experimental planning, implementation and evaluation. The monitoring of sales to farmers of new cowpea varieties from DAREP research sites is one example. Another is the monitoring of biological control by farmers in the LGB project. A more novel example comes from another DFID-funded project, the Zanzibar Cash Crops Farming Systems Project, in the research on perennial species. Evaluating mango varieties that would be suitable for grafted mango production, and for an improved ginger variety, the project agronomist simulated a trial using matrix ranking with knowledgeable farmers, and analysed the results using conventional statistical methods (de Villiers, 1996). These cases show that research trials, whether conducted on-farm or on-station, may not always be required to address a research problem or opportunity.

A time-consuming process?

The cases mostly suggest that collaborative experimentation is a time-consuming process, particularly where the farmers and researchers involved lack previous experience of it. It requires a heavy investment of person hours in developing relationships, and requires extensive consultation. It is a process that cannot be hurried, although in some cases it can speed up the experimentation process, as the ARPT case illustrates with the testing of new varieties.

Need for input from other stakeholders

Some of the cases, particularly LGB, a number of the DAREP experiments, and the FPRP and ITDG work, illustrate that effective participatory experimentation is not just a question of one researcher with a generalist background working with farmers. Specialist researchers and stakeholders often have a key role to play, providing information on various technologies, making suggestions on experimental design and helping with technology evaluation. This is addressed further in Chapters 14 and 15.

6.6 CONCLUSIONS

Experimentation that involves effective collaboration between researchers and farmers may be helped by a number of factors that can be considered in project design and implementation. Design should encourage researchers, wherever possible, to collaborate with farmers who have previous experience of formal experimental methods and on-farm trials. If this is not possible, at early stages farmers need to be given technical information, reassurance, support, encouragement and training if necessary to build up confidence.

A project may be hampered from effective collaboration if farmers lack confidence and understanding in the first year/season of experimentation, and particularly if there are adverse production conditions (e.g. poor rainfall, flooding or livestock damage) giving a high failure rate of trial plots. Some of the factors that can negatively affect the collaborative process listed by the case study authors were:

- poorly explained experimental objectives and processes
- negative comments about experimental plots by visiting researchers
- much data is collected but very little information is given back to farmers
- technical researchers' resistance to qualitative evaluation methods and novel trial designs
- limited recognition by peers to novel approaches to experimentation
- farmers with many other pressing needs and priorities
- semi-permanent settlement and farmers migration
- researchers and farmers have different perceptions of the seriousness of the problem being researched
- long meetings for extractive data collection by researchers
- long distances between homes of collaborating farmers
- poorly timed meetings that clash with other competing interests.

From the cases presented, and from collective experiences shared during the 1997 forum and during the preparation of this book, some tips on collaborative experimentation are given in Boxes 6.1–6.4.

Box 6.1 Tips for collaborative experimentation

- ✔ Encourage research managers to assign innovative technical researchers to collaborative experimental work.
- ✔ Consider giving collaborating farmers training in both basic experimental methods and empowerment-oriented training for transformation, to develop their confidence.
- ✔ Aim for appropriate gender, wealth and age-group participation in experimental design, management and evaluation (informed by prior gender analysis relating to the enterprise or factor being addressed).
- ✔ Give farmers plenty of warning and increased responsibility in organizing experimental planning and evaluation meetings.
- ✔ Within the parameters of local cultural acceptability and logistics, use group-based approaches facilitating planning, monitoring and evaluation events in which farmers can meet and exchange ideas.

Box 6.2 Tips for collaborative experimental design

- ✔ Involve farmers in setting the research agenda so that they will be more likely to understand and 'own' the experiments with which they are involved.
- ✔ Encourage researchers to be more proactive in studying farming systems and sharing new knowledge with farmers by emphasizing missed opportunities, not just problems.
- ✔ Draw in as wide as possible a range of research expertise into the design of experiments.
- ✔ As far as the project mandate permits, experiment on problems of direct relevance and immediate benefit to the collaborating farmers.
- ✔ Avoid experimental designs that are complex, or do not fit well with the local farming system.
- ✔ Use PRA methods as a complement to conventional quantitative methods for planning experimental design and layout (e.g. mapping of soil types).
- ✔ Train technical researchers in farmer-friendly trial designs and novel methods of statistical analysis, such as statistical methods for analysis of unbalanced data.
- ✔ In designing experiments, take into account concerns of resource-poor households.
- ✔ Aim for appropriate gender and age-group participation in experimental design, management and evaluation (informed by prior gender analysis relating to the enterprise or factor being addressed).
- ✔ If trial design is to be left almost entirely to farmer participants, facilitatory support should include: group work to clearly define the aims of research; individual visits to farmers to assist them in their planning; regular group meetings to monitor progress and discuss problems jointly; end-of-season evaluation and group consensus on good trial design.

Box 6.3 Tips for collaborative experimental implementation and monitoring

- ✔ Foster farmer responsibility for data collection and analysis, involving more members of the household if necessary, for example, by involving literate children in recording observations and events in notebooks.
- ✔ Foster creativity and confidence in 'learning by doing'.
- ✔ Particularly during the period of establishing a collaborative experimental programme, ensure that researchers pay regular visits to help farmers with any problems faced in experimental management.
- ✔ Create more opportunities for dialogue during experimentation through: cross-visits between experimenting farmers; well programmed researcher visits to on-farm trials; farmer open days; formation of trial farmer clusters, farmer research groups and expert panels (see Chapter 8, section 8.2).
- ✔ Involve social scientist team members in the implementation of experimental programmes.
- ✔ For farmers involved in livestock and other more complex on-farm experiments (e.g. soil fertility and crop protection), consider more formal contractual agreements which clearly outline obligations and expectations on both sides.
- ✔ Facilitate the process of meetings so that the collaborating farmers have optimal responsibility including choice of location, time of day, arrangements for food, and reporting of information and results from group discussions.
- ✔ Rather than making meetings too long, consider follow-up meetings to accommodate an overspill of issues from the first meeting.
- ✔ Promote the involvement of husband and wife in farmer research groups or in trials conducted through individual farm households.
- ✔ During visits, researchers must show sensitivity towards the circumstances and culture of the participating farmers.

Box 6.4 Tips for collaborative experimental evaluation

- ✔ Involving all farming stakeholders in evaluation is important. It may even be useful to carry out separate evaluations and develop distinct sets of recommendations for different target groups.
- ✔ Clearly define evaluation data needs with all stakeholders at the start: if people understand why data are being collected, it will be collected more effectively.
- ✔ Experiment with a range of PRA and other more formal methods for enhancing participation by farmers and other stakeholders in the research process.
- ✔ Link evaluation with experimental redesign and planning activities.
- ✔ Try and involve other researchers, such as commodity researchers who supplied technology, and also extension specialists responsible for uptake in the participatory evaluation exercises.

NOTES

1. 'New knowledge' in this context can include indigenous local knowledge that is not widely shared within a community; local knowledge from farmers in other areas; or knowledge available elsewhere within the country and beyond that holds promise.

7 Sharing new knowledge and products

7.1 INTRODUCTION

This chapter deals with improved uptake of new knowledge and practices, the central rationale behind increasing farmer participation in agricultural research. From a local-level perspective, participatory research may be judged successful if participating farmers use the new knowledge and products acquired to improve their well being. However, just because increased farmer participation makes agricultural research more effective for location-specific technology development and adaptation, is this a sufficiently strong reason for promoting wholesale adoption of farmer participatory approaches in public-sector organizations? For a cost-effective use of publicly funded agricultural research resources, participatory approaches need to show significant impact beyond the community of producers involved in the research process. The challenge is to share and promote new knowledge and products developed from participatory approaches effectively across a widening constituency of potential users (Farrington, 1995,1998; van Veldhuizen *et al.*, 1997).

Through the cases below, projects share experiences in promoting more widely the new knowledge and products they developed and adapted through participatory approaches. The cases are drawn from somewhat contrasting institutional contexts. The first three are situated within public-sector research and/or extension organizations, which have large geographical mandates and an obvious concern to ensure the results of their research reach as many farmers as possible. The second three cases document the experience of projects where the demonstration of impact within the immediate target community is very important. Two of these are NGO projects; the other, the Dryland Research and Extension Project (DAREP), is a somewhat untypical public-sector research project that had an area-specific mandate including extension and dissemination activities.

7.2 EXPERIENCES FROM NATIONAL PROJECTS IN THE PUBLIC SECTOR

The Adaptive Research Planning Teams (ARPTs) in Zambia, the National Agricultural Research Project Phase II (NARP II) in Kenya, and the Larger Grain Borer (LGB) Control Project in Ghana were all situated within national institutions. While undertaking location-specific research, all projects clearly did this within the context of the national research mandate strategy and perspective, and with the clear expectation that research results would be more widely disseminated.

CASE 7.1

ARPT: FROM TECHNICAL RECOMMENDATIONS TO ADVOCACY

Early focus on technical message transfer

The Adaptive Research Planning Team approach in the early 1980s was fairly conventional, based on the transfer of new technical messages developed from on-farm adaptive research trials through the government extension services. The approach was based on the identification of recommendation domains (described in Chapter 3), which were delineated with the assistance of extension staff. The rationale was that, having participated in defining recommendation domains, the extension staff would be better placed to relay messages based on research in these domains. The assumption was that technology adapted for a specific target location could then relatively easily be disseminated more widely within the recommendation domain. After successful on-farm trials on a few farms (from 3 to 10), promising options were to be 'validated' more widely within the target area through test plots implemented by local extension staff, and then beyond it into the whole recommendation domain through the provincial extension service.

Train-and-visit or similar extension models operated at the time. These were not felt to be inherently incompatible with a farming systems research approach, despite some challenges such as the capacity of frontline extension staff to handle more complex messages (Sutherland, 1986). Validation of on-farm trial results went along with the production of revised extension recommendations targeting specific categories of farmers. All the provincial ARPTs had research–extension liaison officers who were seconded from the Extension Branch to facilitate the flow of information and the development of new technical recommendations. Most provincial ARPTs collaborated effectively with the local extension services to produce revised technical recommendations for small-scale farmers for the main crops grown within each province. These recommendations were based on the results of on-farm trials, usually conducted over at least three cropping seasons. In cases where research information was limited, the expert knowledge of local extension staff was used as a basis for formulating initial recommendations for local areas to supplement those based on national-level on-station commodity research. In many cases these recommendations took account of differing resource bases and the characterizations of farming systems conducted earlier. The system of validating extension recommendations was top-down, in that the provincial extension recommendations were commented upon by other national researchers, and discussed and approved by a national committee. To enable faster dissemination of information, some provinces developed a newsletter in which on-farm research results were published along with contributions from local extension staff on various technologies and issues about which they were knowledgeable.

Limited uptake and impact

The ARPT approach to dissemination through revised technical messages had limited impact on farmer uptake. There are a number of reasons for this. First, often the technologies tested in adaptive trials (new varieties, types of fertilizer and herbicides) were not available to farmers at all, or were not available at the right time. Hence even the recommendations included inputs that were often not accessible to farmers, and frequently did not indicate what farmers might do in the absence of these inputs. Second, the extension service was not trained in farming systems approaches, and was not adequately equipped to deliver some of the more complex messages relating to cultural practices for specific categories of farmer. Third, some ARPT on-farm research was based on farming systems diagnosis conducted several years previously, influenced by the interests of project agronomists, and of limited interest to farmers.

Trying out alternative approaches

During the 1990s, some of the ARPTs began to look at alternative approaches to dissemination. There was less emphasis on developing technical messages for specific farmer categories for dissemination through a train-and-visit extension model, and more emphasis on testing and availing new products that were in popular demand from farmers, and on advocating solutions to address institutional constraints affecting farmers' access to new technologies.

This change came about for a number of reasons. The leading reason was increased farmer participation in setting the research agenda, brought about largely by working with farmer research grousp (FRGs) instead of individual farmers. For example, in ARPT Western Province, much of which is remote with very limited potential for commercial agriculture, seed banks were established through the FRGs in order to disseminate and preserve new varieties of open-pollinated crops (pearl millet, cowpea and maize). In Northern Province, remote but with greater potential, farmer extension groups were established as part of a re-orientation of the extension approach in the province away from the contact farmer system established under the train-and-visit approach. The decision to establish these groups was influenced by positive experiences with the FRGs, and implemented with the assistance of the ARPT's research extension liaison officer. Farmer extension groups were involved in testing and disseminating technologies developed and adapted in the FRGs.

The ARPTs in Western and Northern Provinces were able to devote more resources to dissemination-oriented research activities due to substantial donor support, including support to extension. However, the change was not only linked to donor funding. Some ARPTs with very limited donor funding also changed their approach. For example, in ARPT Central Province, some FRGs increased in size rapidly, and established satellite groups whose main function was to produce and distribute the seed of new varieties introduced through the on-farm trial programme. Both Lusaka Province and Central Province ARPTs formed links with other development projects and local extension programmes to test and disseminate promising new open-pollinated varieties through local networks of farmers.

Opportunities for advocacy

A second reason for the change of approach was a growing awareness that, in the context of economic liberalization and the poor performance of the parastatal input supply agencies, something had to be done to facilitate access by resource-poor farmers to new technologies. The initial awareness had come about during rapid rural appraisal (RRA) surveys, and had grown during interaction between farmers and researchers during experimentation over the seasons. It became stronger still after the ARPTs, having established a reputation for cost-effective data collection and analysis relating to smallholder agriculture, were commissioned to undertake two major studies in the late 1980s and early 1990s. One of these was a national study into smallholder access to certified seeds; the other was a drought-recovery assessment covering affected areas in four provinces. Both studies highlighted the plight of most smallholder farmers in terms of access to new technologies, and fed into policy processes within the Ministry of Agriculture. This issue was discussed in ARPT annual review meetings, where an explicit commitment to and strategy for advocacy was made. Following this, the provincial ARPTs became increasingly involved in advocacy activities, mainly through provincial committees and strengthened links with provincially based input supply, marketing and credit institutions, as a means of promoting uptake of some of their research findings. The opportunity for advocacy at national level was provided by the decision taken by Kenneth Kaunda in 1990 to move from a one-party state to a multi-party system. This decision, accompanied by economic reforms (liberalization of the agricultural sector) created a 'policy space' for further debate between staff within the government and parastatal organizations providing agricultural services to smallholders. Advocacy was conducted through displays at national and provincial agricultural shows, dramas conducted for visiting permanent secretaries and ministers, policy briefing papers, and half-day topical seminars.

Source: A.J. Sutherland, personal communication (2000).

CASE 7.2

NARP II: DEVELOPING TECHNICAL INFORMATION FOR UPTAKE THROUGH DELIVERY SYSTEMS

National and project context

The National Agricultural Research Project's approach to sharing research results and products was shaped by the Kenya Agricultural Research Institute (KARI)'s mandate as a public-sector research organization, committed through NARP II to "more participatory approaches to on-farm research, with an adaptive focus, and a concern to effectively transfer technologies to smallholder farmers and delivery systems" (Sutherland, 1999b, p.1). "New and existing technologies packaged and supplied for uptake" was one of the three core project outputs of the UK Department for International Development-funded component of NARP II. In order to enhance the conditions for technology uptake, KARI had a formal memorandum of understanding with the Ministry of Agriculture, Livestock and Development, which outlined a range of collaborative activities and research–extension linkage mechanisms. This included forming district-level farming systems teams for joint diagnostic surveys and adaptive research agenda setting; a joint committee to discuss research programming; and appointing a research–extension liaison officer within both the KARI research centres and the provincial extension offices. Influenced by the agricultural knowledge and information systems (AKIS) approach, NARP II made further inroads into linking research with other delivery systems.

New initiatives

Activities initiated by the project to promote sharing of research results were designed to ensure these results were prepared appropriately for the existing delivery systems for information and new technology. Activities included characterization of uptake pathways and agricultural knowledge and information systems (Box 7.1); workshops to guide the identification of uptake pathways and preparation of extension materials; and farmer training linked to uptake assessment.

Information packaging process

The project used a specific process to "ensure appropriate packaging of research information for smallholder farmers". The process fell under a steering committee, and included a review of the information needs of the target groups for the technologies being developed, of likely partners for dissemination, and of choice of media. A series of workshops were convened to review media characteristics, information channels for target groups, relevance of different media for different target groups, strengths and weaknesses of potential partners for dissemination, and types of message. These workshops involved over a hundred participants, including representatives from 10 research centres.

Further workshops were held to enable KARI scientists to work with technical editors, graphic designers, illustrators, translators, extensionists and the steering committee to formulate, design and pre-produce leaflets, pamphlets and posters as learning materials to assist in the dissemination of improved technologies. The process accepted that messages developed should be officially endorsed, while at the same time avoiding 'blanket' recommendations and accepting "the possibility of several different, overlapping messages for the same commodity or enterprise, for different zones/regions and/or target groups". This was in line with the 'basket of options' approach. A checklist of topics/questions for pre-testing of messages was developed as shown in Box 7.2, and each lead scientist pre-tested their information materials with a range of stakeholders as appropriate (participant and non-participant farmers, men, women and young farmers, extensionists, other scientists and traders, etc.).

Linking farmer training with uptake assessment

A group of researchers working on animal health-related issues undertook an exercise that combined farmer training and demonstration with an initial assessment of uptake. An assessment of the existing knowledge of farmers on tick and worm control was undertaken through focus-group meetings in Tranz Nzoia and Uasin Gishu Districts. Gaps of knowledge were identified using a short questionnaire for one in every five persons attending the meeting. After this, hands-on training of farmers was undertaken to fill gaps relating to tick control and worm control strategies. An uptake assessment was conducted 6 months later, again questioning a sample of those who had participated in the training, compared with those who had not. This assessment indicated that farmers' awareness and knowledge had been increased to some extent by the training. Further assessment was to be undertaken in order to establish whether or not knowledge was the real or primary constraint to uptake,

Box 7.1 Agricultural knowledge and information systems in Kenya – implications for technology dissemination and development

The Kenya Agricultural Research Institute and the Ministry of Agriculture undertook a study of the agricultural knowledge and information systems (AKIS) of four districts, including high-potential and pastoral areas to document and assess the significance of different actors and organizations as potential uptake/dissemination pathways for agricultural technologies, and to consider ways to improve the performance of the knowledge and information systems in the districts. Databases of the organizations, institutions and actors involved in agriculture in the four districts were compiled, and a series of participatory and 'rapid appraisal of agricultural knowledge systems' exercises were carried out with those concerned with agriculture in selected sublocations and divisions within each district.

The AKISs of Kenya's smallholder farmers are diverse and complex, varying with agricultural enterprise and agroecology, and from district to district. Agribusiness plays a major role in the AKIS of Kiambu District near Nairobi, whilst government and non-government (NGO) agencies are the major 'external' actors in the pastoral areas of West Pokot. NGOs and church organizations are particularly active in Homa Bay, but their coverage is limited. Links between external institutions and organizations, for both government organizations and NGOs, are generally weak and poorly co-ordinated.

The major sources of knowledge for smallholders are local (neighbours, family, markets and community-based organizations). Some 40–70% of respondents reported government extension as an important source of information, although both farmers and extension personnel expressed dissatisfaction with the quality and frequency of their interactions. NGOs are also important sources of information in those areas where they are active. Churches, Chief's *Barazas* (community meetings) and agricultural companies are significant information sources in some locations.

Most farmers considered their most pressing information requirement was information on technical details of farming (such as chemical application rates; how to manage late blight in potatoes; where to obtain certified seed; the most appropriate varieties for a given location; housing and management of livestock).

Inadequate human resources (government and NGO extension), and poor local leadership (particularly for community-based organizations), were seen by farmers as the most serious barriers to effective information flow, whereas government and NGO extensionists stressed lack of resources to mobilize communities, and poor communications with researchers leading to information distortion.

Potential delivery systems and entry points for knowledge dissemination were tabulated, but were quite diverse – district-specific and commodity-specific strategies are needed. Increased use of networking and pluralism in the provision of extension and research services are advocated to increase the cost-effectiveness, equity and efficiency of agricultural development.

The importance of participatory learning approaches was emphasized by many of the study participants. KARI could 'capture' a pivotal role in the varied AKISs of the country through increased emphasis on the production of 'basket-of-options' information materials for farmers and extensionists, and of teaching materials to assist the many actors involved in extension to facilitate participatory learning.

Source: Rees et al. *(2000).*

Table 7.1 Crop protection technologies – target groups and dissemination partners

Target group/ partner	Interest/objective	Strengths	Weaknesses
Farmers	Healthy, productive crops	Direct beneficiaries	Inadequate information and resources
Extension	Teaching farmers better crop protection	Practical training	Lack knowledge Lack motivation
Growers' associations/other community-based organizations	Help members	Grassroots presence/group approach	Not easily accessed
NGOs	Community development	Community contacts	Other agenda
Traders	Sell chemicals	Grassroots presence	Lack technical know-how
Chemical companies	Sell chemicals	Expert knowledge, global influence	Want to sell even when chemicals not needed
Pesticide Board	Effective chemicals, minimal toxicity	Knowledge, authority, existing communication channels	Rigid, discourage innovation

Source: Scarr et al. *(1999).*

Table 7.2 Animal husbandry technologies – media analysis

Medium	Strength	Weakness
Leaflet	Store information, can be used repeatedly	Not all farmers can read
Poster	Reaches illiterate farmers, good for awareness-raising	Short-term access to information
Baraza, field days	Reaches illiterate farmers	Only a few people reached at any time No storage of information
Radio	Reaches many people, awareness raising, attitude changing	Expensive, one-time broadcasts, not suitable for skills developments
Video	Awareness raising, attitude changing, skills development	Expensive Limited access in rural areas

Source: Scarr et al. *(1999).*

Box 7.2 KARI, NARP II Checklist of topics/questions for pre-testing

- Is there anything new in this message that you/your farmers did not know before?
- How big is the demand for this information in this area?
- Is the information practical for you/your farmers to use?
- Are there any words that are difficult to understand/not clear?
- Are the measurements and units shown in a way that you/your farmers can easily understand them and apply them?
- Are the illustrations clear and easy to understand?
- What information is missing/What else do you need to know?
- What type of farmer would be interested in this and be able to use this information [women/men/rich/poor, etc.]?
- How many families in this area will be able to read this leaflet in this language [none/few/half/many/all]?
- If we had to charge 10/- for this leaflet/poster, how many families in this area would buy it [none/few/half/many/all]?
- What is your overall impression of the message?
- Any other comments?

or whether farmers were more constrained by economic factors. The conclusion of the exercise was that further on-farm testing may be needed in order to provide an effective demonstration of the control strategies.

Sources: Curry et al. *(1999); Mulira* et al. *(1999); Scarr* et al. *(1999); J.A. Sutherland (1999b).*

The Larger Grain Borer Control Project was situated within Ghana's public extension services, and aimed to develop a range of technical solutions to address a specific pressing problem: the larger grain borer which was endangering household-stored maize reserves. The approach incorporated a range of stakeholders, including local traders, and worked to develop an extension approach, based on the use of decision trees, that had the potential to deliver relatively complex and context-specific technical messages on grain storage.

CASE 7.3

LGB: THE ROLE OF TRADERS AND DECISION TREES IN GUIDELINES

Farmer and trader participation in technology dissemination for larger grain borer

Field reports and observations indicated that there was rapid farmer-to-farmer transfer of knowledge about the new pest and about technologies for its control, although no quantitative data were collected to prove this. The Larger Grain Borer Control Project did not carry out any specific activities to encourage farmer-to-farmer transfer. The exception was a few isolated cases, for example, where farmers in one study village were taken to see another (at their own suggestion), and where several villages participated in evaluation of research station trials.

Formulating technical messages

Farmers were involved in two main aspects of formulating technical guidelines:

- refining the details of recommendations (local units of measure, etc.) which were mainly worked out in the on-farm trials
- formulation of decision trees and a training game to help extension staff advise (or help literate farmers decide by themselves) on the choice between different options.

Decisions on technology choice are sometimes straightforward, but when they are not (for example, when the costs and benefits of two options must be carefully compared, or when a technology is suitable only for particular circumstances), it is helpful to have information which assists farmers in making such decisions. Decision trees and similar tools are one means of presenting such information in a structured way.

Decision trees were initially developed by project staff on the basis of available knowledge on farmer decisions and available options. The draft trees were then tested with individual farmers and focus groups in a special study (Feakpi *et al.*, 1994; Feakpi, 1995). The study focused on whether the questions asked and options offered in the draft trees were relevant to farmers, and also on whether the farmers found the logic of the trees helpful in making decisions. The decision trees were then tested for comprehensibility and usefulness with extension staff, along with other ways of presenting the same written information, using written decision-making case studies (Boxall and Compton, 1996; Compton, 1997a; Compton *et al.*, 1997a). Extension staff generally found the decision aids helpful.

It was also recognized that a decision-making approach would make new demands on extension staff accustomed to delivering a single message to all farmers, as was the case in Ghana and many other countries until recently. Extension staff needed skills in developing a dialogue with the farmer, inspecting stores,

Box 7.3 Tips from the LGB project on decision trees

A useful decision tree should take a genuine and complex decision question and guide the farmer through a series of simple, answerable questions to work through to the best choice of available, practical options. Useful options include:

- Is the decision question asked at the top of the decision tree a genuine decision faced by farmers (not an artificial construct of the researcher or extension officer) and expressed in the way the farmer would express it?
- Do the options available at the bottom of the tree correspond to all the options available in practice to farmers? How will the tree deal with options that are available to farmers, but are not recommended or not expected to work well?
- Are the questions asked in the body of the tree easily answerable by the farmer – if not, are there options for 'don't know/uncertain' answers?
- Are the questions asked in the body of the tree all strictly necessary for decision-making? Is the decision reached with a minimal number of questions?
- Do farmers actually find the trees useful in helping with decisions?

The question of how well decision trees would work when used by extension staff advising illiterate farmers was not resolved before the end of the project; research continues. They are suitable for individual advice rather than work with farmer groups.

understanding concepts of decision-making under risk and performing simple marginal cost–benefit analysis; and finally, they needed to be able to put these skills together to advise farmers in specific storage-decision situations. To address these needs, the project developed a training game (the maize storage board game) to teach cost–benefit analysis and decision-making under risk in an enjoyable way (Compton, 1995), and a short play showing a decision-making dialogue between a woman extension staff member and a woman farmer (Feakpi, 1995). An early draft of the training game was played with literate farmers in four villages and modified following their comments (Feakpi, 1995) before presentation to extension staff. The training materials were used in pilot training exercises for extension staff in three regions in 1995. Further development and testing of extension materials has continued since the project finished.

Training traders as 'extension agents'

While the participatory technology development literature is full of farmer participation, little attention is paid to traders, possibly because of a widespread distrust of traders in many cultures. However, private commodity traders can potentially play an important role in agricultural extension, especially in post-harvest technology. In Ghana, small-scale traders travel widely and arguably reach more farmers than the extension services (Motte, 1995). Moreover, in most of West Africa the majority of traders are women, who can often talk one-to-one with women farmers (who again comprise the majority of farmers, particularly for food crops) more easily than can the mainly male agricultural extension staff. Women are more likely than men to come into contact with traders, as in many areas they have the primary responsibility for selling household maize. As most traders themselves come from a farming background, they have experience of on-farm storage and are, therefore, well able to understand the concerns of their suppliers. It is common for traders to be with the farmer at the time the maize store is dismantled (traders may even help to shell the maize). Insect damage is very visible at this time, so this provides a good opportunity for traders to exchange information with farmers about storage pest problems and potential solutions.

In the LGB project area there were several reasons why traders were willing to act as informal extension agents for new insect control methods in stored maize. First, richer traders often give production credit to farmers which is secured through a lien on the farmer's maize store. This gives them a direct interest in the maize quality, as it influences both the farmers' ability to repay and the value of the collateral (the contents of the store). Second, many traders compete to keep particular farmers as their regular suppliers. In order to maintain farmer goodwill, traders often buy the whole store, including both good and insect-damaged maize; profit margins on the latter are smaller and less certain, so traders have an interest in maize held by farmers being kept in good condition. Traders may also provide other services to their regular suppliers, one of which is the procurement of storage chemicals for farmers in remote villages.

Over 600 maize traders were trained in storage pest control by the LGB project, and their new knowledge was rapidly passed on to farmers and other traders (Compton *et al.*, 1995a; Gbedevi, 1995; Motte, 1995; Semakor, 1995). Trader training may also have helped delay the spread of LGB to new parts of Ghana, as several cases of isolated outbreaks in traders' stores (which are often the first in a new area to be infested by LGB) were reported and treated by traders who had been trained (R.A. Boxall and S.K. Semakor, personal communication).

Lessons on working with traders

The project may have had things very easy, because of the coincidence of traders' and farmers' needs in learning how to control storage pests. Moreover, traders in Ghana are well organized through their 'market queens' (in this case, maize queens) who provided an easy point of contact. It is not clear how replicable the project's experience would be in other parts of the world. However, we would recommend trying.

Source: Compton and Motte (1997).

7.3 EXPERIENCES FROM AREA-BASED PROJECTS

The next three cases document some experiences from area-based projects. They present somewhat different approaches from the projects in the previous section to sharing new knowledge and technology. They are understandably much more focused on the operational areas where the research was conducted. The first case shows the approach of DAREP, which was designed for an operational area with weak government extension services and poorly served by private-sector agribusiness organizations. DAREP emphasized a range of locally based dissemination mechanisms, including FRGs, farmer open days, local site committees and farmer-to-farmer evaluation events. Limited attention was also given to developing technical recommendations.

CASE 7.4

DAREP: A MEDLEY OF METHODS FOR DISSEMINATION AND TECHNICAL GUIDELINES

Guidance in the project document

The Dryland Research and Extension Project document provided a mandate for the project team to be innovative with regard to dissemination of research outputs. The social scientists' terms of reference include the development of new approaches to dissemination, including farmer-to-farmer dissemination and training of extension staff in news approaches. They also emphasize the development of linkages with "other government departments, community institutions, NGOs, etc., to encourage innovative approaches to dissemination" (organized group visits, competitions, etc.). The project document places further emphasis on:

- experimenting with ways of increasing the availability of new seed and farm tools through "private traders, groups or direct sales from on-site offices"
- "developing new approaches to dissemination"
- "identifying institutions that are willing and able to assist in disseminating a viable new technology".

The formulation of technical recommendations is not mentioned in the project document, which implies that the intended main focus was to develop and try out new participatory dissemination approaches within the project area. Nevertheless, the project also had opportunities to make inputs to national extension programme technical messages.

DAREP took over (and following donor directives subsequently wound down) an existing site infrastructure from a previous project. This infrastructure was designed to reach out to local farmers, and give farmers within a 10–15 km radius access to new technology on show at the 10 project sites.

Dissemination methods developed

DAREP used various mechanisms for sharing and promoting new knowledge and products, as follows.

Farmer open days

The most common method used for demonstration and dissemination was farmer open days, held once in each growing season (twice every year) at all project sites. Farmer open days were advertised through the traditional authorities, and would attract 100–500 adults (men and women) living around the local sites, and school classes in addition. A range of new technologies was displayed at the open days. It was usual for collaborating farmers to share knowledge and demonstrate methods with other farmers at the open days, with extension staff and researchers playing mainly a listening or facilitation role. With new crops, new varieties, water-harvesting and intercropping methods, the farmers would walk around and view the technologies *in situ*. Other technologies, such as new tools, recipes, preservation methods and animal parasite control, were also demonstrated at the sites. Farmers attending could usually take these technologies home in the form of new knowledge, or as seeds sold or garnered from the sites. Technology disseminated in this way included new crops, new varieties, new recipes for dryland crops, vegetable preservation methods, and animal health remedies. In addition, some of the technologies were made available for on-farm trials, using more formal methods of validation by farmer groups or clusters. Similar types of farmer open day were held on selected farmers' fields, following nominations from the local site committees. This initiative resulted in comparatively more women attending the open days, but the range of technologies on view tended to be less extensive.

Seed bulking and sale

Seed bulking and sales of new crop varieties to local farmers were an important activity at all the local sites. After the formation of site committees, seed sales were regulated by the committees which fixed the prices, set limits on quantities per farmer, and decided which varieties should be bulked each season. At some sites, the site committees nominated individual farmers to bulk particular varieties for sale to other farmers. This was a more sustainable and low-cost approach. After two sites were closed down in 1995, farmers went ahead to find other land and continued with seed bulking activities using their own labour and inputs. At two other sites which closed in 1996, farmers continued to manage the sites and planted them for seed bulking after the researchers' trials stopped. In one of these sites, when the site committee was asked to leave by the school which owned the land, they secured another site and continued with seed bulking, and started bulking fruit trees as well.

Some experiences with seed bulking were less positive. Some lessons from these illustrate the challenges faced in undertaking this type of initiative in semi-arid areas.

- Some site committees set seed prices so low that at planting time prices were below local market prices. In some cases seed was bought for use as food rather than for planting.
- Some farmers nominated by site committees to grow new varieties for seed sold the crop to local traders shortly after harvest, rather than storing it for sale as seed just before planting time.
- One site committee was assisted by the project to plant and spray legume seed-bulking plots, but failed to organize the harvesting and seed sales effectively – local politics at this site undermined project efforts.

After two consecutive droughts in 1996, some of the basic seed for bulking was lost and the bulking activities undertaken were not economically viable. To address the risks from drought, the project tried irrigated seed bulking, using irrigation facilities of the Ministry of Agriculture and a local secondary school. The results were very disappointing, with high costs and comparatively low yields; rainfed seed production of semi-arid crops was a much more economical use of project resources.

Participatory on-farm trials

Participatory on-farm trials covering a wide range of technologies, and in particular new crops and varieties, were an effective mechanism for disseminating new knowledge and new varieties, as friends and relatives visited the trials and were given seeds to try out. The formation of farmer–researcher clusters for trial implementation and monitoring, incorporating mid-season evaluation sessions, further stimulated farmer-to-farmer dissemination of knowledge.

Other approaches

Some more specific approaches to developing and refining technical messages and disseminating technology are described below, mainly relating to some of the more complex technologies.

Dryland crop recipe workshop

Technical packages, in the form of dryland crop recipes, were developed jointly with farmers and extension staff in a workshop specifically convened for the purpose (Kang'ara *et al.*, 1997). The same workshop developed an extension strategy for testing and popularizing dryland crop recipes using participatory demonstration approaches. Field days were held involving the farmer and extension resource persons, at which the new recipes were cooked by groups of farmers (male and female adults and school pupils) who then presented the results to other farmers. In subsequent seasons the DAREP research site committees met to decide which recipes they would like to be demonstrated at the open days. These demonstrations were led by interested farmers who prepared the dishes for other farmers to taste.

Mange control study tour

In the mange experiment, which addressed a parasite that had ravaged goat herds in parts of the project area, other interested farmers were invited on a study tour to participating trial farmers who demonstrated mange control methods. The recommendations were not written, but passed on by word of mouth – although some visiting farmers took their own notes. Some farmers who went on this study tour, after successfully treating their own animals, started to treat the infected goats belonging to their neighbours, charging a small fee for this.

Tree propagation workshop

The project agroforester undertook research into the propagation of a popular local timber species (*Melia volkensii*). Farmer workshops were convened to train farmers in propagation methods through demonstration and hands-on practice. Farmers took their own notes from graphically prepared flip charts. They then tried out the methods on their own farms, which were selected in clusters for easy dissemination and learning from one another, as well as for evaluation visits. A brochure detailing the steps followed in these workshops is being prepared for use by NGOs and other agencies involved with dryland agroforestry.

Location-specific recommendation workshops for new crops and varieties

After successfully popularizing (around the project sites) some of the new crops and crop varieties through open days, seed sales and on-farm trials, it was felt that more formal dryland crop recommendations could be produced, based on the experiences of the researchers and farmers involved. In the closing stages of the project, community-level workshops were held in which recommendations were developed for specific crop varieties by farmers, together with local project and extension staff. The workshops discussed planting dates, spacings, intercropping arrangements and other aspects of crop management for the new crops and varieties. The participating farmers said they learned a lot from each other during these workshops. However, the results of these workshops were not analysed or published, as the project ran out of time and lacked a budget for this activity.

Soil and water conservation farmer research groups

Some farmers in the tools and tillage farmer research groups engaged in extension activities on their own initiative, including visiting other farmers to advise them and help them lay out conservation structures, and also holding their own small field days without any outside facilitation. Recommendation workshops have been held for water harvesting with the farmers and extension staff involved in the experiments. These workshops have come up with guidelines for water-harvesting structures suited for particular biophysical and socio-economic circumstances, as summarized in Table 7.3.

Tools fairs

Following experimentation with new types of tillage tools, local artisans were engaged to manufacture these tools and display them to farmers at community-level tools fairs. At the fairs, a panel of farmers judged the quality of the tools displayed and awarded prizes to the artisans with what were judged to be the best tools. Contacts were established between farmers and artisans, and in a few cases some farmers placed orders for tools. However, uptake was rather slow, with some complaints over the quality of the tools produced. Moreover, the artisans complained that the market for agricultural tools was very limited, it was difficult to compete with imported tools, and it was more profitable for them to produce other items such as door and window frames.

Topical dissemination workshops

In order to share the results of the soil and water conservation research more widely, a workshop was held to which various national experts were invited from research, extension and NGOs. The workshop participants visited the field sites and talked with farmers to evaluate the technologies developed. As a final stage, they endorsed most of the technologies as being suitable for more widespread dissemination. The national soil and water conservation extension experts present decided to use the research results as a significant input into a handbook on water harvesting which they were preparing for the national soil and water conservation programme. Other technologies were disseminated at an end-of-project exhibition and conference attended by a wide range of research and extension specialists.

Challenges from DAREP

There is a challenge in how to present and publish recommendations that are location-specific. The more participatory research approaches, particularly the soil and water trials and the variety testing, generated considerable diversity of opinion which was difficult to summarize in the form of a single recommendation for wider dissemination. DAREP was terminated after 3.5 years, giving very limited time for the development of extension literature based on the research conducted.

Sources: Mellis (1997); Mellis et al. *(1997); Kang'ara and Ouma (1997); Kang'ara* et al. *(1997b); Sutherland* et al. *(1997b, 1997d); Njiru* et al. *(1997); Sutherland and Kang'ara (2000).*

The Intermediate Technology Development Group (ITDG)-Chivi Food Security Project, like DAREP, also focused mainly on locally based approaches to technology and knowledge dissemination, emphasizing a continuous process of technology adaptation along with dissemination. The Chivi project, after initial successes, quickly looked to ways of sharing the technical results more widely, and also scaling-up more participatory extension approaches. In later stages the project focused more on developing a participatory extension methodology for adoption by government extension at district level, rather than developing a menu of technologies for scaling-up.

Table 7.3 Farmers' suggestions for water-harvesting structures

Factor	Cumbered beds			W/h from road			Pits			Small furrows		
	Good	**Bad**	**n/s**	**Good**	**Bad**	**n/s**	**Good**	**Bad**	**n/s**	**Good**	**Bad**	**n/s**
Soil	sandy loam sandy clay murram gravel	black cotton clay stony	swampy	sandy loam murram sandy clay	black cotton soil stony soil clay		sandy loam sandy clay black cotton soil murram			sandy loam sandy clay murram	black cotton soil clay stony	
Crop	maize sorghum millet greengram cowpea pigeonpea tobacco		cabbage tomato kale potato	maize millet pigeonpea sorghum groundnut cowpea greengram		banana sugarcane horticultural crops passion fruit pawpaw	maize sorghum millet greengram cowpea bean cotton	pigeonpea carrot cassava horticultural crops		millet sorghum cowpea greengram bean finger millet	maize pigeonpea cotton sunflower	sukuma
Tools	jembe mattock shovels f/jembe pangas ox-plough	wheel- barrow *muro*	crowbar	jembe mattock crowbar	wheel- barrow	crowbar	jembe f/jembe spade	*muro* panga		jembe spade ox-plough	f/jembe wheel- barrow	
Season	Apr	Dec		Apr and Nov rains			Apr			Apr rains	Nov rains	
Preparation time	Jan, Aug, Sep	Dec, Nov, Apr		Nov, Apr			Before rains	During rains		Before rains	During rains (Nov, Apr)	
Slope	flat, gentle	very steep		flat	sloping area		flat moderate steep (with terraces)			flat moderate slope		

n/s – not sure
Source: Mellis (1997).

CASE 7.5

ITDG-CHIVI: FARMER PARTICIPATION IN TECHNOLOGY DISSEMINATION

Farmer participation in formulation of technical guidelines/recommendations

One of the most exciting facts to emerge from the participatory technology development process has been the level of farmer experimentation. Rather than merely taking ideas and copying them exactly in their own plots, farmers and gardeners have adapted and modified ideas to suit their own needs and circumstances.

In mid-season, farmers evaluated various technologies in each others' fields. Frequently, the farmers' experiments modified ideas, particularly the design and dimensions of soil and water conservation structures and practices. Farmers would combine techniques and try out variations on standard designs that they thought would serve them best at plot level.

Competitions

Competitions have been an important way of developing recommended practices into methods that suit farmers in Chivi. These are organized by the groups. Individual farmers compete for prizes for the best idea, while neighbouring communities challenge each other to have the most farmers and gardeners participating in trials and experimenting with new ideas. These competitions are organized and judged by elected committees. The leadership training feeds into the electoral process.

There was some concern that rewarding individuals sometimes leads to jealousies that may result in innovators being victimized. Combining individual competitions with community competition makes individual innovators' contributions important for each community. Innovators then become appreciated and respected, even when failures occur. The overall effect of these in-field evaluations and competitions was to allow a number of technology options to be refined to suit local social and environmental conditions.

Creating a conducive local dissemination environment

The lesson that emerges from these experiences is that for new practices to spread informally, a conducive environment needs to be facilitated. Farmers need encouragement and their confidence to be built up, so they can confidently share their knowledge. Sometimes it is difficult for them to do so if their environment only allows information to come from one source, and only allows proven technology to spread. (One of the concerns of the research stations was that unproven technologies might be disseminated.) Such an environment arrests the potential for innovation.

The manner in which materials such as seed are spread may be different from the spread of more complex technologies and the associated skills and knowledge. For instance, if the technology of tied ridges is not accompanied by thorough technical training, its spread could well end up doing more harm than good. This is because the technology has some very specific technical aspects that require specialist training. Similarly, with pesticides the correct mixture formulation is also important. However, with seeds the risks are very different, and consequently it is far easier for new varieties to spread from farmer to farmer (even without seed fairs).

The widespread interest that events generated was an important part of the dissemination process. Farmers and gardeners were able to see various technologies in their neighbours' plots. They were able to see the effects for themselves and discuss these with their neighbours. They could also see for themselves why some adaptations of a particular technology worked better than others. They were able to pick up design criteria by looking and talking.

Seed fairs

Seed availability also became an area explored by farmers. Here, seed fairs were a particularly effective dissemination approach. These fairs were originally organized in 1993 by the project team, but subsequently by farmers groups, and have allowed farmers to see, compare and discuss the merits of differing varieties. It emerged that a large number of varieties of sorghum, millet, maize and various beans and legumes were grown locally. Nevertheless, individual farmers tended to know of and use only a fraction of these. The totality of local knowledge was huge, but individual farmers knew only a little of this totality. Seed fairs organized by farmers are now planned regularly.

Successful outcomes

Some examples of the success of this approach to dissemination include the following:

- tied ridges/furrows, a new technology, were first tried by 28 farmers in 1992/93 – by the 1994/95 season over 500 farmers were using them
- another new technology, infiltration pits, was being used by over 800 farmers by 1994/95 and by 1800 farmers in 1996
- intercropping, a technology falling into disuse as monoculture was promoted by the government extension service and farmers clubs, gained a new lease of life – during the 1992/93 season 28 farmers experimented with intercropping, and the following year over 450 farmers did so
- by the end of the same period over 300 women were mulching their vegetable plots in their gardens – by 1996 this had risen to over 800.

There are also numerous examples of farmers from outside the project area hearing of the activities in Ward 21. Many have visited to see and learn, and have returned to their own villages with new techniques to try.

Source: Croxton and Murwira (1997).

CARE Livingstone's approach was based on building local capacity for technology supply and dissemination. The project was implemented in the context of a farming community going through, and emerging from, serious setbacks caused by drought and animal disease. The CARE Livingstone Food Security Project (LFSP) explicitly aimed to improve food security through making new technology available to smallholders in the project area, and establishing mechanisms for this technology to be locally preserved and distributed.

CASE 7.6

LFSP: SEIZING THE OPPORTUNITY FOR PROMOTING NEW KNOWLEDGE, PRODUCTS AND FURTHER RESEARCH

Drought and livestock disease provide a dissemination entry point

The 1995 participatory rural appraisal livelihood analyses, facilitated by CARE staff who had previously worked in the Zambian ARPT teams, consistently identified hunger as the villagers' fundamental problem, exacerbated by livestock disease, as cattle are the major asset used by many in drought-coping strategies. In addition, the sequence of three droughts in 4 years also had a hugely debilitating effect on household seed stocks, especially for the legume crops grown by women. By the end of the 1994/95 drought, women throughout the Kalomo South area had lost virtually all their previous stores of local groundnut, cowpea and bambara varieties.

Not surprisingly, the acquisition of early maturing crop varieties was seen by farmers in all parts of the district as the key priority for restoring their food security. CARE focused initially on the seed scheme to promote new technical knowledge and products that it was confident would meet the priority need of farmers.

The pilot seed scheme

In the pilot seed scheme of 1994/95, 330 farmers were provided with a newly released, but not widely available, improved sorghum variety known as Kuyuma. This variety did well and these farmers fared better than their neighbours. The pilot scheme farmers obtained sufficient grain from their half-hectare plots to last their households until November–December, whilst their neighbours were running out in August–September. In planning for the 1995/96 season, CARE first held discussions with farmers in the previous season's pilot areas. It was agreed that for the coming season the scheme would be managed by local village institutions, and as there were no existing institutions that farmers felt were appropriate, they would form new village management committees (VMCs). CARE's field staff then held a series of area meetings affirming the need for new crop varieties, and asking villages to form their own VMCs if they wished to participate in the seed scheme. Villages had to undertake three organizational tasks. First, they had to elect their management committee – the two organizational criteria established by CARE being that the committees should be elected and, as in Central and Copperbelt Province ARPT Farmer Research Groups, all should have at least one woman. Second, groups of four to seven farmers had to form seed groups, the members of which would be jointly responsible for ensuring all repaid their loan in kind to the VMC. Third, the seed groups had to register themselves with the VMC, as well as the crop for which each member wanted seed.

The response to the area meetings was overwhelming, with 180 VMCs formed during the 1995/96 season. Much of the village-level seed distribution was carried out by farmer extension facilitators, who were elected by and accountable to a group of VMCs. During the season, these facilitators were responsible for checking on field-level progress and conveying back to CARE any problems requiring attention. Sporadic aphid attacks on cowpea was one issue, for instance, which resulted in the facilitators being trained in how to conduct a spraying programme in affected areas. Local agricultural extension staff, where they showed interest, were also involved in seed programmes.

Benefits of inherited institutional relationships

The range of new varieties introduced to the farmers, and CARE's ability to obtain the seed for the seed programme, owed much to the institutional linkages established by the two ex-ARPT farming systems agronomists involved in the project. The most widely distributed seed, the early maturing white sorghum variety Kuyuma, was the only seed obtained through the market. Early maturing maize seed – Pool 16 – was obtained from the Smallholder Development Project in Mpongwe, whose farming systems agronomist had co-ordinated the Copperbelt ARPT. Cowpea and groundnut seed were provided by the food legumes research team within the Ministry of Agriculture, who had their own FAO-funded multiplication scheme for newly released varieties. For groundnuts the multiplication for Chipego (a short-season variety bred for the dry areas of the country) had failed due to poor management. The 120 kg of seed the LFSP received was virtually the only seed available in the country. The project, therefore, decided to multiply its scarce stock commercially before re-disseminating on farm.

Looking towards the future, CARE established three further linkages with research teams. A food legumes breeder, based in the Southern Province, has provided the Livingstone Food Security Project with greengram and pigeonpea seed, both of which farmers are currently assessing. The root and tuber research team, based in the north of Zambia, wished to test some of their sweet potato and cassava varieties bred for the drier southern areas of Zambia. The sorghum breeder responsible for Kuyuma discussed providing another new, early maturing, white variety. Along with these new varieties, the project will disseminate widely varieties whose broad suitability is known – to enable farmers to make their own choice.

From dissemination of varieties to research and development on other food security issues

In its second full season of operation, the LFSP has continued to expand its operational area and to diversify its activity base, including development and further research. The LFSP is adopting a twofold approach to the task of new technology development. First, in VMCs which have farmers willing to experiment with new technologies, the project is introducing technologies that have been tried elsewhere in the country or region. In conjunction with the VMCs, the project is involved with small-scale irrigation for market gardening in an escarpment zone where some springs feed perennial pools, and along the Zambezi River. With simple irrigation technology, LFSP has also experimented with a treadle pump piloted by CARE Zimbabwe, trying out the technology (as a loan) to see how it can be improved, adapted or altered completely, to be more appropriate for the context and farmers' needs. An institutional partnership is developing with the Dutch-funded Palabana Animal Draught Power Team, which has been developing conservation tillage technologies and equipment. With respect to both small-scale irrigation and conservation tillage, the project is working with specific groups of farmers to obtain a better mutual understanding of the issues at hand.

Sources: Drinkwater (1997); Mitti et al. *(1997).*

7.4 DISCUSSION OF ISSUES

The cases above raise some important issues around the theme of technology dissemination and uptake, particularly those arising out of a participatory agricultural research process.

Operational and organizational boundaries

For the research and extension staff involved in participatory agricultural research, increased farmer participation tends to blur the operational distinctions between doing research trials, analysing and reporting the results, and developing technical recommendations which characterize more conventional research.[1] Information is generally shared freely between those involved in the research process. This is particularly true in the second three cases of projects with a community-based mandate, which placed more emphasis on sharing knowledge and products through the research process than on a more selective dissemination of research findings at the end. Such projects do begin to challenge the rationale for functional boundaries between organizations, particularly the organizational and functional separation of agricultural research and extension. The IDTG-Chivi case illustrates that the transition from generating to sharing information can be a process of widening networks, with a crossover of actors (research, extension, community leaders, farmers) involved. The DAREP experience was that direct contact between researchers and farmers leaves some local extension staff feeling disempowered, particularly those who have not been actively involved in the research, because the farmers are likely to be better informed than they are about new technologies. Frequent staff transfers within extension make for a discontinuity of involvement and interest.

The first three cases in this chapter illustrate projects within public-sector organizations giving relatively more attention to fuller documentation, packaging and wider dissemination of technical findings. For this type of project, functional distinctions between research and extension activities are much more of an operational reality, particularly in the vast parts of their mandated areas where there are no participatory research activities taking place. Project teams are often acutely aware that many of their colleagues in public-sector research and extension have a more 'traditional' transfer-of-technology perspective, and that old habits die hard.

Scaling-up/rolling out strategies

All the above cases illustrate that farmer participation in the research process enables participant farmers to become actively involved in sharing the acquired knowledge and products with other farmers. The case studies illustrate three main strategies for scaling-up or rolling out technical findings: facilitating increased farmer-to-farmer extension; re-orienting existing public-sector extension approaches; and exploring alternative uptake pathways. These three strategies overlap somewhat.

Farmer-to-farmer extension will continue to be very important for sharing new information and products. The ITDG-Chivi, DAREP, the Kavango Farming Systems Research and Extension Project, and other cases illustrate approaches used to increase the extent of farmers' involvement in dissemination, facilitated by project and field extension staff. This implies that government extension staff are themselves prepared to change their approach towards increased problem-solving and facilitation, and move away from a more straightforward 'deliverer of messages' role.

Re-orienting public-sector extension approaches is likely to be a long-term task, and will require commitment from senior management along with a longer-term programme of training and sensitization with staff at all levels. We return to this point in Chapter 16.

Participatory research projects which involve agricultural extension staff but are led by researchers are chipping away at the edges of the task, rather than addressing it head-on. The LGB research team was in a stronger position than other projects in this regard, being situated within Ghana's government extension service, and in a relatively short period made significant progress in terms of working through ideas for delivering more complex technical messages through the existing extension system. The IDTG-Chivi project also, through its effective involvement of the local government extension services from early on, was able to convince extension managers of the value of more participatory approaches, and had a significant impact on extension approaches in the district selected for piloting more participatory approaches (Hagmann *et al.*, 1998).

The third strategy, exploring alternative uptake pathways, may be seen as a research-led strategy that steers research organizations and projects in the direction of partnerships with the priority uptake agencies identified. The NARP II case illustrates a structured approach to developing such a strategy, which was undertaken during the closing stages of a process-oriented adaptive research project. The LGB project also illustrates the practical involvement of grain traders in its uptake strategy. CARE Livingstone provides an alternative perspective on partnership: this project can be seen as an NGO uptake agency actively looking for technical solutions to identified problems, and at the same time developing farmer-to-farmer mechanisms for technology bulking and dissemination. A challenge for future participatory agricultural research projects will be to identify uptake pathways and demonstrate effective demand for their products (Garforth, 1997).

These three strategies are not mutually exclusive, and the cases illustrate a somewhat different emphasis on each. What is clear, however, is that while public-sector extension is likely to remain an important potential partner in participatory agricultural research, there are major challenges in terms of using conventional top-down extension approaches for scaling-up the positive technical results achieved through participatory approaches. Projects which were designed with uptake issues clearly in mind at the start, such as LGB, DAREP and CARE Livingstone, are more likely to have an immediate impact on uptake than projects which start to consider uptake only towards the end of their life.

Products and information

A further emerging issue relates to the type of products and information generated by participatory approaches. Most of the projects' outputs were not ready-made prescriptive packages, but technology options (choice from a range of products) and new knowledge about biophysical processes. The less complex technologies, such as new varieties, were generally made available relatively quickly and easily within the local communities participating in the research. These products of participatory research were relatively easy for both farmers and local extension staff to manage and disseminate. More complex technologies, often based as much (if not more) on new knowledge as on new products, presented more challenges. This included the improved grain-storage methods developed in the LGB project, the animal health and tree propagation technologies developed in DAREP, the soil and water conservation methods developed in ITDG and DAREP, and the cashew disease control methods developed in the Cashew Research Project.

There are implications in terms of project design, depending on the type of technology a participatory research approach is expected to produce. Moreover, supply or market information is also crucial to the uptake of new ideas. This aspect of uptake was rather neglected by most of the case study projects.

7.5 CONCLUSIONS

It is clear that farmer participation in technology development and testing stimulates adoption of new products and knowledge by the participants. Wider sharing of these new products and knowledge depends on a number of factors. Factors that both help and hinder farmer-to-farmer sharing of new knowledge and products listed in the case studies are summarized in Box 7.4.

Measures to improve the uptake of new knowledge are summarized in Box 7.5.

NOTES

1. A case study author comments "Do they? For the farmers undertaking the work, yes they do, but for other farmers and extensionists – no they don't. Use farmers to develop extension messages and think multimedia".

Box 7.4 Factors that help and hinder sharing of new knowledge and products

Helping	Hindering
Supportive attitudes among participating research and extension agents – e.g. appreciation of farmers' knowledge and openness to new dissemination approaches	Participating research organizations do not place high priority on making new knowledge and products easily accessible to potential uptake agencies
A desire by participating researchers, extension staff and farmers to see research produce concrete results in the field	National policies and over-centralized technical recommendation and variety release procedures hamper the free flow of new products and information
Involved research and extension staff have appropriate skills, including facilitation, two-way communication, identifying and building local capacity for dissemination activities	High costs associated with participatory dissemination, as in transporting farmers during exchange visits, transporting bulky new products (e.g. vetiver grass for soil conservation)
Technical competence among local farmers, frontline extension staff and input suppliers relating to new knowledge and products (e.g. knowledge of seed production and quality control, tool manufacture, etc.)	Participating research and extension staff are driven by top-down and technocratic outlooks
Research results are available in a clear format to the participating farmers and local extension staff	Technical research results are not presented clearly
A strong local infrastructure, capacity and social organization for the production and supply of new products such as seeds, seedlings, tools and concoctions based on local materials	Farmers motivated by a desire to please researchers, or those who become a supporter of a particular technology to the point of no longer being objective about it
A local social organization and culture that encourages sharing of technical knowledge and visits across farms	Participating organizations offer few incentives and rewards to staff involved in the development of technical messages
Conducive biophysical conditions (soils, rainfall, vegetation) for reproduction of new products developed during the research process	Local NGOs are not involved or interested in agriculture; or only interested in distributing technology products with limited attention to supporting knowledge; or not willing to be closely associated with public-sector research activities; or wanting to be seen as the originators of new technology or approaches rather than as the recipients and distributors
	Involved communities have long-standing experiences of free hand-outs of seeds, tools and other inputs
	Local conditions are adverse for bulking up new products such as seed
	Institutional problem of dialogue between research and extension or other organizations that have responsibility for preparing dissemination material

Box 7.5 Tips for improving the uptake of new knowledge and products

- ✔ During project design, include participatory development of technical recommendations and dissemination materials as a project output.
- ✔ Involve farmers together with manufacturers, suppliers and extension agents as early as possible in the process of generating new information and products, so that they take on dissemination activities as useful new knowledge and products emerge.
- ✔ Provide project team with orientation in farming/livelihood systems and how this relates to identifying and disseminating technical solutions to address particular problems and opportunities for specific target groups.
- ✔ Use new institutions that encourage farmers to share information and challenge traditional barriers to knowledge transfer during the research process, such as FRGs, farmer research clusters and farmer competitions.
- ✔ Strengthen existing farmer-to-farmer communication channels and institutions.
- ✔ Encourage an outreach vision in new and existing institutions, and encourage individual farmers to take a leading role in promoting the technologies with which they have had success.
- ✔ Provide training to participating research, extension and frontline staff in facilitation, community organization and communication skills.
- ✔ Encourage involved professionals to appreciate local knowledge and to think how to incorporate it into new messages and products for dissemination.
- ✔ Encourage project staff to think about how to facilitate devolved decision-making and build local capacity to disseminate research outputs early in a project's life.
- ✔ Involve relief-oriented local NGOs and government agencies early in the research process, to foster their interest in research and uptake issues.
- ✔ To make new information easy to apply, identify local cultural practices and convert quantities to local units of measurement.
- ✔ If resources allow, train participating extension agencies in demand-led and knowledge-oriented approaches.
- ✔ Encourage project staff to think about ways of disseminating more complex types of messages, such as the use of decision trees.
- ✔ In preparing information, think multimedia: posters, flyers, radio, TV, etc., and have media field-tested.

Local institutions for farmer participation

8

8.1 INTRODUCTION

This chapter deals with institutions that projects have adapted or developed in order to facilitate more farmer participation in the research process, and to build farmers' research capacity. The term 'institution' is used here in the broader sense, not just to describe an organization, but to include established events and routines used to structure and advance the research process. For example, trials and research proposals are well established institutions in most research organizations.

What is the justification for developing institutions for building farmers' research capacity, given that small-scale farmers have been doing their own research for many years, and will continue to do so, with or without support from external agencies? Projects can facilitate organizational arrangements and events, and develop procedures to foster better interaction between researchers and farmers. They may use these to empower farmers to initiate contact with research agencies, and also to undertake a more formal type of research[1] using their own initiative.

Previous chapters covering the main elements of the participatory research process have described some of the participatory institutions used to foster greater participation and ownership of the research process by farmers. This chapter looks explicitly, and in more depth, at building and institutionalizing farmers' research capacity. The chapter starts by looking at the type of local organizational structures that can be used for organizing participation, beginning with existing rural structures. New structures created by projects are also reviewed, together with the relative merits of working with groups and individual farmers. Other, related institutions that have tried facilitating farmer participation are also mentioned, particularly those that have not been described in so much detail in previous chapters. Experiences of capacity-building through formal training of farmers and formal farmer representation in decision-making fora are also shared. The chapter concludes with some general tips for building farmer capacity in agricultural research.

8.2 WORKING THROUGH EXISTING LOCAL STRUCTURES

Nearly all participatory research projects start by communicating their intentions through existing rural administrative structures. These include traditional authorities, the local government, area-based extension services, and existing project structures on to which participatory research is being grafted. The existing structures are very much influenced by previous history. For example, in Namibia (Case 8.5) the formation of groups in rural areas was forbidden during the apartheid period. The cases below give accounts, in somewhat different national and historical contexts, of how three projects used existing rural structures as the research process moved from diagnosis and planning into experimentation. The first case looks at how the approaches of the provincial Adaptive Research Planning Teams (ARPTs) in Zambia were influenced by historical, cultural and other factors.

CASE 8.1

ARPT: USE OF EXISTING LOCAL STRUCTURES IN ZAMBIA UNDER THE ONE-PARTY STATE, 1982–88

During the 1980s the Adaptive Research Planning Teams' entry point into communities was through the local extension services, the local headmen or chiefs, and in some cases the political structures established under one-party rule established through the United National Independence Party (UNIP). Local headmen were approached through local extension staff to facilitate meetings, particularly planning meetings and field days. For smaller meetings and for experimental implementation, the local extension worker and trials assistant were the main contact points with farmers. Use of existing structures varied according to the situation in each of the provinces, and also from one area to another within a province, due to historical and cultural differences.

In Western Province, the approach varied according to the political history of the area. In the Zambezi floodplain areas traditionally under the rule of Lozi paramount chief, the *Litunga*, the team worked through local *indunas*, who were the *Litunga's* representatives. *Indunas* were used to call the family group heads together to discuss the allocation of trials to specific family groups. Family groups who felt the trial was relevant to their farming problems were then allocated the trial. Within the family group there was a further discussion about which household should have that trial. In Kaoma District target area, 150 km outside the Zambezi flood plain where the traditional system of authority was not strong, the local UNIP leaders undertook a similar role in on-farm trial allocation and implementation.

In the Eastern Province, where the training-and-visit extension system was established concurrently with the farming systems research programme through a large World Bank-funded project, parts of the on-farm trial programme were incorporated into the ongoing training-and-visit extension programme. This included the use of extension contact farmers as trial farmers, and discussion of the on-farm experiments as part of the regular programme of fortnightly visits to farmers by frontline extension workers. The same extension workers were involved in management of the on-farm trials. While the fortnightly visits and monthly training meetings were operational, farmers brought issues to the attention of extension staff, who relayed these to researchers attending the monthly training meetings. In this way, researchers were motivated not only to initiate research to address some of the concerns raised by farmers, but also to lobby the Ministry of Agriculture Headquarters on issues of a policy nature, such as supply of the most appropriate hybrid maize varieties and fertilizer for various districts in the province. This system of feedback from farmers, however, tended to break down after the end of project support to extension, and the government did not have the resources to sustain the system.

In Central Province, one of the ARPT target areas had a particularly strong and well organized local UNIP party structure. Here the party section heads, over a number of seasons, mobilized their party members for the planting and farmer assessment of on-farm trials. The section members collaborated to plant the trials on a communal basis each season, planting on the field of each member in turn, and ending with a small social gathering and feast. This arrangement enabled researchers and participating farmers to interact more effectively and build up a better rapport than in other target areas of Central Province where local party structures were weak and the trials were planted by individual farmers.

In Luapula Province, in Mansa District on the plateau target area, the team worked very closely with the local chief, who was highly respected in his community. The local chief was very effective in mobilizing people to participate in the research and related dissemination activities, and was himself a keen trial farmer along with other men and women in the community. By contrast, in Nchelenge District along the shore of Lake Mweru, a somewhat different approach was used. The local chieftainess was less interested in farming, even though women were the main farmers in this area, because the men spent most of their time fishing or searching for work in urban areas. A community study identified a group of families in which the men did not fish, but concentrated on cropping activities, and were known locally as the 'unbaptized' (a reference to the fact that they had not been initiated into fishing). This subgroup of the community emerged as the ones who were interested in collaborating in crop-oriented experimentation.

Sources: Drinkwater and Sutherland (1993); Drinkwater (1997); A.J. Sutherland, personal communication (2000).

In the next case, the Intermediate Technology Development Group (ITDG)-Chivi Food Security Project shares its views and experiences on the comparative merits of working with existing farmer groups versus individual farmers. This case is set in a national context of increasing decentralization of government services, at a time when the development of smallholder agriculture had been a government priority since shortly after national independence in 1980, and where farmer groups had been an important vehicle, even prior to independence, for promoting smallholder agriculture initiatives.

CASE 8.2

ITDG-CHIVI: WORKING WITH FARMER GROUPS VERSUS INDIVIDUALS

The communities in Chivi have a tradition of managing common property resources such as trees and grazing areas. This experience provides a strong foundation for a project to develop a programme that works with groups. However, the Intermediate Technology Development Group's Chivi Food Security Project has not formed new groups; the farmers' and gardening groups that the project works with were already in existence when the project started.

There are many ways to structure and organize farmers' groups. It is important to recognize that merely forming groups will not necessarily promote technology development and dissemination. During the 1980s there had been a heavy-handed attempt by the Ministry of Community Development to impose a system of co-operative gardening groups and to prevent individuals gardening on their own. This was not a success and caused a lot of resentment. The continued existence of gardening groups in Chivi is probably despite, rather than because of, this experience. While most group members prefer gardening in groups, some people would still prefer to garden on their own. In addition, groups can impose their own constraints, particularly when they are very hierarchical and structured like the Master Farmer groups established prior to independence. In such a rigid social environment it is unlikely that more innovative farmers will experiment.

Coverage and inclusion

Overall, the ITDG-Chivi project worked with around 90% of the community covered by the project. The non-participating 10% were, with the exception of a few wealthy households who had little to gain from project activities, drawn from the poorest wealth rank. They were typically the old, infirm, or single-parent households. This was a constant cause for concern amongst project staff. The question of whether or not these non-participants should be gaining some direct benefits from the project has never been resolved. Technical innovation requires a certain minimum level of resources. The very poorest often lack this minimum. The project has managed to encouraged wider community debate about the situation of the most marginalized households, but has not succeeded in providing direct benefits to them. There are still serious, unanswered questions of equity, and whether the process of forming groups itself has created barriers to entry for some of the poorer households. These are important long-term issues that any project seeking to have broad, poverty-focused impacts will need to address.

Groups versus individuals

There are obvious logistical advantages to working with groups rather than individuals. However, there are also many other advantages, particularly if the groups see themselves, and are seen by outsiders, as vehicles for learning. The most important of these is the sharing of knowledge and skills that can take place within and between groups. In addition, groups facilitate mutual assistance through, for example, exchanging labour on a rotational system, and the sharing of assets (e.g. ploughs), which frequently benefits poorer households. Ideas for solving common problems can be generated easily and rapidly among and between groups. There are other beneficial spin-offs for groups, as they can frequently gain bulk discounts for purchases, transport and marketing.

Despite the project's focus on working with groups, it is clear that a few key individuals have also been important in making this process successful. Certain individuals command respect for their specific skills and knowledge. The project identified and has reinforced the status of these people, and it is these individuals who have inevitably been selected by their neighbours to take part in the pilot experimentation, whilst others observe the results before trying new ideas in their own plots.

Costs of participation

Whatever the benefits, there are also costs to participating in group activities. There are meetings to organize (for leadership) and attend (for all members). In the Ward where the project was most active, there are large numbers of visitors attracted by the tales they have heard of the process. These may be a useful proxy indicator of success, but they are also extremely time-consuming. Farmers are now interacting with a number of different institutions. These relationships come with their own transaction costs. Information needs to be sought out, social relationships built up and maintained, local political ramifications dealt with, and conflicts managed. It is only worth investing in these while tangible benefits are perceived to outweigh the costs. In Chivi, benefits still appear to outweigh costs, but the potential is there for these costs to grow beyond a sustainable level.

Source: Croxton and Murwira (1997).

The next case documents how the Farmer Participatory Research Project (FPRP) project in Uganda tried working with individuals, groups and clusters, with the initial aim of comparing their effectiveness as structures for farmer participation.

CASE 8.3

FPRP: EXPERIMENTING WITH INDIVIDUALS, CLUSTERS AND FARMER GROUPS

The original project framework for the Farmer Participatory Research Project (output 2) refers to working with farmers' groups as well as interested individuals. FPRP began working with several existing farmer groups, then began working with individuals as well. The farmers' group members effectively operated as individuals during the trial process. Some farmers in the farmers' groups had suggested having a group plot, but this idea was not pursued by the farmers as the majority were not in favour, preferring to control their own individual plots. As the project developed, it began working with a 'cluster' of 10 farmers in one village who lived near one another. The intention was to compare how the three arrangements of farmers – groups, individuals and the cluster – operated and, in particular, how these different arrangements influenced the surrounding farmers in terms of dissemination of findings about the trials.

In practice, it was difficult to devote adequate attention to monitoring this, or to designing an approach for monitoring. Some general observations can be made based on experience. Superficially, at least, differences between individuals, groups and the cluster did not emerge in terms of sharing information with others. None appeared particularly dynamic as a learning environment. In all three situations, farmers did not want to share information about their trial until they were convinced about the outcome or value of the finding. They feared ridicule if they recommended something that failed.

Working with the groups at the problem identification stage was advantageous because it facilitated the process, although possibly at some cost to representativeness. Once the trials were under way there appeared to be little difference. Similar observations apply to the evaluation stage because, as far as the participatory evaluation facilitated by the team was concerned, all participants came together and mixed in.

Source: Salmon and Martin (1997).

8.3 CREATING NEW STRUCTURES: FARMER RESEARCH GROUPS

Some of the case-study projects have found it helpful to create new local structures in order to foster participation. The most common has been the farmer research group (FRG), as documented below for ARPT, the Kavango Farming Systems Research and Extension (KFSRE) Project, and the Dryland Research and Extension Project (DAREP).

Experiences of working with farmer research groups

The ARPT use of FRGs built on their approach to working through existing local structures in selected provinces.

CASE 8.4

ARPT: BUILDING ON A MORE COMMUNITY-BASED APPROACH – FARMER RESEARCH GROUPS IN CENTRAL AND COPPERBELT PROVINCES

Community-based approaches

Case 8.1 documents how, during the early and mid-1980s, the provincial Adaptive Research Planning Teams worked through existing local structures, some of which were effective for addressing early problems encountered relating to trial implementation. A further development, building upon existing local community structures, came with the idea of forming clusters of on-farm trial sites on the basis of residential groupings. This clustering, which in some provinces attracted the label 'community-based approach', was done to increase the scope for interaction during the research process, both between visiting researchers and farmers, and between farmers themselves. A further motivation was to improve the quality and reduce the operational costs of experimental monitoring and evaluation.

Forming special groups

In the late 1980s, the community-based approach began to involve the formation of special groups. These were first initiated in Northern Province, as 'village research groups', and later became known as FRGs. In Central and Copperbelt Provinces the move to FRGs was based on learning of the positive experience with these groups in Northern Province, and a conviction by these provincial teams that this would be a more effective way of working.

In Central and Copperbelt Provinces, the move to FRGs was comprehensive. Farmers interested in participating in the adaptive research process were asked to form research groups in every trial area. The aim was to see just how much they could be involved in the research process (Drinkwater, 1992).

Inclusion of women farmers

At the beginning, the concept was simple. Each group was asked to do two things – to elect a committee that included at least one woman to ensure women's interests were represented, and to decide on the three crops they would like to have in research trials the following season and what aspect of that crop they wanted to investigate. At this initial stage, most people wanted new varieties, perhaps with specific characteristics – early maturing and bird-resistant varieties of sorghum, open-pollinated maize (so that the seed could be replanted), and varieties of bean that mature quickly, cook quickly and taste good (Drinkwater, 1992).

Evolving roles and functions

From this start, the dialogue that took place with the research groups evolved considerably over the following years, as did the roles and functions of the research groups. Working with groups was absolutely central to the learning that occurred. In each research area, a cadre of farmers developed who became increasingly capable of taking a reflective attitude towards their work, of sharing ideas and views, and of visiting each other's fields in ways that fears of witchcraft normally prevented. This led to the development of a more complex understanding of the issues they were placing on the research agenda. These groups, through the participatory rural appraisals (PRA) of farming systems and food security that were conducted during their second season, were involved in more complex mechanisms for arriving at research agendas. The FRGs were established in areas where it was known that the farmers participating would be in poor and vulnerable categories. By involving women in discussions, and ensuring that at least one woman was on the initial committee, a good balance of men and women was usually achieved. The groups varied in size and in membership from one season to another. Some, in the Mpongwe area of Copperbelt Province, even evolved satellite groups. All FRGs retained core groups of men and women farmers who stayed in them through the 3–5 years of intense activity.

Lessons

Two major lessons were learned from the evolution of dialogue with the FRGs in this period (1991–95). One was the enormous potential, in the context of a public-sector research organization, for working with FRGs to develop a farming systems research programme that really does address farmers' needs. The second lesson was more cautionary: that this process takes considerable time and commitment, and thus needs a secure allocation of resources for at least a 5-year period – anything less will probably produce only limited results. While the FRGs were set up with the involvement of the frontline extension staff, they did not take the lead, and the dialogue with researchers was enabled and sustained through an adaptive research mandate and programme under the control of the researchers involved.

What farmers said about the FRGs

A review workshop was carried out in Kabwe, Central Province in February 1993 on farmer participation and FRGs. This workshop involved the FRGs themselves. Four members of research groups in Central and Copperbelt Provinces participated throughout the 5-day workshop, and two full days were spent in the field, with the workshop participants camping in the local areas of three different FRGs. In their participation, the members of the FRGs stressed four main themes:

- they thought the FRG process was fantastic
- they felt the outcomes to date had been limited, mainly in terms of the amount of dialogue with researchers and the number of useful new technologies they had access to through FRG membership
- to improve the process in the future, they wanted closer and more frequent interaction with researchers, but were not clear how this could be achieved
- they believed the level of farmer involvement and decision-making in the process could be increased, but they still saw 'ideas' for improvement as coming largely from researchers.

At the end of the workshop, some of the provincial ARPTs were still sceptical about the benefits of farmer participation and the use of research groups. One in particular could not see how groups could be formed given the dispersed nature of the collaborating farmers in their operational areas. The strongest and most consistent advocates were the farmer representatives. They were absolutely sure about the benefits of continuing with such an approach. There was a clear indication from the field exercise carried out during the workshop that an ongoing research agenda could be developed on issues such as soil fertility, alleviating hunger periods, processing and storage, and preventing livestock disease. The obvious limitation was the ARPTs' capacity to address all these research issues.

Sources: Drinkwater and Sutherland (1993); Drinkwater (1997).

While experiences in Zambia of working with farmer groups were positive, setting up FRGs is not always a smooth process, and may not work well in all situations. The KFSRE (Case 4.2) documenting farmer selection has already illustrated some of the challenges involved in establishing FRGs. The case below takes the story forward, raising issues relating to managing and sustaining FRGs.

CASE 8.5

KFSRE: FROM PROJECT GROUPS TO EXTENSION GROUPS

The decision to work with groups

The Kavango Farming Systems Research and Extension (KFSRE) Project made a decision to work with groups for on-farm research, rather than with individuals. This was backed by government policy that demanded group work, because it was thought this would achieve better coverage. Moreover, the project's social scientist had a previous positive experience in setting up and working with FRGs in Kenya, in the early days of DAREP. The project team felt that working with groups of farmers would facilitate the following:

- better linkages with the community
- improved management of on-farm research
- increased farmers' awareness of what research activities better suit their needs
- more effective farmer-to-farmer dissemination of research findings
- development of a farmer research network
- increased farmer participation in the analysis and evaluation of new technologies.

Changing policies on groups

There were few existing groups in the project area, partly a legacy of the ban on group meetings during the apartheid era. The current organizational structures are church and kinship groups. Neither of these is involved in community mobilization or development activities.

The situation regarding government policies on rural groups changed during the life of the project. At the inception phase, the extension service was firmly locked into the train-and-visit system, with extension agents visiting individual farmers. However, the senior extension service management was questioning this approach, and through the EU-funded Rural Development Support Project (RDSP), major changes in extension approach and monitoring were effected. The RDSP played a prominent role in assisting the Ministry of Agriculture, Water and Rural Development (MAWRD) to develop farmer groups. Initially these were called farmer learner groups, latterly they became known as farmer extension development groups (FED groups).

Forming groups

At the outset of the KFSRE project, two farmer groups were formed in separate villages from two different farming-system zones. Each group had a chairman or leader. Certain ground rules were established: for example, it was agreed that all group members had an equal say. The local extension agent had overall responsibility for the group. Groups were encouraged to help themselves and to discuss problems amongst themselves.

The project started the process off with a series of meetings with the groups to determine what technologies to test or trial. Critical to this process was explaining, both collectively (in meetings) and individually, the following questions:

- What is the purpose of a trial?
- Why do researchers undertake trials?
- What does a trial look like?
- How do you lay out a trial?

Notebooks were issued for farmers to draw maps of their trial site and note down key events. Questions were raised as to how illiterate farmers would cope with this system. This was never found to be a problem in practice; with universal primary education in Namibia, a relative was always close at hand to help.

Levelling researcher and farmer expectations through monitoring visits

As soon as the seed or other technology was given to farmers, the KFSRE team embarked on a series of regular monitoring visits. This was done to provide help and guidance to farmers. The need to mark plots was realized, so they were marked with tags. The tags were frequently stolen; thus the need for a map was critical. Many mistakes were made in the first season as there was clearly a lot of confusion, which brought to the team's attention the importance of clear communication and learning-by-doing. However, a few participating farmers clearly understood what was verbally explained, and laid out a set of trials that matched researchers' expectations. In the first season there were insufficient trials to collect data from, but the second and subsequent seasons were very encouraging, with a lot of trials maintained to standards above those of research stations.

Monitoring played a key role in promoting learning and effective communication between farmers and the research team. In the first season, after all the trials were planted, only mid-season and end-of-season evaluation visits were made. The project swiftly realized that crucial data had been omitted. This was discussed with farmers, who complained of the infrequency of visits and the need for more guidance. It was agreed that the frequency of monitoring visits from the research team would increase. End-of-season field walks were introduced, and helped to demonstrate to those farmers who had 'confounded' their trials what was required of them in terms of laying out trials. This was very effective, and in the second season there were only a few confounded trials.

Increasing monitoring frequency

In the second season the frequency of monitoring visits was increased to one every 14 days. Each monitoring visit consisted of two KFSRE staff members. Any problems were addressed and solved, if necessary by a visit to the trial site. However, the number of staff members on a visit could have been reduced to one, and a fortnightly visit frequency was too high – farmers began to complain that KFSRE was always visiting, and consequently attendance at meetings began to drop. Moreover, the cost of such regular visits was unsustainable by the extension service given the budget levels for recurrent expenditure at the time. In the third and succeeding seasons, having established expectations on both sides, there was one farmer group meeting and one field visit. If the farmer was around, s/he accompanied project staff to look at the trials. This was beneficial; if there was a problem key background information could be obtained, and if there were no problems credit could given for a job well done.

With this mode of farmer–researcher collaboration, a balance of interests was struck. Project staff from research and extension undertook their tasks and were confident in receiving their salary at the end of the month. The farmers were not paid a salary, and under adverse production conditions were unsure of the benefits forthcoming from participation. The overriding objective was to develop, maintain and foster a cordial and effective three-way relationship between farmer, extension service and researcher.

Discussing problems of participation

Problems with the groups, such as poor attendance at meetings and quality of research, were reviewed at the end of the first season's work. Modifications to the group structure were suggested. New members were selected by the group and wider community at this stage. The poor attendance of women was overcome by inviting all the wives of male members, resulting in a better gender balance.

The problems of forming a representative farmer group in the river community are discussed in Chapter 4 (Case 4.2). These problems included poor communication between group members, and poor participation by some group members. The group did not appear to co-operate well as a unit, nor did it have good relations with the rest of the community. The principal underlying cause was poor social cohesion, caused by the influx of migrants from different ethnic backgrounds.

Cycle of planning, implementation, review and new planning

Through the cycle of trial planning, implementation and evaluation with the groups, a community-based research planning process was established. Both farmers and project found this forum useful, analysing successes and failures, with a view to learning from the failures and building on the successes. On a few occasions, farmers presented the results of their trials to a wider audience. This had a major impact and added a significant momentum to the research process. The effectiveness of this process, particularly the groups' growing self-confidence in managing and controlling it, was reinforced with leadership training, training for transformation (see Case 8.7), which group representatives started attending in mid-1992.

Scaling-up the positive experiences

Underlying the process and strategy of working with farmers' groups was the key question of scaling-up the process: having the field-based extension technicians themselves pick up the farmer group approach and take it forward. The project's objective relating to research was to have the farmer groups determine the research agenda, within broad policy guidelines. An ultimate objective relating to both research and extension was to have the field-based extension agents using similar procedures and processes in all trials and demonstrations for which they were responsible.

Projects must have a clear idea of how to extend the coverage of the participatory research and dissemination methodology they are promoting and/or developing, as this will ultimately show how sustainable and economic the proposed methodology is. The KFSRE project needed to extend its participatory approach to other parts of Kavango region, and it took three approaches:

- establishing its own groups elsewhere in Kavango Region
- using existing FED groups established as a result of the RDSP project initiative
- through the extension agents, establishing a focused FED group around a specific problem.

Each approach had its strong and weak points.

Establishing its own groups was the least sustainable option. While this option gave the project team maximum control over the process, and provided space to pilot and experiment with participatory approaches, it was the weakest in terms of passing on participatory skills to those who matter, farmers and researchers and, particularly, the field-based extension agents. In the longer term, this option tended towards isolation of the project from the mainstream extension effort.

Using an existing FED group: in Kavango region, all extension agents had established between two and five FED groups. However, there appeared to be confusion as to what these FED groups were supposed to do. It was known that some of the FED groups were established around a crop-related theme. The project started working through two selected extension agents, each having established a FED group around a crop improvement theme. The extension agents were free to disseminate some of the information and technology to other farmers. The project provided advice and a limited range of inputs, while the extension agent provided leadership and was the contact point for the project. After a period, the extension agent started to undertake most of the project's functions relating to problem diagnosis, technology evaluation and dissemination, working closely with the project when it transferred to the provincial centre to become the Farming Systems Unit (see Case 16.4).

Establishing a focused FED group: in some communities there were no FED groups with a crop orientation, but there were well known agronomic problems. In this instance the extension technician was asked to establish a FED group, but only if there was a specific agronomic problem to solve. These communities were identified through a region-wide PRA. The local extension agent became the primary focus for the farming systems unit and the subsequent extension activities that took place around a FED group. The project supported the extension agent in running village- or community-level workshops to better define the problems, chairing or facilitating these meetings. It was made clear that the project was supporting the extension agent, not substituting for him or her. The extension agent had a recognized leadership role in the community and, as a consequence, had full ownership of the FED groups rather than ascribing them to the project.

Undoubtedly other options would have worked, but these three seemed to be the most practical and workable at the time. By its conclusion, the project had become the Farming Systems Unit, working with six groups as follows:

- two groups established by the project itself
- two groups acquired by using existing FED groups
- two FED groups established on the basis of specific problems.

Defining researchable problems with farmers

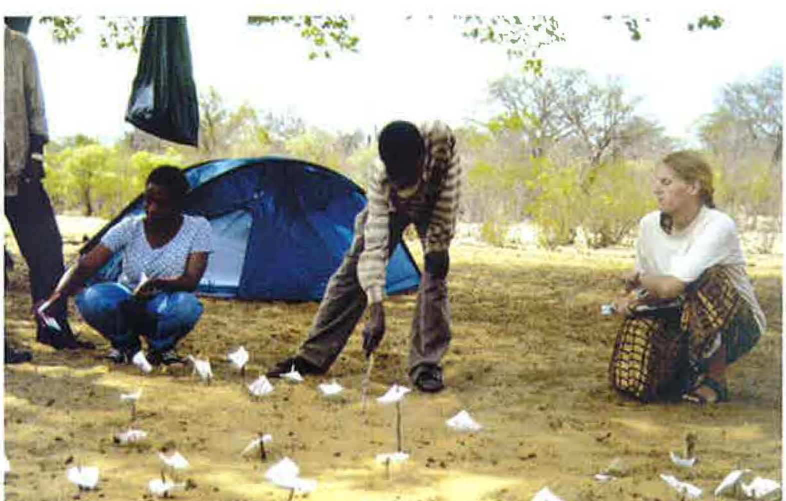
Samora, South West Tanzania, CRP

Cashew farmers constructing a matrix of cashew management practices

(Nick Nathaniels)

South West Tanzania, CRP

Discussion with farmers about the biological pressures on cashew production



Kavango District, Namibia, KFSRE Project

Farmer explaining village social structure, in a participatory mapping exercise, during a PRA undertaken to identify constraints and opportunities in agriculture

(Barbara Adolph, 1999)

Anoenu, Volta Region, Ghana, LGB Control Project

Farmers ranking problems associated with maize farming including insect infestation. Chief farmer, LGB project staff and other maize farmers

(Sammy Gbedevi, 1994/95)

Dzolokpuita, Volta Region, Ghana, LGB Control Project

Social mapping in a village, LGB project staff looking on

(Priscilla Magrath, 1994/95)

Kamaguna Sub-location, Maragwa Location, Tharaka District, DAREP

Farmers using stones to rank the relative importance of the main crop and livestock enterprises in this very dry area during the early stages of a diagnostic exercise conducted with local extension staff in the first year of the project

(J.N Kang'ara 1993)

Evaluating technology options

Kavango District, Namibia, KFSRE Project

Farmer post-harvest evaluation of new varieties. A farmer research group member preparing pearl millet porridge from the new varieties tested in order to give members and other farmers an opportunity to evaluate the taste of the new varieties

(Barbara Adolph, 1998)

Kavango District, Namibia, KFSRE Project

In the same event, farmers are tasting what has been prepared

(Barbara Adolph, 1998)

Kajiampau, Tharaka District, Kenya, DAREP

Farmers gather round to evaluate new sorghum varieties using a matrix ranking method laid out on the ground with heads of the varieties at the top of the matrix for identification

(Alistair Sutherland, 1995)

Anoenu Village,
South East Volta Region, Ghana,
LGB Control Project

A group of women rank larger grain borer control options according to the number of participants who would be willing to try out the method. This was done in order to generate ideas about control methods for trials and to test project ideas with farmers for on-farm trials

Dzolo Kpiuta Village, Ho District,
Volta Region, Ghana,
LGB Control Project

As part of the the same exercise, a farmer explains larger grain borer control options to other farmers. Note the visualization of options using locally available material on the ground

(Priscilla Magrath, 1994/95)

Gacheraka, Tharaka District,
Kenya, DAREP

The project displayed 35 new cowpea varieties in replicated trials at the local research sites and farmers selected the ones they liked to test on their own farms. The picture shows farmers looking at the varieties during a site open day, recording in their notebooks the numbers of the varieties they would like to test

(Alistair Sutherland, 1994)

Trial implementation with farmers

Leklebi, Volta Region, Ghana, LGB Control Project

Farmer meeting to select farmers for on-farm trial. LGB project staff, chief farmer and other maize farmers

(Priscilla Magrath, 1994)

Kpeve, Volta Region, Ghana, LGB Control Project

On-station experimental trial. Farmers invited to give comment on treatments (actellic dust/woodash/lime) with LGB project staff

(Julia Compton, 1994/95)

Kavango District, Northern Namibia, KFSRE Project

The KFSRE on-farm trials were often managed by women. This woman and her child pose for a photograph in front of her crop variety trial. She is holding the notebook in which she recorded the planting date, weeding dates, and any other trial treatments

(Barbara Adolph, 1999)

Working with farmer groups

Machakos District, Kenya, DAREP

Travelling seminar: selected farmers from the Tools and Tillage research groups, together with farmers from another soil conservation research project, visited farmers in adjacent districts who had experience with other types of soil and water conservation technologies. Farmers carried notebooks and recorded everything of interest

(David Mellis, 1996)

Machanga, Mbeere District, Kenya, DAREP

Farmer to farmer competitions: farmers from a cluster of local sites compete during the season to see who would do well in managing on-farm experiments. They were involved in judging each others' experiments, often together with a local extension worker. In the picture they are recording their scores in the shade on a member's farm with the help of the local extension agent on the left

(Alistair Sutherland, 1996)

Mutuobare, Mbeere District, Kenya, DAREP

A farmer from a research cluster being awarded 2nd prize (a panga) by the local chief during an on-farm open day

(Alistair Sutherland, 1996)

Kajiampau, Tharaka District, Kenya, DAREP

The Tools and Tillage research group from Kajiampau met monthly to discuss how their trials were doing and contribute money to their group savings fund. Members whose turn it was to receive the money were encouraged by the group to buy farming tools – but sometimes they elected to hire labour, or pay school fees

(C.R. Mugo, 1996)

Kajiampau Trial Site, Mbeere District, Kenya, DAREP

Participating farmers of an expert panel evaluating 16 sorghum varieties of wide ranging types. These were provided by an ICRISAT breeder for preliminary evaluation in order to identify which characteristics farmers value, so that these could be considered in the breeding programme for semi-arid East Africa

(Alistair Sutherland, 1996)

Machanga Village, Mbeere District, Kenya, DAREP

Some of the participating farmers of an expert panel evaluating new dryland crop varieties decided to form their own self-help group. The picture shows a group meeting where they are discussing how to use the funds they have raised by selling local handicrafts and through weekly contributions. They decided to purchase pesticides for spraying cowpeas and green grams and provide these to group members on credit basis, to be repaid in cowpea grain

(Alistair Sutherland, 1996)

Farmers and dissemination

Kajiampau, Tharaka District, Kenya, DAREP

Farmer to farmer demonstration: farmers who participated in the animal health experiment on control of mange, demonstrate to others how to treat an infected animal with the local concoction – in this case a bath in a solution based on castor oil and tamarind pods

(J.N.Kang'ara)

Kamwaa, Mbeere District, Kenya, DAREP

Participatory dryland crop recipe demonstrations: a range of recipes for dryland were developed at a workshop involving home economics extension officers and farmers. At the farmer open days, the recipes were prepared by groups of farmers. Farmer representatives from each cooking group explained what they did and then provided everyone with a taste. The picture shows a home economist introducing 10 new recipes cooked by local farmers

(J.N Kang'ara)

Kajiampau, Tharaka District, Kenya, DAREP

Farmer to farmer dissemination: farmers, settled Masai pastoralists, from another dryland area visited DAREP in order to get more ideas for dryland agriculture. Here the group is one of the on-farm research sites where farmers are being shown how to lay out cambered beds for rain-water harvesting

(David Mellis, 1996)

Kajiampau Trial Site, Tharaka District, Kenya, DAREP

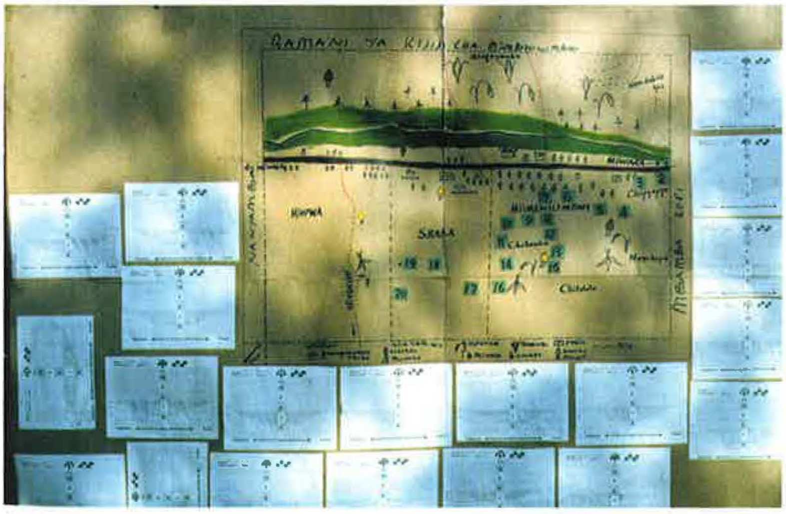
Meeting of the Tools and Tillage farmer research group convened to reach consensus on recommendations for rain-water harvesting methods based on five seasons of participatory on-farm research. The meeting is being facilitated by the Divisional Extension Officer responsible for soil conservation, and one of the participating farmers is recording in the local language on the paper pinned to the wall of the local site office

(Alistair Sutherland, 1996)

Rundu, Kavango District, Namibia, KFSRE Project

Farmer to farmer technology exchange: farmers discuss the different seeds exhibited at the 2nd Kavango seed fair which had stands of seed provided by farmers and farmer groups from all over Kavango

(Barbara Adolph, 1997)



Cashew Research Project, South West Tanzania, CRP

The Cashew project used billboards to provide visual information about cashew production and diseases in a way that was easy to present to farmers. This is a slide of a billboard showing disease incidence in Mtimbwilimbwi Village, southern Tanzania

(Dominic de Waal, 1996)

Team building

Choma District,
Southern Province, Zambia,
KFSRE Project

A study tour to projects in neighbouring countries helped to build the KFSRE team. Here the team is visiting a tree nursery during a visit to a farming systems team (formerly the Adaptive Research Planning Team) in Southern Province, Zambia)

(Hugh Bagnall-Oakley, 1996)

KARI Embu Regional Research Centre, Kenya, DAREP

Regular team meetings, usually chaired by the team leader, were initiated mid-way through the first year of DAREP. They became a focal point for discussion of operational issues and plans involving researchers and technicians working on the project

(J.W. Irungu, 1997)

Kiritiri, Mbeere District, Kenya, DAREP

Team building needs to be done at all levels. The project provided training for the frontline project staff in participatory approaches and concepts – the picture shows a trainer discussing the importance of communication skills

(Alistair Sutherland, 1996)

Sukumaland, Farming Systems Research Programme in Lake Zone, Tanzania, DAREP

Study tours for DAREP team members gave an opportunity to bond and interact and learn from similar projects. A tour research projects in East Africa took the DAREP team to meet a village research group in North West Tanzania. The gender specialist on the the host team (shaking hands with the groups chairwoman) is introducing the visitors to the women in the group, including the DAREP socio-economist standing on the right

Thokpalime Village, Volta Region, Ghana, LGB Control Project

Team building was strengthened by doing tasks together. In the photograph the project research team, joined by students from Logon University, are analysing maize from study stores as part of a loss assessment exercise

(Priscilla Magrath)

Kavango District , Northern Namibia, KFSRE Project

The project team conducted PRAs in various districts, building the capacity of the local extension team to continue with problem-oriented approaches. Planning is an opportunity to build team spirit, and this picture shows the PRA team preparing a plan for fieldwork, facilitated by the extension technician

(Barbara Adolph, 1998)

Involving other stakeholders

Kamwaa, Mbeere District, Kenya, DAREP

Peer review of experimental activities by researchers from outside the project team was undertaken to sharpen the quality of research implementation. Some of the peer review team in the picture are standing in the livestock pen of the farmer participating in the mange control with local concoctions experiment being shown a calf infected by mange; a badly infected goat is lying down on the right

(Alistair Sutherland, 1995)

Mutuobare, Mbeere District, Kenya, DAREP

A range of other stakeholders may be involved in research, including those supplying the technology. Here a local blacksmith (Gerald Ngugi) is demonstrating how a hand-pulled weeder that he has made works. The farmer (Patrick Nthiga) is guiding the weeder from behind

(David Mellis, 1995)

Volta Region, Ghana, LGB Control Project

Traders from Kpere Market price samples of maize with known levels of damage as part of a study of the relationship between retail maize price and the degree of insect damage

(Priscilla Magrath, 1994/95)

A key feature of all the above farmer groups was their involvement in determining immediate agricultural problems and deciding, in conjunction with researchers and extension agents, what could be done at a local level. The project saw the potential of this structure for a more co-ordinated and participatory approach to developing a regional research plan. The group provided a forum for farmers to express their views at the end of each season and plan for the forthcoming one.

In scaling-up the approach, the challenge confronting the KFSRE and a similar EU-funded project in another region of Namibia was how to involve all the extension agents in the region in using participatory methodologies for forming and running FED groups. Various workshops were held to discuss this, and a strategy was determined.

Source: H. Bagnall-Oakeley, personal communication (2000).

In DAREP, the FRGs started as groups of farmers focusing on a particular technical issue, rather than on a range of disparate technologies. They were initiated by the same researcher who later on became the social scientist in the KFSRE project.

CASE 8.6

DAREP: WIDENING INTERESTS OF FOCUSED RESEARCH GROUPS

In September 1993 the first agricultural engineer on the Dryland Research and Extension Project team set up focused FRGs in two sites, in order to implement the tools and tillage technical component of the research programme (described in Chapter 6; Case 6.3). These groups were initially set up to test agricultural tools. Focused groups were chosen by the first agricultural engineer to the project, who had a combined social science and engineering background. Her early experience of testing tools with existing women's groups suggested that farmer participation was much more effective when those who volunteered had a specific interest in the technology, rather than with groups based on a broader generic criterion such as gender.

When the first agricultural engineer on the DAREP team left to join the KFSRE team in a social scientist role, the team's livestock scientist carried the groups forward, facilitating training in water-harvesting methods until a replacement arrived after about 5 months. The FRGs gained strength and identity over time, and accommodated a shift in technical emphasis away from tools towards on-farm water harvesting methods over a 2.5-year period. Although the groups focused on a particular technical area, members were also interested in other technologies such as new crops, new varieties, agroforestry, etc., and many also participated in the other research conducted by the project. This helped to sustain their interest in research over time, and to integrate the various technical components being researched around the project's local sites. A strong group identity was built up through frequent meetings of the group throughout each of the two growing seasons, and through special events such as tools fairs and study tours to look at soil- and water-conservation structures elsewhere in Kenya.

In July 1996, when the second agricultural engineer left the team and the project was drawing to a close, it was agreed that the groups would continue on their own, with encouragement and support from another agricultural engineer and a technician from the Kenya Agricultural Research Institute's research centre who was taking forward some of the research into soil and water conservation. The groups continued to meet for some time in the absence of project researchers. By project closure, one of the groups had become a self-help group, with a rotating savings scheme.

Sources: Matsaert et al. *(1995); Mellis (1997); A.J. Sutherland, personal communication (2000).*

Limitations and sustainability of farmer research groups

Possible limitations of FRGs relate to: (i) the representativeness of the groups; (ii) the readiness of farmers to accept a group approach; and (iii) the resources required to form effective research groups.

Regarding representativeness, the case studies suggest that even when efforts are made to include a cross-section of the community at the start, over time group membership tends to exclude the very poorest in the community. When FRGs are formed on the basis of convenience, or existing groups are used rather than purposely selected ones, it is less clear to what extent the research results can be extrapolated to farmers in other areas. The issue of representation was most clearly addressed in the KFSRE and ARPT cases, when the groups were established within a farming-systems framework. Research zones or recommendation domains were first identified, and the research groups were formed at carefully selected sites representing these zones (Drinkwater, 1994). Moreover, when the groups were formed the issue of representation was usually raised with farmers, and the inclusion of women members was often a precondition. However, because membership is voluntary and, over time, groups are self-selected, it is difficult to track the extent to which the group members fully represent the farming community from which they come.

As the KFSRE experience in the riverside communities shows, farmers are not always ready to accept and work with a group-based approach. Projects should, therefore, be wary of trying to impose group-based approaches to participatory research in cases where farmers are clearly not ready for the idea.

An issue related to resources which emerges from the above accounts is the sustainability of individual FRGs. It can be argued that, from the point of view of pragmatic research efficiency and not wasting farmers' time, FRGs do not need to continue forever. They need only exist as research groups as long as they are effectively functioning in the research process – effectively, that is, from the perspective of both the farmers and researchers involved. A measure of permanence may be justified from the perspective of cost-effective use of public-sector research resources. Because formation of effective groups can be resource-intensive, higher returns to their establishment may be achieved if the groups effectively facilitate dialogue with farmers on a semi-permanent basis over the long term.

A few tips for those wanting to try and establish FRGs are contained in Box 8.1.

8.4 OTHER LOCAL INSTITUTIONS FOR RESEARCH AND DISSEMINATION

In addition to (or as an alternative to) FRGs, other local institutional structures may be established by projects in order to undertake specific roles in the research and dissemination process. The next case describes how DAREP set up local site committees, expert farmer panels and researcher–farmer clusters.

CASE 8.7

DAREP: SITE COMMITTEES, FARMER PANELS AND CLUSTERS

The Dryland Research and Extension Project document did not specifically advocate a group or an individual farmer approach. However, the anthropologists' terms of reference emphasize "prior analysis of the local community leadership and group institutions and structures and the way these can be strengthened and linked

Box 8.1 Tips for starting and managing farmer research groups

Starting and expanding groups

- ✔ Start groups after general awareness-raising through PRA, public relations activities, technology marketing, participatory planning, etc.
- ✔ Study the past history of farmer group formation and the structure and norms of existing groups before initiating FRGs.
- ✔ Select representative villages/communities.
- ✔ Evaluate existing groups and select those with potential for research.
- ✔ Assess the representativeness (wealth and gender) of groups at the start.
- ✔ Provide guidelines for FRGs' composition/establishment (e.g. secret ballot for electing group leaders) and membership (make it clear that the groups are not closed clubs and others may be allowed to join later).
- ✔ Use existing successful FRGs to start new ones.
- ✔ Expose participating farmers to successful farmer groups and co-operatives.
- ✔ Encourage established groups to become registered and link up with any existing support networks.

Managing the working relationship

- ✔ Monitor the representativeness and participation of group members and discuss the results and any action needed to address imbalance.
- ✔ Visit groups frequently in the early stages, including regular reviews of research results and priorities.
- ✔ Support local information systems – linking farmer groups to each other or to other information networks.
- ✔ Stimulate farmer-to-farmer visits in-season within the group.
- ✔ Review and discuss the benefits, to researchers and farmers, of the FRG.
- ✔ Co-ordinate information management on the research side to reduce conflicting images and messages being presented to FRGs by different researchers.
- ✔ Discuss ideas about experimentation with farmers – processes (biological and ecological) as well as new products.
- ✔ Listen out for, discuss, and resolve conflicts arising within the group.
- ✔ Work with a limited number of FRGs and encourage farmers to make group size self-regulating through their own mechanisms.
- ✔ Regular self-monitoring and evaluation by the group should be encouraged, and appropriate adjustments made to management systems.
- ✔ Invite FRG representatives to workshops and ensure their role in the research-planning process.
- ✔ If resources allow, facilitate regular exchange visits between FRGs, as rewards for effort and to promote productive dialogue (which needs to be captured).
- ✔ Present and discuss researchers' data on experimental results and leave copies of the results with participating FRGs.

Sources: Sutherland et al. *(1998).*

to Location and Sub-location Development Committees". The study of local community structures around the sites did not receive attention early in the project.[2] As the project pushed ahead with its programme of on-station and on-farm experimentation and related dissemination activities, more attention was paid to establishing local structures that would facilitate the research and dissemination process.

Local site committees

One of the project's objectives was to work towards sustainable and replicable institutions for effective multi-disciplinary adaptive research, which link with local planning institutions. It was against this background that the project team facilitated the establishment of local committees in all DAREP sites. The idea of these committees was floated during farmers' open days in January 1994, and was well received. During June and July, farmer representatives were elected in a public meeting to constitute the site committees. The project team suggested during the elections that at least one committee member should be female, and despite cultural norms ascribing public decision-making to older men, the communities all accepted this suggestion. The site committees comprised collaborating farmers conducting on-farm trials with representatives of the project, local extension agents, and local chiefs as co-opted members.

The project drafted guidelines for the formation of committees, including the type of functions they may perform and how, in general terms, they may be constituted and operate. These were given to the field staff at the sites to study and discuss with the elected committee members. In each of the sites, the committee elected a chairperson, vice-chairperson and treasurer by secret voting. The secretary was either the project field assistant for the site or the locational extension technical assistant in cases where there was one nearby. Rules were then made by the committee to govern the running of the committee, such as the term of office, attendance, timeliness, code of conduct, and so on. These rules differed from one committee to another. In each meeting the committee deliberated on various issues relating to agriculture, and copies of the minutes were sent to the project team, the local Ministry of Agriculture office, and the locational development committee. The project team met to discuss the issues raised and formulated appropriate responses. This was followed by monitoring visits to the site committees to explain the written responses and encourage the committees to initiate sustainable activities.

Most committees met at least twice during each cropping season (at least four times a year). The first meetings were normally held before the farmers' open day, to discuss and plan the open day. The second meetings were held after harvesting to discuss the seed-production strategy. The committees at three sites were particularly active, and two of these sites had active tools and tillage FRGs. This suggests that such committees are strengthened and spurred on by the existence of other active groups around with similar interests. Women farmers were represented on the committees, but men out-numbered women in all except two sites, reflecting gender norms regarding public domains of decision-making (Table 8.1).

The site committees made important decisions relating to seed bulking and distribution, planning on-station and on-farm open days, and planning on-farm tours. They have also made some requests to the project staff. The types of issues discussed by the site committees and some other aspects of their functioning are reflected in Table 8.1.

At two sites, during public meetings it proved impossible to reach a consensus of opinion about having a site committee and the topic was abandoned. More follow-up effort was required from the project, working through the local extension office. Farmers were advised that if a committee was not formed, this would be taken to imply a lack of sustainable interest in the project's activities. In one site, with some reluctance and under the threat of project activities being withdrawn, a committee was formed. This committee did not function effectively in terms of mobilizing local support, but instead tried to solicit for external assistance by using the influence and contacts of committee members. In the other site, inter-ethnic rivalries, local land politics and local relief programmes made the formation of both a site committee and cohesive farmer clusters problematic. After considerable efforts, a site committee was established with representation from each of the main ethnic groups. This committee functioned quite well for a while in terms of managing the seed bulking and open day arrangements. However, it was not able to resist moves by local land speculators, who for a second time

Table 8.1 DAREP site committee meetings, attendance and issues discussed, October 1994–November 1996

Site	No. of meetings	Attendances by gender: Men	Attendances by gender: Women	Main discussion topics
Gategi	3	11	13	Open day arrangements, seed production (cost recovery, prices, sale date), site cost saving, on-farm variety testing, farmer-to-farmer evaluation, transport and lunch, training on tree nurseries, disciplining of misconduct by members, fence maintenance
Machanga	5	17	17	Open days, Jua-Kali exhibition, seed production, prices and distribution, farmer-to-farmer evaluation
Mutuobare	8	49	15	Farmer-to-farmer evaluation, farmer tour, open day planning, new committee introduction, research group, members' conduct, seed bulking, self-help groups, taking over of site by committee-proposal
Kamwa	4	14	5	Seed bulking, distribution and sales, open day planning, farmer selection, variety selection
Kajiampau	Data missing	–	–	–
Gacharaka	3	20	6	Election of office bearers, seed bulking and prices, open day planning, land tenure of site, tree nursery proposal, co-option of new members, discipling of misconduct by casual labourer, resignation of member, well fees
Kaanyaga	4	21	6	Open day planning, seed production and sales, farmer-to-farmer tours, vegetable preservation, evaluation team visits, site maintenance
Isiolo	3	26	5	Membership rules, fine of members, seed bulking, tool requirements, variety demonstration needs, open day arrangements, fence damage

succeeded in grabbing the project research site for development purposes. In both the above cases the sites were located close to administrative offices and, perhaps as a result, were subject to more influence from local politicians who were seeking to capture perceived benefits.

Expert farmer panels

In three of the project sites, expert farmer panels were formed in December 1995. The decision to form these panels came after a review of experience in using farmers at project open days to evaluate new crop varieties. The open days were only held once a year, and in-depth evaluation often took up so much time that the other activities were adversely affected, while the evaluations themselves were also rushed and lacked continuity in that different farmers participated from one season to another. It was felt that a more structured approach, which allowed evaluation at several stages of crop development, with a more permanent group of interested farmers, would be more effective. The need for a more structured approach was also due to the increased numbers of new sorghum and pearl millet variety entries provided by the national and regional breeding programme. Most of the panel members had several seasons' experience in managing on-farm trials. A few farmers also participated who wanted to become involved in the research process and gain access to new information and varieties through membership of the panels. The farmer panels, unlike the site committees, did not have a fixed membership or structure. The panel meetings ranged in size from about 14 to 25 farmers, most of them having more female than male members attending. The panels decided how many times in a season they would like to meet. Most met three times in the first season but less frequently in the two following seasons, which were marked by severe droughts. At one site involvement in the panels increased farmers' interest in seeds and served as the stimulus for establishment of a separate self-help group, which secured its own site for seed bulking in late 1996. In another site, a self-help group was also formed, assisted by the interaction during expert panel activities.

Researcher–farmer clusters

When the project started in 1993, farmers were selected by the local field staff and interacted on an individual basis with the project, having little to do with each other. The following year, most of the site field staff organized the farmers into clusters based on the localities where they lived, in order to improve farmer-to-farmer interaction and make it easier to monitor the on-farm trials. These clusters served as the basis for farmer-to-farmer evaluation exercises which started in 1995. The result, in most cases, was increased interaction between the collaborating farmers. In an evaluation of the clusters it was found that learning, interaction and encouragement were perceived as the main benefits of cluster membership (Sutherland *et al.*, 1996). A significant proportion of the clusters engaged in self-help activities in addition to research activities. In one site the clusters did not shape up clearly – one of the main problems identified was the highly scattered nature of the settlement and the long distances between the homesteads of those identified as potential cluster members. In this site, the expert panels that met at the site were a stronger integrating factor than the clusters. At another site, inter-clan rivalries made it difficult to form a cluster in one locality. Farmers from this locality refused to participate in project activities, including visits to the trials at the project site, or in visits to the fields of neighbouring farmers. Further discussion with the local extension staff indicated that this was a long-standing problem, and one to which no solution had been found. In another site where there were complex ethnic relations, also linked to relief programmes, instead of forming clusters the on-farm field assistant worked through existing groups that had been established for channelling agricultural relief and advice. These groups were based on ethnic divisions, and when the relief ended the groups lost interest, except for one which continued and generated further demand for technology demonstrations.

The overall experience of establishing new institutional structures at the project sites was that this was easiest and worked best where local political rivalries were not pronounced, and often in the more remote areas where farming was more important and food relief programmes were less prominent.

Sources: Ouma et al. *(1996a); Kang'ara and Ouma (1997); Mellis (1997); Sutherland* et al. *(1997b, e).*

8.5 OTHER INSTITUTIONS AND PROCESSES

Whether existing structures are used, or new local institutional structures are formed to facilitate farmer participation, the whole institution of formal agricultural research, with its actors, its routines and its underlying concepts, may be new to farmers.[3]

First, participatory agricultural research can bring new ways of thinking and acting into a rural community. For example, farmers may be used to seeing extension demonstration plots, and not appreciate at first how trial plots are different from crop demonstrations. The formal experimental layouts, detailed attention to site selection, plot size, controlled comparison of treatments, and collection of quantitative data on a range of parameters are likely to be novel institutions to such farmers, and difficult for them to grasp unless they become involved in the implementation of experiments.

Second, the methods researchers use to make the research process more participatory may be new to local farmers. In well trodden development pathways, farmers may be used to formal surveys, PRAs and extension field days. However, some of the institutions documented in this and previous chapters, such as cross-visits, research planning workshops, evaluation meetings, open days, seed and technology fairs and farmer-to-farmer competitions may be new concepts. How some of these institutions were developed by DAREP is the subject of the next case.

CASE 8.8

DAREP: FARMER-TO-FARMER TOURS, COMPETITIONS AND STUDY TOURS

Local tours

Tours of each others trials were initiated during the April 1994 season by members of the soil and water farmer research groups, with transport and lunch facilitated by the agricultural engineer on the Dryland Applied Research and Extension Project. While these tours were very effective, they did depend on project transport as the distance between the group members' trials were often considerable, making travel on foot impractical. In an effort to make these tours less expensive, FRG members were grouped into clusters of households within walking distance, with the idea that cluster members could visit each other's fields easily during the seasons. The introduction of clusters thus modified the scope of the farmer-to-farmer tours so that they were no longer focus-group tours, but more geographically defined and covering a wider range of technical topics (Mellis, 1997). This arrangement proved very effective for getting farmers into the habit of visiting each other's trials and farms in order to learn. The idea of using clusters instead of a wider group, however, had a drawback in that not all farmers see all other participating farmers' trials, reducing the number of potential opportunities for learning which were available when transport was provided to visit all the farmers.

An evolving method of farmer-to-farmer technology evaluation

In the programme of on-farm cropping trials, seasonal visits as part of the farmer-to-farmer evaluation of trials emerged as the method favoured by the clusters of collaborating farmers. This type of farmer-to-farmer evaluation in most sites was combined with a competition. This idea was developed at one site by farmers in consultation with a field assistant in early 1994, without any prompting from the project team. At the annual training held for field staff in 1994 the field assistant shared the idea with colleagues, who received it with enthusiasm. The project team, after learning about the idea and becoming excited about its potential, modified the approach and developed some guidelines in early 1995. The guidelines were distributed and discussed by the local site committees, who were also very enthusiastic and started to plan these competitions for their areas. In this way, farmer-to-farmer evaluation conducted within the framework of a competition provided not only an additional motivation to farmers to undertake trials, but also an indirect means of sensitizing farmers to the importance of valid comparisons of on-farm research trials. For judging purposes, a fairly detailed scoring system was used to select the winner from each cluster, and also the overall winner. The criteria first used for judging were: site selection; control or local check; records; visits by other farmers; innovations; farmers' understanding of research.

Within each cluster, farmers and field staff visited each other's trials and farms and judged the trials according to set criteria, selecting a winner from among their cluster. The next stage of the tour involved visits to the winning farmers in each cluster and further judging to determine the overall winner, who received a prize at the next farmer open day. Usually an 'outsider', such as a teacher, sub-chief or local extensionist, was requested by the farmers to officiate in order to ensure impartiality.

This approach was effective for:

- improving motivation for participation in the on-farm trial programme
- training farmers in basic formal research procedures
- encouraging farmers to visit each other's fields and ask questions.

The method evolved further in the light of the interest and experience of farmers and site staff. Farmers proposed the idea of prize-giving. It was also the farmers' idea to have an on-farm open day at the farm of the winning farmer, to which other farmers would be invited and where the prize for the winning farmer would be awarded. Farmers and field staff also modified the criteria for evaluation to take account of the whole farm, rather than focusing only on research trial implementation.

Study tours

Study tours were an important source of ideas for new technical interventions. There were two main types of study tour used by the project: those for research and extension professional staff, and tours largely for farmers in which staff were also involved. Three professional study tours were made by project researchers, extensionists and NGO collaborators to see programmes in other semi-arid areas: one to Laikipia and Baringo Districts, one to Coast Province, and one to neighbouring districts of Eastern Province. The Laikipia tour provided options for soil and water conservation, particularly mulching, which were at first discussed with farmers but then rejected by them as not appropriate. The Coast tour, including Tiata Taveta District, provided interesting lessons in water harvesting. On the basis of this, a specific study tour was planned which involved farmers from the FRGs together with field and extension staff. During the tour FRG farmers were exposed to a range of water-harvesting options, and returned very excited and keen to try these out on their farms. The extension officer from Tiata Taveta agreed to work with the DAREP FRGs to help them decide which structures were most suitable for their fields, and to train them in how to lay out these structures. The study tour made in 1996 to Machakos and Kitui Districts of Eastern Province combined farmers with researchers from another project, and extension and NGO representatives. This provided farmers with more ideas which they began to try out on their own farms, as agreed at a meeting at the end of the tour.

Source: Mellis (1997); A.J. Sutherland, personal communication (2000).

8.6 FORMAL REPRESENTATION OF FARMERS

One of the most challenging issues in Africa has been to effectively organize and sustain a system whereby small-scale farmers could be represented effectively on higher-level decision-making forums within research organizations. Experience with this approach in some African countries has been mixed, however. There are questions about how to select a representative farmer, about language, and about the level of interest and understanding that is required for effective participation. Often the farmers keep quiet and lose interest, being overshadowed by the formal setting and intimidated by the amount of technical language used. Such meetings are often conducted in English which, in addition to scientific jargon, puts less-educated farmers at a great disadvantage. If translation is not well done, translations from English into local languages can still sound like a foreign language to farmers. Often the most vocal farmers are usually retired civil servants or teachers who are less likely to be representative, and may not push the interests of the poorest. Farmer representation at higher-level planning meetings is a challenging concept to achieve effectively where farmers are resource-poor, live far from research institutions, and lack strong farmers' organizations that can effectively represent their interests. Nevertheless, worthwhile efforts have been made, and will continue.

For example, the KFSRE project in Namibia and the FPRP in Uganda responded to the criticism that resource-poor farmers have not been effectively represented during the research-planning and priority-setting processes. Both projects made attempts to institutionalize farmer participation in more formal research planning meetings.

CASE 8.9

KFSRE: PARTICIPATION OF FARMERS IN REGIONAL AND NATIONAL PLANNING AND EVALUATION MEETINGS

Involving farmers in regional research planning

The Kavango Farming Systems Research and Extension Project looked into the development of a regional research planning agenda. A meeting was held within Kavango Region, in which researchers, extensionists and farmers participated. Agricultural extension technicians were asked to bring a representative group of five farmers from their extension wards. This they did, but it was probable that the groups who came represented the richer end of the scale. Farmers made their views known. For example, the livestock researchers were left in no doubt that research into goat kid mortality was a priority issue for Kavango farmers. Farmers raised issues, which were listed, and prioritized these issues.

The Kavango regional research agenda was later presented to the national-level meeting, but disappointingly the national researchers never picked up on it. There were several reasons for this. No farmers or farmer representatives were present at the national research planning meeting. The Kavango Farmers' Union does not have a very vibrant grassroots constituency, nor does it work well with its parent organization. In agronomy, researchers were undertaking research into some of the farmers' priority issues. However, livestock researchers were unable to respond, as there were no goat researchers in the Ministry of Agriculture.

Farmers' attendance at these higher-level meetings requires a strategy to give them the confidence to articulate their views. One such strategy is to have farmers in subgroups with one articulate local person to present their collective views to the plenary session.

The project developed ways to deal with these problems at its final workshop, attended by farmers and held in English. Three approaches were developed: simultaneous translation during plenary sessions; putting the farmers into their own group during working group sessions; and always inviting a farmer who could speak English so that he or she could present the group's findings.

Participation at lower levels of research planning

Farmer participation was more effective in research planning at lower administrative levels. The KFSRE Project developed a sequence of planning meetings through the research cycle. This sequence started with the 'reporting back' meeting, where the results of on-farm trials were reported back to farmers. The results focused on the village concerned, but were set in the context of results from the other sites. Time was allowed for discussion; farmers were also allowed to change the result if the researchers' analysis, in their view, was misleading. Farmers, researchers, farming systems unit personnel and extension technicians needed time to comment on the achievements and failures of the previous season. The results of the meeting were written on flip-chart paper which was left with the farmers. This marked the end of the year and the beginning of the sequence for the forthcoming season. The planning meetings followed a three-stage sequence, each with a specific function:

- first planning meeting – to discuss the achievements and failures of the previous season
- second planning meeting – to discuss new varieties and comment on the previous season's varieties
- third (final) planning meeting – farmers formally decide which varieties are to be included/excluded in the forthcoming season's on-farm trials.

The first and second planning meetings were an opportunity for farmers to express their views on the characteristics of the different crop varieties. These meetings also provided an opportunity for researchers to participate by discussing the varieties in previous trials, as well as presenting new varieties. It was also an opportunity to review the assessment criteria for the varieties under trial. The farmer determined these criteria at the outset, but the criteria needed to be reviewed on an annual basis. Decisions on which varieties to include, or exclude from, the forthcoming trials were delayed until the last meeting. This gave farmers time to make a more considered decision.

These meetings were also an excellent opportunity to discuss additional work, often unrelated to the work in hand. Comments by farmers prompted several initiatives, for example, on the need for the Ministry to undertake research and extension work into cucurbits, and the use of draught-animal tillage.

Source: H. Bagnall-Oakeley, personal communication (2000).

The ActionAid FPRP in Uganda focused mainly on representation of farmers at community- and project-level meetings. Nevertheless, there were some important initiatives to facilitate communication between farmers and national researchers.

CASE 8.10

FPRP: FARMER REPRESENTATION EXPERIENCES

The Farmer Participatory Research Project framework did not specify farmer participation in research planning meetings, but instead referred more generally to meetings and discussions with formal research organizations. Who should take part was not specified in the project document.

Project retreat

In early 1995, about 12 farmers who had been active participants in on-farm trials facilitated by the project, together with a couple of non-participating farmers, attended a project-run retreat funded by the African Research Utilization Network. This was attended by national-level researchers who had had some contact with the project. The retreat discussed agricultural problems raised beforehand by the different participants, which were put into an agenda developed by the team. The retreat was organized around four themes: communication between farmers, researchers and extension workers; farmers' access to resources; knowledge; and attitudes. It aimed to explore methodological issues arising from such an event.

The discussions between the participants at the retreat helped to increase the level of shared understanding between them and to identify common interests, concerns and approaches. A weak area was the balance between different groups of participants. Extensionists from the district had been invited but did not attend. The choice of spoken language and the way the written word is communicated, particularly in explaining the workshop procedures, required careful consideration, but was not problematic as the group was comparatively small and workshop activities relied mainly on group work conducted in local languages.

End-of-project workshop

In addition, collaborating farmers took part in the end-of-project workshop which was attended by national and regional research and extension project staff. The farmers participated in this with interest, and their contributions were well received by all participants. The issue of language arose in this workshop, which was conducted in English with *ad hoc* arrangements for translation for farmers. A lesson learned was that much better planning and provision for non-English speakers was required in future workshops if farmers were to participate.

The project team, as an NGO-based project, was not invited to national and regional research and extension planning and evaluation meetings. Nevertheless, the project was invited to a range of annual conferences for various institutions, and to a small but increasing number of get-togethers about participatory research. For example, in 1995 the FPRP was invited to a national agricultural research organization workshop on the institutionalization of farmer participatory research (FPR) and presented a paper about its experiences with FPR. Collaborating farmers were not invited to such events. The FPRP team also took part in the first meetings of an FPR/ITK (indigenous technical knowledge) Network in Uganda which involved extensionists, researchers and representatives from farmers' unions in Uganda.

Sources: Martin and Salmon, (1996); Salmon and Martin (1997); A. Martin, personal communication (2000).

8.7 TRAINING FARMERS

Most of the projects provided farmers with some form of 'hands-on' training during the course of their participation in the research programme. However, some projects have gone further, making explicit efforts to train farmers in order to equip them for more proactive participation in the research process. The ITDG-Chivi project trained farmers as part of a conscious strategy of empowerment, following negative experiences during early efforts of farmers' implementation of researcher-designed experiments (see Case 6.1).

CASE 8.11

ITDG-CHIVI: TRAINING OF GROUP MEMBERS

One of the key issues that the Intermediate Technology Development Group Project team had to address was the capacity of the groups to manage themselves and to attract members. Again, leadership training through the training for transformation courses was extremely important and has paid dividends. Previously the gardening groups had little influence beyond the garden fence, and the farmers' clubs lacked legitimacy because of exclusive membership. The combination of changes in leadership roles and increased technical options has transformed these groups.

- Membership has changed and increased.
- The groups are more representative, are able to be more effective in providing benefits to members, and are more powerful in representing members' interests.
- The number of clubs has increased from 9 to 33 (mid-1996), and their average membership has risen from 16 to 30.
- Total club membership has increased from 161 to 865.
- The dominance of affluent farmers from wealth rank 1 has decreased, and membership and leadership are more representative of households in wealth ranks 2 and 3. It is, however, notable that the operational and structural changes in the local farmers' clubs has not been mirrored by any change in the Zimbabwe Farmers' Union at national level.

Training for transformation has been an important method of supporting and facilitating greater participation, and greater levels of community management and control. This leadership training is based on the concepts of conscientization originally developed by Paulo Freire in Brazil, adapted for a Zimbabwean context. It is a set of awareness-raising techniques that assist groups to analyse their formation and management, their roles, opportunities and constraints, and to plan courses of action together. The training was provided, at the project's request, by another Harare-based NGO that specialized in this type of training.

Key elements covered by this training are:

- defining development
- examining approaches to community development
- group dynamics
- planning skills and methods
- facilitation skills
- social analysis and justice issues
- decision-making processes
- leadership and communication skills
- stress management
- gender and development
- team management
- self-reliance.

The training starts by focusing on those who are least empowered. This has stimulated demand from those who are low in the social hierarchy, and has sometimes caused some anxiety among those who are used to being in control. Within groups, it has led to greater democratization of leadership and more transparent decision-making. This, in turn, has increased effectiveness, attracting new members and thus increasing the representativeness of a wide cross-section of the community. Within the agricultural extension service, AGRITEX, there have been changes too, as farmers demand changes in the approach and attitudes of extension workers. This in turn has resulted in AGRITEX extension staff demanding training, and these effects have rippled upwards through the organization.

The process described here has allowed researchers to have direct contact with farmers in Chivi, and the two have entered into a new type of relationship. Relationships have been built with key government research institutions, especially Makaholi and Chiredzi Research Stations and the Department of Research and Specialist Services. These relationships have the potential to continue long after the project has finished.

An important aspect of this relationship is the growing confidence among Chivi farmers to relate to research institute and AGRITEX staff as clients or customers, with specific demands and problems which they want to address. They are no longer prepared to be seen as passive recipients of information. The leadership training was important in developing this self-confidence, but is not the sole reason for the change in attitude. Farmers' self-confidence was also supported by a project approach that was explicitly valuing farmers' own skills and knowledge, encouraging experimentation, and constantly seeking to strengthen local people's capacity to control and manage a technology-development process.

These emerging relationships have allowed researchers to gain a better understanding of gardeners' and farmers' needs and perceptions. These are vital ingredients for successful research, but frequently ignored by more conventional approaches to research and extension. This may be a reason why these research and extension institutions had such a poor record of developing technology options that were widely adopted by resource-poor producers in marginal communal areas such as Chivi.

Researchers from Chiredzi Research Station, Makaholi Farming Systems Research Unit who have been working with trained farmers in Chivi now realize that:

- farmers are also researchers in their own right
- participation of farmers should be much more than provision of labour and land
- researchers can learn a lot from farmers; it is important for both researchers and farmers to share their knowledge and ensure that any future research builds on farmers' experiences
- developing any research agenda should be done with the participation of farmers.

Source: Croxton and Murwira (1997).

Some of the other projects also gave more formal training to farmers. As noted in Case 8.5, KFSRE provided training for transformation for some of the community members where they worked, after a study tour to the ITDG-Chivi project. Other projects provided more technical training, particularly those with a more developed technical research agenda. For example, the National Agricultural Research Project, Phase II provided training to farmers in animal health as a basis for exploratory dissemination of improved tick and worm control methods (Case 7.2). DAREP provided livestock owners with training in basic principles of animal health, as a basis for participation in a worm control experiment on goats using local concoctions. In the agroforestry propagation research, DAREP provided farmers with training in propagation principles and methods, as a means of preparing them to undertake their own experiments on their farms (Kidundo, 1997a, b).

8.8 CONCLUSIONS

The cases described in this chapter have illustrated some of the ways projects have developed local institutions and processes to build farmer capacity in participatory agricultural research. Many of the institutions and processes described are still young when compared to the established institutions of more conventional agricultural research. How these more novel approaches will develop further will depend on the importance given to building farmer capacity by a number of stakeholders: practitioners of farmer participation; research and extension managers; other rural development agencies; government policy-makers; international donors; and the private sector. In further developing local institutions for farmer participation, trade-offs will be involved. For example, concerns with sustainability and representation will need to be balanced against those of functionality and efficiency. This aspect of institutionalization is revisited in Chapter 16.

We conclude this chapter by emphasizing factors to be considered during project design relating to farmer capacity-building and training processes. It is particularly important that projects which include the stronger integration of national research and extension programmes as a core output should be informed by an awareness of the factors likely to help and hinder this objective. Many of these factors have been outlined in Chapters 3–7 in relation to specific elements of the research process. The more important factors relating to farmer capacity-building and local institutions for participatory research are summarized in Table 8.2. Some tips to guide farmer capacity-building through participatory agricultural projects are summarized in Box 8.2.

NOTES

1. A more formal type of research implies a systematic approach to planning and design, with controlled comparisons and collection of data, both quantitative and qualitative.
2. One reason was that, in order to achieve area representativeness during the diagnostic surveys, the sites selected under the guidance of local extension staff were quite far from the inherited project research sites where the experiments were done. Some very basic social analysis conducted in the diagnostic surveys indicated that residence patterns were originally based on clan membership, and that after land registration the system of residence had become increasingly rigid, with inter-clan conflicts emerging over land. Women's groups, some of them church-based and others based on groups set up under a national development programme, were also important local structures. Premature termination of the project, starting with a 50% reduction of research sites in the second year, further reduced the relevance of more in-depth study of local social structures.
3. The term 'institution' is used here to refer to a pattern of behaviour or a distinctive way of doing something that is repeated several times and becomes accepted as part of normal practice within an organization or enterprise.

Table 8.2 Factors influencing farmer capacity-building by participatory agricultural research projects

Helping	Hindering
National policies supportive of local-level capacity building and empowerment initiatives	National policies and the organizational cultures of research and extension agencies are top-down, and discourage innovation in approaches
An organizational and management culture within the host institution that supports participatory approaches	Poor communications within a project, between staff and between project staff and farmers, resulting in a poor understanding of the project's purpose
Project document specifies outputs related to farmer capacity, indicative related activities and resources	Cultural and workload factors make it difficult for women farmers to attend meetings and workshops
Ability to access relevant local expertise on a consultancy basis if needed	Weak indigenous farmer organizations and inadequate mechanisms for farmer representation at higher levels
Project able to select a team of staff with hands-on experience, competence in local languages, and appropriate gender and disciplinary balance	Farmers with a very low education level, resulting in low confidence in interaction with educated researchers, particularly if there are also language problems and a top-down political and administrative culture
Local communities selected have natural resource-centred livelihoods, are responsive to inputs from outsiders, able to work together and communicate effectively, and had few negative experiences with previous projects	Extension service poorly resourced and motivated, driven by top-down thinking which does not reward local initiative and a problem-solving approach

Box 8.2 Tips for farmer capacity-building in participatory agricultural research

- ✔ Train team members in rural facilitation and communication skills close to the start of the project.
- ✔ Plan initial entrance to the target community and any selection activities with care, being careful not to build up unrealistic expectations.
- ✔ Make efforts, early on, to develop a good understanding of community and household dynamics.
- ✔ Formulate a farmer selection strategy prior to the start of research activities and before trying to establish local structures (groups or committees) for research. The selection strategy must be transparent.
- ✔ If resources allow, provide farmers with training to build their confidence in facilitation, conflict management and leadership skills. Use experienced trainers and conduct the training in the local environment.
- ✔ Allow time for learning during 'on-the-job' training of farmers in formal research approaches, to enable time for building on researchers' and farmers' errors.
- ✔ Hold regular meetings with farmers to demonstrate commitment and maintain farmers' interest.
- ✔ Adopt a policy of taking planning and decision-making meetings to the farmers as much as feasible.
- ✔ Adopt a positive inclusion strategy to foster participation by female farmers in all relevant research activities, including planning meetings.
- ✔ Regular monitoring and evaluation of farmer participation in decision-making and implementation activities against criteria agreed with the participants.

PART TWO Teamwork: a neglected dimension

Part Two deals with the important but neglected topic of teamwork in agricultural research. Although the concept of participation has been a common currency in agricultural research for some time, the interactions within the project team for effective teamworking have been neglected in the literature on participatory agricultural research. Many of the principles of project teamwork generic to management theory and practice focused on enterprise in developed countries are broadly applicable to agricultural research in developing countries. Yet agricultural research as an enterprise in developing countries also raises its own set of specific issues. This part of the book highlights these issues as a point of departure from conventional management literature. Internal reflections by team members and team leaders on their experiences of teamwork illustrate lessons learnt from the case-study agricultural research projects in sub-Saharan Africa. Some general principles and strategies for managing participation in project teams in agricultural research in developing countries are outlined.

Chapter 9 provides the project context for teamwork in the case studies, outlines typical phases in the development of agricultural research project teams, and points out both similarities and differences from phases identified in management literature. Chapter 10 discusses the formation of project teams and factors that influence team structure, team composition, effective team leadership and the selection of team members. Chapter 11 describes team-building processes including joint planning, fostering interdisciplinary working habits, and building competencies through training. Chapter 12 addresses a range of consolidation and operational areas that are important to sustain effective teamwork. These include enhancing interaction and communication, fostering project ownership, team management, addressing issues of hierarchy within the host organization, incorporating support staff, and the (often delicate) issue of managing project resources. The less enjoyable aspects of teamwork, including team closure, formulation of exit strategies, documenting the project process, handing over activities and resources, and saying farewell to collaborators are covered in Chapter 13.

Contextualizing teamwork

9

9.1 INTRODUCTION

This chapter introduces the key elements of teamwork, discusses the context within which teams undertaking participatory agricultural research operate, and provides an overview of the phases typical to teams implementing agricultural research projects.

Projects have been defined as "non-routine, non-repetitive, one-off undertakings, with their own specific time and cost targets" (Kharbanda and Stallworthy, 1990). Within a project environment, the most valuable resource – people, organized into teams – is far more likely than single individuals or techniques to transform initial concepts into working realities (Kharbanda and Stallworthy, 1990). A team as "a group in which the individuals have a common aim and in which the jobs and skills of each member fit in with those of others" (Bernard Babington Smith, cited in Adair, 1986) has two strands that are essential to the concept of a team – a common task, and complementary contributions.

An effective team may, therefore, be defined as one that achieves its aim in a synergistic way. Although some doubt has been raised over whether teams are in fact more efficient than individuals working alone (West, 1994), the utilization of teams to design, implement and manage projects has become as central to agricultural research as it has to many other fields. Within agricultural research, teams have emerged within existing hierarchies and organizational cultures of what Chambers (1997) calls "practical professions", as an aspect of "normal professionalism". Yet many aspects of teamwork require changes in the behaviour of professionals; a "new professionalism" (Chambers, 1997) which includes greater value being attached to self-critical awareness, open-mindedness, respect for the views of others (including support staff), and empowerment of staff with lower status.

The burgeoning literature on management highlights effective teamworking as one of the key features of an innovative organization (Tidd *et al.*, 1997). Innovation is considered to be primarily about combining different perspectives to solve complex problems, and thus is it suggested that groups have more to offer than individuals, both in terms of fluency of idea generation, and in the flexibility of solutions developed. The characteristics of high-quality project teams in an environment of organizational change imply that such teams rarely evolve by accident, but result from a combination of careful team selection, an investment in team-building, clear guidance on roles and responsibilities within the team, and a concentration on managing the group process as well as task aspects (Tidd *et al.*, 1997). These facets of team-building are discussed in Chapters 10–12, while Chapter 13 discusses the closure of teams as part of project exit strategy. The next section discusses some of the more specific aspects of the organizational and policy environment of agricultural research in developing countries.

9.2 THE AGRICULTURAL RESEARCH PROJECT TEAM PROCESS

All fields of work contain unique constraints, ambiguities and complexities. Agricultural research is no different. Agricultural research projects in poorer sub-Saharan African countries are often located in national research institutes lacking physical resources, limited and unpredictable operational funding, inhibiting bureaucracy and low salaries. Even where funding and conditions are adequate, research organizations may lack a clear sense of direction and purpose and, as a consequence, staff can have motivational problems. The nature of organizational mandates often requires professionals to work in relative isolation from each other, both geographically and in terms of disciplinary work programmes, fostering a very individualistic work culture. Agricultural scientists are a small, specialized and often highly educated national resource, making it difficult to find staff with the necessary qualities to substitute one team member with another.

The research process is often a lengthy and complex one in which the timing of specific inputs is critical, and continuity of specialist inputs is important. This makes innovation in research organizations more risky than in enterprises that produce results quickly, depend less on favourable climatic conditions, and can easily call in specialists to address specific issues. The features of most agricultural research organizations call for patience and tolerance in the process of team-building and operation. Research organizations sometimes have levels and cultures of hierarchy that can inhibit innovation, even though the research enterprise has innovation as its cornerstone.[1] Moreover, despite an emphasis on respecting hierarchy and status, many of the research operations cannot, in practice, be closely supervised by those more senior in the hierarchy. More junior staff often work in relative isolation and have to make decisions that influence research outcomes. In such circumstances, results will benefit from more effective teamwork rather than strictly enforced decision-making hierarchies.

The professional evaluation of national researchers[2] is predominately internalized within the national scientific research community. This community tends to share the values of the wider international community of scientists, in which publication in refereed journals, rather than direct impact on intermediate and end users, is the hallmark of success and status (Pretty and Chambers, 1993; Hall and Nahdy, 1999). At the same time, researchers are under pressure from their own governments and from projects to achieve often highly ambitious national research mandates linked to national development goals. Donor projects, the main source of operational funding in many national research systems, are increasingly influenced by challenging development goals such as poverty eradication and the empowerment of rural people. In particular, the requirement to work directly with the end consumers of research, the farmers, in developing and testing technology may challenge existing professional values and procedures relating to scientific rigour and control over the experimental process. Donor research projects usually bring together expatriate and local staff with markedly different conditions of service, different degrees of control over project resources, and perhaps differing perspectives on the research process itself. A researcher who has worked as an expatriate in a technical assistance role and wishes to remain anonymous notes:

> "One of the key problems of project teams, for example, those consisting of expatriate Technical Assistants (TAs) and local staff, is the fact that they often don't have a common aim. Officially, their Terms of Reference are streamlined so as to achieve a common aim. But in reality, peoples' hidden agendas are often different. The TAs want to get work done, receive credit for it from the donors, publish papers, and move on. The local staff, who are generally civil servants, are at times differently motivated: they also want to get work done, but their jobs are more secure and there is often no performance-oriented pay and promotion policy in place. They will be there after the project has ended, so they will have to be more diplomatic than the expatriate TAs. Local staff are often seconded to projects without being given a choice and without being involved in the project design. Therefore the TAs have generally a higher level of ownership of the project, which again has an impact on teamwork."
>
> *Source: Anon., personal communication (2000).*

Within this context there is often relatively limited guidance on teamwork within project documents. Logical frameworks do not usually make any reference to teamwork, even in the assumptions column. Thus assumptions such as "team members will collaborate effectively and not undermine each other's efforts" are not made explicit.[3] Terms of reference may include statements such as: 'the social scientist will undertake diagnostic surveys in collaboration with other team members', but do not give guidance about how to collaborate effectively. Likewise the team leaders' terms of reference may include phrases such as "provide leadership", but without guidance as to what constitutes good leadership and the qualities and competencies of an effective leader.[4]

The challenges of managing an effective research process are many, and require careful planning through an inclusive approach. The process itself has several phases, and by disaggregating these phases and illustrating them with examples from practice it is hoped that the reader can gain further insight and useful tips.

9.3 TYPICAL PHASES IN AGRICULTURAL RESEARCH PROJECT TEAMS

The environment in which agricultural research project teams operate influences the phases of project team development. There are fairly distinct phases to research project team development, that both reflect and are differentiated from those described in generic management literature. In terms of common features, the process of team development through formation, resolution of internal differences and conflicts around leadership and objectives, and enhancement of a commitment to shared values and norms as preconditions for effective performance are as pertinent to agricultural research projects as they are to other enterprises. The four-phase model (cited in Kharbanda and Stallworthy, 1990) of 'forming' (assembling a potential team of people together); 'norming' (efforts to agree goals and code of conduct); 'storming' (as they vie for influence and personal recognition); and 'performing' (when they combine efforts to achieve an agreed task) describes quite accurately what happens with most research project teams. The six-stage model proposed by Woodcock and Francis (1994) in their applied work on team-building strategy is more descriptive of the relational aspects of team development. It starts with 'ritual sniffing' (like animals upon meeting); 'infighting' (like storming); 'experimentation' (which is similar to norming); 'effectiveness' (performing as a consciously self-contained group following an agreed plan); 'maturity' (performing in a flexible, less self-contained and more innovatory fashion); and 'degeneration' (complacent, opinionated and inward-looking performance). Woodcock and Francis (1994) note that not all teams go through the disfunctional sixth stage, which is also true for some agricultural research project teams.

While both these four- and six-stage models could be applied to the agricultural research projects discussed here, first-hand experience and the case studies suggest that four somewhat different phases (that are more influenced by the typical research project cycle and associated decisions) are appropriate. The first phase is team design and selection; followed by team launching and equipping; team consolidation and operation; and ending with team closure (which does not always occur).[5] These four phases overlap temporally and by issue, but provide a convenient framework for highlighting issues in teamwork in agricultural research and proposing improvements to project design and implementation.[6]

NOTES

1. Apart from hierarchy, it is not uncommon for employment creation to be an implicit objective of research organizations, particularly those linked to government. This objective may not be seen as a trade-off with innovation, but is a potential inhibitor.
2. It is noted by some case-study authors that professional evaluation (peer review) is difficult to achieve in very small research organizations.
3. Irrespective of the content of logical frameworks, it has been noted that they (and project documents more widely) are generally seen as belonging to

the donor by national staff members, and thus nothing to do with them. In many cases team leaders are responsible for creating edited versions that reduce the jargon and make the content more practically applicable. This is an important initial exercise in internalizing the project's aims and objectives and clarifying understanding.

4. Whilst the qualities and competencies of good leadership can be outlined, the extent to which these are intrinsic qualities, as opposed to skills that can be taught, remains a moot point. It has been noted by some case-study authors that, alongside a generally poor provision of management training within ministries of agriculture, few expatriate team members/leaders have been through management or leadership courses.

5. A caveat highlighted by one case-study author is that not all teams do 'close' after project completion. The Kavango Farming Systems Research and Extension (KFSRE) Project team, for example, was drawn largely from government staff, and has continued to function together, albeit in a slightly different role (H. Bagnall-Oakeley, personal communication, 2000).

6. However, it is important to note that the distinct stages described here assume that a team is stable enough to experience these stages. In the KFSRE case there was high staff turnover due to policy changes (farming systems research and extension – FSRE – was adopted as a national strategy, thus more staff were seconded to FSRE teams); differences in pay (FSRE team members left the ministry or shifted to different parts of the ministry due to relatively poor pay for agricultural research and extension staff); regional imbalances (insufficient numbers of local qualified staff mean unsustainable recruitment of staff from other regions). As a result, whenever the team solved some of its problems and moved on to the next phase, interruptions occurred because new members joined who had to catch up with the process. Similarly, team members leave (often with little notice) and their tasks have to be taken over by the rest of the team, thus disturbing the working routine (B. Adolph, personal communication, 2000).

10 Team design and selection

The main aspects of team design and selection relate to the structure, composition, selection and leadership of a project team.

10.1 TEAM STRUCTURE

The structure of a team refers to the formal framework within which team members relate to each other and to other key stakeholders, and includes the leadership roles assigned within the team. This structure is likely to be influenced both by the objectives or focus of a particular project, and by the organizational context. The structure, composition and permanency of research project teams depend largely on the nature of the project. Development problems in natural resource management that were once conceived as purely technical have increasingly been acknowledged as having important institutional dimensions. As a result, capacity-building has become a key objective in some agricultural research projects, whereas in others it is recognized as being secondary to specific technical project objectives. The case-study projects from sub-Saharan Africa represent both foci, illustrated in Figure 10.1 and further explained in Table 10.1.

At the technical end of the spectrum, the Ghana Larger Grain Borer (LGB) Control Project, the ODA/DRT Cashew Research Project (CRP), and the Kenya Dryland Applied Research and Extension Project (DAREP) were largely task- and research output-orientated, whilst the Zambia Adaptive Research Planning Teams (ARPTs) and the Kenya Agricultural Research Institute/DFID National Agricultural Research Project, Phase 2 (NARP II) and FARM Africa Farmer Research Project (FRP) were focused on building capacity in public-sector research organizations. ActionAid's Farmer Participatory Research Project (FPRP) combined the aim of building on an ongoing emphasis on community-level capacity-building whilst concurrently building ActionAid's own capacity for participatory research. The Namibia Kavango Farming Systems Research and Extension (KFSRE) Project team started out as an institutional capacity-building initiative and became increasingly task-

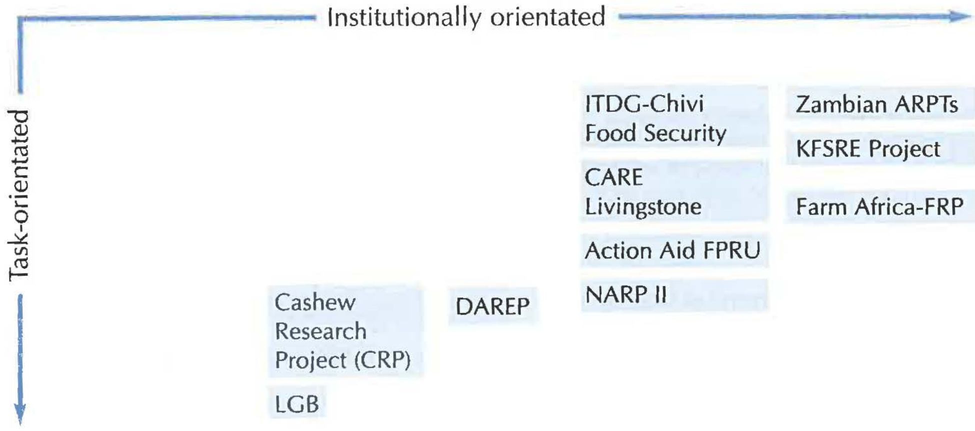


Figure 10.1 Framework of objectives locating the case-study agricultural research projects. This framework does not demonstrate the dynamic nature of project objectives (as illustrated in the KFSRE project), but aims to provide a broad characterization of aims and thus a reflection of team composition.

Table 10.1 Case-study projects: main focus, team structures, linkage emphasis and representation

Project name	Main focus	Team structure*	Linkage emphasis
ActionAid/NRI Farmers Participatory Research Project (FPRP)	Capacity-building of NGO and local communities in farmer participatory research	Small team, team leader and disciplinary responsibility	National research
Adaptive Research Planning Team (ARPT)	National capacity-building in farming systems research approach	Small provincial research teams with extension liaison member, provincial and national co-ordinators	Senior government research, extension and planning division management
CARE Livingstone Food Security Project	Capacity-building of village institutions, local agriculture/trial spread	Team leader and deputy, activity co-ordinating and field level	Linking villages into area federations. Ministry of Agriculture, marketing, relevant donor agencies
ITDG-Chivi Food Security Project	Capacity-building to farmer-led research	Small team with local, provincial and national levels in research and extension	Broad linkages at various levels. Linkages with national research stations. Other partners, NGOs, farmers' organizations at all levels
Dryland Applied Research and Extension Project (DAREP)	Technology development and extension for smallholders in semi-arid areas	Medium-sized team; team leader with technical sub-leadership	National and international research organizations
FARM Africa – Farmers Research Project (FRP)	Training and capacity-building	Medium-sized team	National Research and Extension. Agricultural college
KARI/ODA National Agricultural Research Project, Phase II (NARP II)	Capacity-building in adaptive research	Large open-ended regional teams with extension representation, regional and project co-ordinators. Members of regional teams established smaller community-based teams with farmers and local government and NGO extensionists	Senior research management
Kavango Farming Systems Research and Extension (KFSRE) Project	Capacity-building in farming systems approach for research and extension	Small team, from research and extension. Expatriate team leader. Changed in 1999 to Namibian team leader, plus technical advisor	Senior management in research and extension, and to agricultural extension technicians in the field
Larger Grain Borer (LGB) Control Project	Control of larger grain borer	Medium-sized team with technical and geographical sub-leadership	National research
ODA/DRT Cashew Research Project (CRP)	Improvement of cashew production	Medium-sized team with technical project manager and technical sub-leadership	National and international research organizations and local extension; eventually farmers directly through the integrated crop management (ICM) working group

*Team sizes equate roughly to the following scale: small, fewer than five team members; medium, five to eight members; large, more than eight members.

orientated as a function of the increased confidence shown by KSFRE staff in the use of participatory approaches.

Table 10.1. indicates that, where project objectives are primarily technical research outputs, the team structure tends to emphasize the role of specialists, with a team leader playing a largely administrative role with some responsibility for co-ordination of technical inputs within the team. Where capacity-building is emphasized, specialist roles are still recognized but there is relatively more emphasis on strategic co-ordination, particularly of relations between the team and key stakeholders. For example, if the emphasis is on capacity-building within an organization or with other formal organizations, strong linkages between the project leader/co-ordinator and senior management of the target organizations are emphasized. If the emphasis is on community-level capacity-building, links with local communities are given greater priority.[1]

Team structure is also influenced by the organizational and geographical context of a project. The increasingly interdisciplinary focus of participatory agricultural research, together with an explicit strategy to integrate and build up existing capacity, encourages inter-organizational project teams. This type of team broadens the type and number of issues for project management, particularly where there are dual lines of accountability and where collaborating organizations have different conditions of service (see Chapter 12). In cases where expatriates work alongside national researchers, the expatriates may feel more accountable to the donor agency's agenda, while the nationals may attach priority to the agenda of their own organization and national policies (see Chapter 9, section 9.2). If team members are spread across a broad geographical area, there will be need for some form of geographically focused leadership in addition to overall co-ordination. The Zambian ARPTs (Kean and Singogo, 1988), NARP II (Rees *et al.*, 1997a), and the LGB project (Compton and Motte, 1997) each had specific structures for geographically based leadership. In Zambia there were different lines of responsibility for technical leadership and routine administrative issues.

CASE 10.1

ARPT: TECHNICAL LEADERSHIP BY PROVINCIAL AND NATIONAL CO-ORDINATION

In Zambia the provincial Adaptive Research Planning Teams each had a provincial co-ordinator who was responsible for the technical co-ordination of activities within the province, and for linking to other research programmes at the research station where the team was based. The provincial co-ordinator reported to the research station officer in charge on issues relating to the general administration of on-station research facilities, and to the provincial agricultural officer on aspects of financial reporting, housing, seconded field and professional extension staff, and staff discipline. Technical reporting was directed to the national co-ordinator. Support on technical implementation was provided through a National Support Team which included the National ARPT Co-ordinator, a human nutritionist, a senior rural sociologist and a senior agricultural economist.

Source: A.J. Sutherland, personal communication (2000).

In the case of the KFSRE project, leadership structures evolved along with an expanding geographical programme and the establishment of a Farming Systems Research Unit within the Namibian government structures. At the same time, attention was given to developing capacity for leadership among the Namibian team members.

CASE 10.2

KFSRE: FROM PROJECT EXPANSION TO INSTITUTIONALIZED PROGRAMME LEADERSHIP

In Namibia, the Kavango Farming Systems Research and Extension Project team grew steadily as the project developed, from only two or three technicians early on to about 15 by the end of 1999. This included one technical assistant and one Department for International Development (DFID) associate professional officer. From May 2000, the team was reduced, as the technical assistant and associate professional officer left, and three Namibian staff members were transferred. From the perspective of sustainability, the project represented an over-generous allocation of resources, which the Ministry of Agriculture, Water and Rural Development (MAWRD) could not afford on a regional basis. However, further rationalization of resource use was anticipated in the process of institutionalization of new research approaches. The Ministry of Agriculture adopted the farming systems approach as the extension method of choice in September 1997, when it decided to progressively establish six farming systems units. The KFSRE project was seen as one of those units, albeit embryonic. In its later stages it made the transformation from a project to an institutional structure within MAWRD. The project's team structure, roles and responsibilities were, in outline, translated across, as was the Monday morning meeting and the vehicle management system (see Case 12.26). A decision was made that the Head of the Farming Systems Unit was the Chief Agricultural Extension Officer (CAEO). All farming systems unit staff reported directly to the CAEO through their respective section heads. Questions arose as to how the Farming Systems Unit was to relate to and co-ordinate with the Chief Agricultural Extension technicians and other specialists, and also how the Unit was to liaise with field technicians. Furthermore, field staff attached to the regional extension office had to be incorporated into the Farming Systems Unit. This assimilation process is 'in progress'; the leadership structure that came across with the project needs to undergo an adaptation process.

Building leadership capacity

Within the team there was a tendency amongst many staff to defer to the team leader or the CAEO, even for relatively minor decisions. To counter this and to reflect the growing size of the Farming Systems Team, the KFSRE team was broken down into smaller components: smaller teams with their own team leader. Each subteam had responsibility for an activity (agronomy or livestock) and, where necessary, other *ad hoc* teams were formed. Each subteam leader was responsible for developing their team's workplan and assigning tasks. At each Monday morning meeting the respective subteam leaders were responsible for briefing others on the week's activities.

This arrangement gave technicians the authority and mandate to exercise a degree of leadership, albeit at a micro-level. This provided a knowledge base and structure from which to carry forward the development into a farming systems team when the project relocated to the Regional Offices in Rundu.

The above approach has given KFSRE team members 'hands-on' experience of leadership and organizing teams. Therefore, the new structure includes a cadre of staff who can lead and co-ordinate activities, as well as keeping everyone informed about what is going on. It is also envisaged that the Farming Systems Unit members will provide leadership to the field technicians when confronted with problems or constraints that require specialist input, including further research.

Source: H. Bagnall-Oakeley, personal communication (2000).

In more task-orientated (rather than capacity-building) projects, such as DAREP and the LGB project, where a multi-organizational team has members who have been seconded and geographically concentrated in the host organization, the opportunities for team building are greater. The context for NARP II was different. Some of the national commodity research programmes in the Kenya Agricultural Research Institute (KARI) are geographically dispersed on the basis of agroecological zones, making teamwork within them more difficult. Moreover, often there are large numbers of scientists involved in regional research, or with overlapping responsibilities between adaptive regional research and national strategic research, so there has been less scope for forming teams with a tight topical and geographical focus.

Team structure may be more-or-less open-ended in terms of membership. For example, there may be small, fairly closed teams like the ARPTs (Kean and Singogo, 1988) and larger, more open-ended teams such as the NARP II regional adaptive research teams (Rees *et al.*, 1997a), which is illustrated in Figure 10.2.

NARP II was one of several projects contributing to the host institute's regional research programmes, and so avoided the development of a unique team identity, encouraging instead a sense of identity with the host institute and the regional research programme.

More open-ended teams may be very effective for task-oriented projects, where very specific

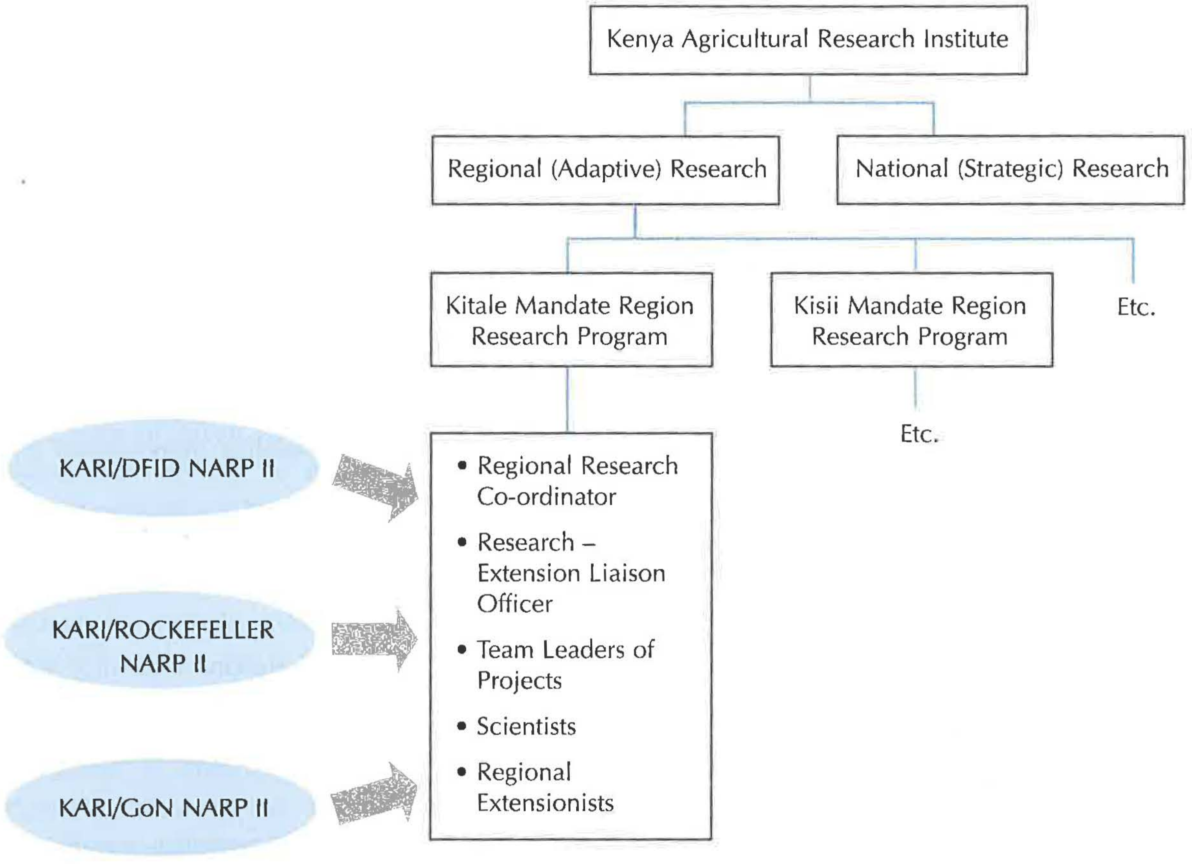


Figure 10.2 KARI NARP II structure – three projects contributing to KARI's regional research programme at one regional centre. The NARP II team structure emphasized a large, open-ended, permeable structure, able to vary to some degree according to the needs of the regional research programmes. Typically, more than one donor-aided project functioned at each regional centre, and the scientists and extensionists of that region could access these different sources of funds for projects with farmers, according to varying criteria and conditions, within the overarching framework of the regional research programme. Accordingly, the co-ordination roles of the regional research co-ordinator and the team leaders of individual projects became very important, and there was relatively little development of a unique team identity amongst the other project participants. *Source: Rees* et al. *(1997).*

technical inputs are required at particular stages of the project. For capacity-building projects, in which much of the project's success may depend on establishing good relations (both within the project team and between the team and other stakeholders), more permanent teams may be required, particularly for the purpose of establishing the credibility of new approaches such as the farming systems approach introduced through the Zambian ARPTs and Tanzanian regional farming systems teams (Stroud, 1999). Shorter-term consultancy inputs may be very useful, but need to be well managed if they are to be effective in building the team.

CASE 10.3

KFSRE: MANAGING SHORT-TERM CONSULTANCY INPUTS IN A TEAM CONTEXT

The Kavango Farming Systems Research and Extension Project had a considerable sum of money set aside (at the disposal of the team leader) for short-term consultancy inputs. Unusually the outgoing team leader, who left the project to take up a position as a professor of rural development, was invited back as a consultant due to his good relationships with staff and the Ministry of Agriculture, and his extensive knowledge of the project. Whilst these benefits of familiarity were significant, there were also inevitable disbenefits, with some project staff feeling that certain topics tended to be dwelt upon.

In other circumstances the KFSRE looked for good quality in-country candidates, both national and expatriate. Only when unable to find appropriate short-term consultants in-country were outside consultants sought.

Source: H. Bagnall-Oakeley, personal communication (2000).

Short-term inputs that provide training or reinforce skills in a particular priority area may be most useful, particularly if the same consultant (as in the KFSRE project, Case 10.3), having established working relations with the team, is in a position to return to reinforce and provide complementary inputs. If short-term consultancy inputs are poorly managed and imposed by external project managers, they may result in additional disruptions to the team's programme, and even diversion of the team's attention away from more relevant and important tasks.

Some general points to be considered when recruiting short-term consultants are listed below.

- Preferably recruit a short-term consultant who is known to produce good quality work. For this it is essential to canvass several sources. Consultants need to have a good track record of working with people at varying scales, from farmers to government officials.
- Draft concise and achievable terms of reference. Avoid rambling introductions and obscure tasks.
- Consult widely. The client and/or the host government must approve or authorize the terms of reference.
- Discuss with the consultant a tentative work plan and other requirements.
- Ensure that clear deadlines are shown on the terms of reference.
- The consultant should complete a work plan shortly after arrival.
- The team leader should ensure vehicles and other resources are available and serviceable.
- Ensure that feedback is provided through the consulting process, and a summary report is presented to the team for discussion before the consultant leaves the project.
- Attach a member of the project team to work alongside the consultant, as a training

opportunity and to provide guidance and information.

- The biggest challenge is to establish a working relationship with this consultant over a relatively short period.

Summary of team structure

The structure of project teams, in the context of agricultural research, are thus strongly influenced by:

- objectives of the project or initiative
- institutional context in which they are located
- geographical situation of the teams
- the extent to which teams are 'open' and influenced by external support.

10.2 TEAM COMPOSITION

Central to project team performance is the constituency of the team itself, including the mix of disciplines, age, experience and gender. This mix is largely determined by the project's objectives.

The choice of which disciplines to include in a project team should be closely linked to the project's mandate and the competencies required to deliver project outputs. Where the research project is process-orientated with a broad technical mandate, for example, relating to improvements in household welfare and food security through any available technology options, more generalist disciplines such as agronomy and livestock production (if there is potential for livestock improvement) may be chosen, along with competence in socio-economic analysis and participatory research methods (Shaner *et al.*, 1981). Projects focusing on particular commodities, such as the CRP, or on particular problems, such as the LGB project, require more specialist technical inputs along with socio-economic and participatory research competencies.

In putting together a team for implementing a participatory agricultural research project, a blend of natural and social science expertise is usually required. This can bring with it many challenges, particularly in national agricultural research institutes that may not have established positions for social scientists. In such cases the natural science researchers will not be familiar with the role of the social scientist and with social science methods, while social scientists may be new to the world of agricultural research. In many situations, social scientists are younger and less experienced team members. If inexperienced social scientists are placed in teams of experienced and unsympathetic natural scientist researchers, they are likely to have difficulty in establishing their credibility, and their influence on the research process is likely to be marginal. The Zambian ARPTs avoided this risk by recruiting new graduates from both the social sciences and the agricultural (natural) sciences to start the provincial teams together, both attending the same in-country training courses. Many of the other projects (LGB, CRP, DAREP, KFSRE, FRP) recruited experienced expatriate social scientists to work alongside national researchers with a natural science background, and to give support to younger nationals filling social science roles on the project. In NARP II, an experienced expatriate social scientist was recruited and posted to the KARI National Headquarters in order to provide training in social science methods to KARI natural research scientists and give support to younger KARI social scientists.

CASE 10.4

KFSRE: COPING WITH A SHORTAGE OF QUALIFIED SOCIAL SCIENTISTS FOR THE TEAMS

The desire to house social scientists in each of the farming systems research and extension teams in the Kavango Farming Systems Research and Extension Project was not realized, due to the lack of suitably qualified candidates. In response to this, the expatriate social scientist trained the natural scientists on the teams in basic social science issues and methodologies. Consequently, it was felt that team members had understood the issues and methods well enough to do without full-time social scientists.

Source: B. Adolph, personal communication (2000).

The more flexible technical mandate of process-orientated projects may also facilitate the emergence of new objectives, resulting in a more open-ended type of team – perhaps a core team with a provision to draw in expertise on a short- or longer-term basis as the project progresses. Increasing recognition of the multifaceted and interrelated nature of livelihoods points to the need for specialists who are able also to think (and sometimes act) as generalists. This implies a shift from multidisciplinarity (people of different disciplinary backgrounds working alongside each other) to interdisciplinarity – in which different specialist disciplines go beyond merely working side by side to working together in an integrated manner (Liebler, 1994).

A track record of positive experiences of interdisciplinary teamwork is, therefore, a definite asset for a team member (Compton and Motte, 1997). Broad-based academic training, confidence in one's own discipline, and an open disposition are further characteristics that suggest a candidate may be appropriate to work effectively in an interdisciplinary team environment. Such qualities are also more likely to foster the development of new approaches to problem-solving, and help team members to break with unhelpful professional routines that tend to reinforce disciplinary barriers but add little to project outputs. Examples may include a project agronomist who is inflexible about experimental design and analysis methods, and insists on repeating experiments for a fixed number of seasons, or a project socio-economist who insists on using formal questionnaires and large-scale sample surveys to address socio-economic issues when other approaches could produce similar results much more quickly (see Chapter 11).

Teams often function more effectively where there is a mix of age and experience. In Zambia, the ARPTs tended to be more dynamic when researchers with some experience and plenty of ideas worked alongside younger, less experienced ones. When teams (expatriate or national) were made up of researchers with longer experience, they tended to work more autonomously and conventionally, and were less able to reconcile differences of opinion and practice. As a result they tended to be less interested in innovatory ideas and approaches than were teams with a mix of age and experience.

Widespread recognition of the role of women in agriculture, particularly of the need for gender-sensitive approaches to research and development (Sims Feldstein and Jiggins, 1994; Goldey *et al.*, 1996), has highlighted the need for gender balance in team membership. Although necessary at all levels, the utilization of female researchers at field level will often enhance the accuracy of the research, and the inclusion of marginalized gender categories in the research process (Sims Feldstein and Jiggins, 1994; Goldey *et al.*, 1996). There is, however, a problem of recruitment of women qualified in agriculture, and this will take time to address. Many agricultural colleges produce a very small percentage of female graduates, and in many countries agricultural graduates are no longer being employed in the public-sector services. The challenge to projects is both to recruit appropriately skilled female personnel, and to sensitize all team members to gender issues and provide training in gender analysis.

CASE 10.5

CRP: CHALLENGES IN BRIDGING THE GENDER GAP IN FIELD-LEVEL STAFFING

At the field-end of project teams, the difficulty in recruiting female, village-based support staff was exemplified in the Cashew Research Project, with posts for village-based technicians in Tanzania neither well paid nor near other government posts. Thus for women technicians there would be neither the money to employ a 'house-help', nor a partner to provide a second income. Employing couples, or raising salaries to enable women to be household breadwinners are possible solutions to this problem.

It might be argued that because there are so few women coming out of agricultural colleges, those who do are drawn into the middle ranks of agricultural research and extension to work in jobs such as nutrition advisors. That leaves very few agriculturally qualified women candidates to go into village- and ward-level jobs.[2] However, many of the staff recruited by the CRP for project fieldwork (including village-level technicians) were not qualified agricultural staff, but people drawn from a pool of casual labour.

Many of the people recruited for the fieldwork in the subsequent Integrated Cashew Management (ICM) Programme were young men who had started working with the CRP as casual labourers, and who had then been offered more permanent work with the ICM Programme. The hiring of casual labourers in many institutions is done by word of mouth and not through a formal employment process. The hiring institution is then very likely to promote casual labourers who they know into new jobs that are created. A possible solution is to ensure an equal proportion of men and women are taken on when hiring casual labour.

Source: De Waal (1997); personal communication (2000).

In DAREP the development and demonstration of recipes was undertaken through the home economics section of the government extension service, who form the main constituency of female extension staff. To facilitate the testing and demonstration of food preservation and preparation methods, the project transported female extension staff based in urban centres where there was an abundance of extension officers specializing in home economics.

The gender of field staff can influence, but does not necessarily determine, the gender of participating farmers.

CASE 10.6

DAREP: ETHNIC AND STAFF GENDER INFLUENCES IN SEMI-ARID KENYA

The Dryland Research and Extension Project worked with different ethnic groups in adjacent communities of a semi-arid area of Kenya. In Machanga, an Mbere-speaking community, the gender ratio of registered male and female on-farm trial farmers changed markedly over 2 years (7:3 to 1:20) when one of the two male field assistants was replaced by a female who had primary responsibility for working with on-farm trials. This change was explained by two factors. First, because the new field assistant came from the local area she felt more comfortable working with female farmers with whom she could enjoy a much freer relationship and dialogue, whereas the previous male field assistant had found it easier to work with male farmers from the area. Secondly, the Mbere-speaking community had an established pattern of males migrating out in search of employment, and regarded farming mainly as a female activity. Over the course of the project, an increasing number of the men became less interested in the experimental activities, while interest amongst the women increased. In

Gategi, an adjacent community which was predominantly Kamba-speaking, both field assistants were female but throughout the project the majority of the collaborating farmers were male. The female field assistants in Gategi did not come from the local area, and felt free to interact with men as well as women farmers. Moreover, among the Kamba community men took a much more active role in agriculture, whilst women were more involved in marketing activities and, therefore, were often less available to participate in the on-farm experiments.

Source: A.J. Sutherland, personal communication (2000).

10.3 TEAM SELECTION

Prior to the actual selection of a team, it is beneficial to establish the criteria for team membership. Job descriptions for key project positions tend to focus on qualifications, technical skills and experience, whereas competencies specific to teamwork are often absent. These include generic qualities such as good interpersonal skills, a flexible attitude, willingness to share ideas and to discuss and question methods, and the ability to take on new ideas and change opinions.[3]

The actual process of selection will vary with the organizational environment. There will usually be a degree of choice regarding who, within a particular organization, is selected to implement a participatory research programme. This choice may be greater for an NGO, able to recruit from outside its organization and offer flexible conditions of service, than for a public-sector organization. Government research or extension organizations, many of which have been through staff rationalization processes, may still have a larger pool of experienced staff and a greater degree of flexibility in transferring staff from one programme to another. However, they are less likely to be able to afford to hire external staff, and transfers of staff from one location to another may be rather arbitrary; based on willingness to move rather than disciplinary or personal suitability (for example, KFSRE: B. Adolph, personal communication, 2000). Some projects, such as those supporting some of the provincial ARPTs in Zambia, bypassed the hurdle of a government freeze on all recruitment by recruiting staff directly to the project and paying their salaries based on government rates. Some of these people continued to work for the government after the project was completed and the government recruitment freeze was relaxed, while others left for various reasons, including better job offers and frustrations with the government recruitment process (A.J. Sutherland, personal communication, 2000).

If expatriates are to be on the team as part of technical assistance, the host organization will usually have to approve the resumés of proposed candidates. It is usually more helpful, however, if the host organization is involved in the selection process, and early dialogue is established with potential candidates. In the KARI NARP II project, for example, a KARI representative was one of the three panel members charged with selection of the adaptive research co-ordinator. In the case of DAREP, the expatriate social anthropologist was working in the region, and able to visit the project area and spend time with some of the identified team members prior to the start of the project.

CASE 10.7

KSFRE: SELECTING EXPATRIATE AND NATIONAL STAFF FOR PARALLEL RECRUITMENT SYSTEMS?

In the Kavango Farming Systems Research and Extension Project, the system of recruiting staff to the project seemed to work almost in parallel. The expatriate team was recruited by the donor, with no member of the recipient government participating in the interview panel. However, the resumés of the selected candidates were submitted to the recipient government for approval. In terms of the counterpart staff, two extension technicians were assigned to the project, one of whom had personal problems and was replaced. The project had a staffing problem until October 1996, 2 years after the arrival of the technical assistance team. Matters were bought to a head in July 1996, with a letter signed by both technical assistants stating that either the government provided the staff or, if no staff were forthcoming, the project would be recommended for termination. In the end, the project had a team of seven Namibian counterpart staff, appointed by the Ministry to the project.

Source: H. Bagnall-Oakeley, personal communication (2000).

In a multi-institutional project, a good rapport between senior management of the host organization and other agencies contributing team members is clearly important. It is an advantage if this can be established prior to the start of the project and sustained thereafter. This will allow useful lead-time for discussions on staff selection, so that a team can be initiated and developed that has complementary qualities, skills and experience.

CASE 10.8

DAREP: RECRUITMENT BENEFITS FROM EXISTING GOODWILL

In the Dryland Research and Extension Project, the director of the hosting research centre established good relationships with a range of collaborators. Through collaboration in a project that had started earlier, he had already made good links with the Director of the national forestry research institute. This relationship facilitated the timely recruitment of the first project agroforester, who was among the first of the project team members to arrive. It also facilitated recruitment of a replacement agroforester when the first secured a scholarship to undertake a postgraduate degree overseas, even making it possible to request a female researcher to improve the team's gender balance, which had been affected by the departure of two female team members shortly before. The fostering of a good relationship between the research centre management and the managers in the local extension services made it relatively easy to involve their senior specialists in mechanization, soil conservation and home economics in a number of the project's research and dissemination activities. These staff became, in effect, additional team members during the times they provided strategic inputs into project activities.

Source: A.J. Sutherland, personal communication (2000).

Where previous relationships do not exist, time is needed to foster them once contact has been established. The discussion of work programmes or action plans on a regular basis may be one way to facilitate this. Beyond the importance of personal contact, this should yield indications of the direction the partner(s) wish to follow.

10.4 TEAM LEADERSHIP

The importance of good leadership in teamwork, team-building and team maintenance has been highlighted in the management literature (Adair, 1986), and most agricultural research projects include the position of 'team leader'. However, in some projects the leadership position is complex, with ambiguity in role and responsibility. For example, a project may have a project manager who is locally hired, and a team leader who is an expatriate. Conversely, there may be a local team leader and an expatriate project advisor. Such situations require carefully planned and agreed roles, responsibilities and activities, in order to ensure that both donor and local/national interests and objectives are addressed. Provided the two individuals have a good working relationship, shared leadership arrangements can be effective, and provide a form of accountability and checks and balances in leadership. However, if there are major differences of opinion on particular issues, and these are allowed to come to the fore, then such ambiguity can be problematic.

CASE 10.9

DAREP: SHARED OFFICE, SHARED IDEAS, SHARED RESPONSIBILITIES IN LEADERSHIP

The Dryland Research and Extension Project team leader position was filled by a researcher from KARI who reported to the Director of the KARI Embu Regional Research Centre. The majority of project operational funds were administered through the KARI accounting system, and the team leader, together with the Centre Director, were signatories to the project accounts and administered the budget. The team leader was responsible for co-ordinating the operations of the team. The project had an expatriate team member who acted as a technical advisor on aspects of participatory research methodology and approaches. In addition, due to the procedures laid down by the donor, the expatriate team member was accountable for the administration of project vehicles, equipment and a small imprest account. In practice, the team leader, the Centre Director and the expatriate team member consulted each other on most important issues relating to the administration of the project, including financial management, transport and logistics, training, programming and reporting. This was facilitated by the Centre Director, who ensured that the project team leader and the expatriate team member shared an office to maximize communication on all aspects of the project implementation.

Source: A.J. Sutherland, personal communication (2000).

In cases where the project has a manager or leader who is based in another country, a more structured arrangement may be required for sharing leadership.

CASE 10.10

ITDG-CHIVI: LONG-RANGE PARTNERSHIP IN PROJECT LEADERSHIP

In the case of the Intermediate Technology Development Group-Chivi Food Security Project, the leadership of the project was, to an extent, a partnership. It consisted of a local team leader and an expatriate project advisor who was based in the UK but would have occasional visits to the project site: three 2-week visits in the first year subsequently reduced to one 2-week visit a year in the last 2 years of the project. Visits were a result of negotiation taking place between the two sides, and in most cases were carefully planned.

The starting point was developing a vision of the project shared by members of the team. Around this vision, the team would agree on some basic values which would enable them to decide the strategy for the project. Once the strategy was defined the two would agree on expected outputs, activities to be carried out, and how these activities were to be implemented. During this process the local team leader would suggest to the expatriate advisor areas of support needed. The two would explore whether the support could be best provided by the advisor, or should be provided by someone else. Usually, each visit to the project site by the expatriate would start by reviewing progress made since his/her last visit. During the reviewing process lessons learnt, constraints faced and outstanding issues or tasks would be identified, and at the same time become shared lessons and experiences. At the end of each visit, new targets for the project would be developed jointly by the team. The targets were developed in a flexible manner to allow the community's priorities to take a lead.

Source: K. Murwira, personal communication (2000).

The leadership role is highly culturally sensitive. It is not uncommon for expatriate leaders to be enthusiastic, active, and at times dominating. This can intimidate local partners, especially if (as in the case of KFSRE) their formal qualifications are at a lower academic level. In most cases the team leader is in a difficult position, with even so-called 'capacity-building' projects setting aims and milestones that have to be reached periodically, pressurizing the team leader into pushing ahead, even when s/he may be aware that the involvement of the local partners is less than adequate.

The selection of the right team leader for a participatory research programme is thus particularly important. It may be difficult to find someone with the desired qualities within an organization. Bringing in a team leader from outside the organization may not be an option, and training of an existing staff member with potential may be required to ensure that project leadership is provided. In the absence of a strong and effective leader, a modified management arrangement could spread responsibilities across the team, rather than concentrate these too much on one person. Qualities to look for in effective team leadership are related to the typical challenges and difficulties likely to be faced. The challenges include management of people with different personalities and backgrounds, conflict resolution, motivation of demoralized team members, equitable resource management, and effective delegation.

Practitioners at the 1997 forum (NRI, 1997) felt that team leaders needed to have to following qualities:

- approachable
- fair-minded
- visionary and able to inspire others
- good communicator
- able to accept criticism constructively
- able to see things through
- good listener
- humble
- able to delegate
- able to plan
- good time manager
- honest and loyal.

It was also noted that team leaders should have experience with management and with participatory approaches, and have a holistic and rounded grasp of technical natural resource issues (NRI, 1997).

NOTES

1. It is, however, important to note that the emphasis of a project can change over time (especially if there are different project phases with slightly different logframes). In the KFSRE project, for example, linkages with state extension technicians and senior management were affected by the project move to Rundu (H. Bagnall-Oakeley, personal communication, 2000).
2. It would be also be interesting to know the ratio of women staffing in health posts in Tanzania, as this may give some idea as to whether agriculture simply does not draw women, or whether women (single or married) find it difficult to work at the village/ward level.
3. Normally particular positions within the team are identified and competence areas outlined for each position. However, during the selection process it may be difficult to find individuals who have all the competence areas required for each position. If this is the case, those undertaking the selection may instead focus on selecting a team with the required skills between them, rather than finding individuals who exactly match each position. Such an approach gives more flexibility and may also encourage more crossover of responsibilities, and more effective teamwork as a result.

Box 10.1 Team design and selection – lessons and tips for project team management

- ✔ Within the restrictions of choice and availability, utilize the project objectives to determine the size and nature of the team, bearing in mind that flexibility is essential as most project objectives shift during implementation.
- ✔ If the project is multi-institutional, transparency and inclusion in decision-making is vital. Building up relationships with key individuals in the host/collaborative organizations may determine whether or not the project is successful.
- ✔ Clear lines of command and responsibility are essential, particularly in complex, multi-institutional projects. These lines of command and responsibility need to be established openly and speedily if the project team is to work effectively from an early stage.
- ✔ If external consultants are to be used, their role and responsibilities within the team need to be identified in advance. Consultants should not be used unless a clear need can be established and agreed upon.
- ✔ Efforts should be made to balance the composition of the project team, with a mixture of skills areas, experience, gender and age. The nature of the balance should reflect the objectives of the project, and there needs to be good consideration of how the mix selected, with specific reference to the individuals involved, can function effectively together.
- ✔ Team selection needs to be made in an open and accountable way. The use of stakeholder analysis may be worthwhile to determine the interests and objectives of the individual team members, thus allowing everyone to 'put their cards on the table' at the start. This may not only help the efficiency of the project itself, but also clarify the situation of each individual after the project ends, and thus enable exit or contingency plans to be drawn up.
- ✔ Strong team leadership is vital for an effective project, and again, the role of team leader/s will vary depending on the objectives and environment in which the project is operating. Nevertheless, the skills required for good leadership are fairly generic (see section 10.4).

Team launching and equipping

11

When the team structure is in place, its composition agreed, and team members have been selected, the next stage is launching and further equipping the team. Launching and equipping involves attention to planning, fostering interdisciplinary work habits and building competencies through training.

11.1 DECISION-MAKING AND JOINT PLANNING

Whilst the structure of project teams, and the selection of team members, is often broadly mapped out in project documents or during the design phase, decision-making arrangements are commonly left open for negotiation amongst team members and their host institutions. It is not uncommon for host countries to have centralized, highly hierarchical systems of decision-making which do not favour teamwork, or easily accommodate donor-funded projects. Projects which encourage the sharing of decision-making among team members, particularly including relatively junior members, can result in conflict and/or the creation of a two-tier system, with staff in donor-funded projects taking more decisions (and being otherwise advantaged through access to training, conferences, study tours, better equipment, etc.) than their colleagues in the mainstream system.

CASE 11.1

KFSRE: A TWO-TIER SYSTEM

In Namibia, almost all the farming systems research and extension teams received donor support, and were able to offer advantages to their staff as part of the capacity-building project activities. In order to avoid such a two-tier system, the idea of rotating staff members to the Kavango Farming Systems Research and Extension Project teams was discussed, but not implemented. Whilst giving everyone an equal opportunity, it would make any kind of team-building exercise extremely difficult and increase staff turnover to an unacceptable level. A solution still needs to be found to this dilemma.

Source: H. Bagnall-Oakeley, personal communication (2000).

Joint planning is an essential part of launching a team and equipping it to work together to meet common objectives. Three stages of planning can be identified, although these do not necessarily happen in sequence:

- agreeing a strategic plan to enable the project to deliver the required outputs
- design of specific activities that need to be undertaken as part of the strategic plan
- discussion of regular operational issues that arise in the course of project implementation.

The first two stages are discussed here, and the third is covered in Section 12.1, under the heading of communication and interaction as an aspect of team consolidation and operation.

Project documents, according to donor requirements, often contain details of activities and also terms of reference for the team members indicating who is broadly responsible for the various activities. A common pitfall at the start of a project is for each team member to quickly become busy with the activities they think they should be doing, with minimal consultation with other members of the team. Before individuals get into detailed planning of their own work programmes, it is important for the team to meet and think strategically about how to achieve their overall objectives. This may be easier said than done. When some, perhaps the majority of the team, are relatively inexperienced and new to participatory research approaches and outputs, it is difficult for them to visualize and discuss something that they have not experienced before. A good project design should, therefore, include an activity that will help the team to start thinking strategically and collectively. Thus it may be easier in practice to start with the second stage of planning, probably with a collective information-gathering exercise that involves teamwork and provides an opportunity to build up a team spirit, such as a substantial broad-based survey or participatory rural appraisal (PRA), as carried out in the Larger Grain Borer (LGB) Control Project, the Kavango Farming Systems Research and Extension Project (KFSRE), and the Dryland Research and Extension Project (DAREP).

CASE 11.2

DAREP: INSTITUTING REGULAR TEAM MEETINGS

Regular project team meetings were not part of the culture of the Kenya Agricultural Research Institute's research centre, where the Dryland Research and Extension Project was located when it started. When DAREP started to hold regular team meetings, these attracted frequent jibes from other researchers and project leaders about spending too much time in meetings. Before the full team and its leadership were in place, the various disciplines in the team had started to develop their own work programmes, writing an outline proposal for an activity with a supporting budget for approval by the team leader and Centre Director, so that the activity could be funded. The first diagnostic survey provided an opportunity to introduce a team approach to work programme planning. The first and second diagnostic surveys were planned through team meetings and stakeholder meetings involving representatives from extension, NGOs and other interested researchers at the Centre. As a result of these surveys, individual researchers on the team came up with proposals for research activities. At this point, about June 1994, it was decided that all proposals should be circulated to team members and discussed in team meetings before being funded. As a result, some plans were rejected if they were considered not to be of immediate priority to the team, or not in line with project objectives. Others were modified by the team after brainstorming. It was, therefore, necessary to prepare the plan of work or research protocol in a way that convincingly demonstrated it was participatory and geared towards achieving the project objectives as stipulated in the project document.

Once the principle of joint planning was accepted by the team members, two levels of planning developed during the project: longer-term planning and planning for specific activities. Longer-term planning was undertaken through stakeholder workshops to design the various technical components of the project's research (Sutherland, 1997), and also to plan an exit strategy for the project (Pound, 1996). In these workshops, to minimize distraction due to other duties and activities at the Centre, a room was reserved in a nearby institution and the whole team went over there for 1 or 2 days. Specific activities were planned during regular or *ad hoc* team meetings. For example, diagnostic surveys, study tours, in-country training courses, field days, workshops, joint monitoring visits of sites, peer review of on-farm trials, field staff appraisal, and joint technical report writing are all activities that were discussed extensively in team meetings prior to implementation. The usual procedure was for one or two team members to draw up an outline plan for an activity and circulate it in advance of the next team meeting. This plan would be discussed in detail at the meeting where specific roles would be assigned, dates agreed on, and transport and other logistical support allocated.

Source: Sutherland et al. *(1997e).*

The LGB project and KFSRE teams used a similar approach of starting with joint activities. The LGB project conducted a preliminary survey and trials as a group, without much differentiation of activities, because at this time the team was relatively small. In addition, the team met early on and agreed to review their terms of reference, developing a single set for the team as a whole. This helped to emphasize that everyone was working on the same problem. A second feature was that the process approach was clearly incorporated into the terms of reference, with future activities depending on the results of previous ones. The KFSRE initiated a series of meetings and training in PRA methodologies, stressing the need for these new-found skills to be used and built upon immediately.

A jointly conducted field-oriented activity can provide something of a 'reality check' that will assist team members in attempting more strategic planning as a team. One method to achieve this is for the team to meet and review the project logical framework, perhaps 6 months or a year into the project. This exercise, if effectively facilitated, should further build a sense of common purpose between team members. In the case of the National Agricultural Research Project (NARP II) the adaptive research component, which started as a separate project, was very effectively integrated across a number of more technically oriented research projects which were fused into a single project through a well planned process of facilitation based on a redesign of the logical framework (Sutherland, 1999a).

As with many features of organizational development, there are several factors that both help and hinder joint planning. Major hindrances to developing joint planning within a project team include:

- organizational cultures of individualism in work planning, common in many research centres
- different starting and finishing dates of team members
- turnover of staff
- rigid project documents coupled with inflexible attitudes of project managers (e.g. preoccupation with strict adherence to logical frameworks)
- poor quality documentation
- ongoing analysis of data and project components with very different time scales.

Joint planning may be fostered and developed when there is a willingness by team members to engage with each other and in each other's activities, supported by clear job descriptions and by including a broad-based team approach in the start-up activities during project design. The recruitment of senior team members with leadership, facilitation and planning skills is vital if these activities are to be implemented successfully.

11.2 FOSTERING INTER-DISCIPLINARY WORKING HABITS

Scientific research has traditionally been organized along disciplinary lines, characterized by particular research topics and defined by the internal state of the field rather than by practical problems. Disciplines have maintained a closed institutional order, each with its own professional standards, publication outlets, education programmes, and choice of new research topics to advance disciplinary understanding. However, issues and problems pertinent to agriculture in general, and participatory technology development in particular, are not disciplinary abstractions but multifaceted real-life phenomena and, therefore, a monodisciplinary approach is rarely appropriate in agricultural research projects (Janssen and Goldsworthy, 1995).

For many research projects that aim to bring about interdisciplinary teamwork, prior interaction between disciplines has been limited. Initial divisions are often witnessed between natural and social scientists, with the former so-called 'hard-core scientists', trained in and used to disciplinary approaches and conventional research methods geared to publication in refereed scientific journals (Compton and Motte, 1997). Such scientists may have no prior training in participatory methodologies, and this, coupled with their professional background, may make it difficult for them to accept a participatory and multidisciplinary approach to research.

CASE 11.3

DAREP: SOCIOLOGISTS ACCUSED OF HIJACKING SCIENTIFIC RESEARCH

During the initial stages of the Dryland Research and Extension Project, one of the natural scientists was overheard saying that the sociologists were 'hijacking' the scientific research, and all these jargons of "PRA, FPR and FSR" were just gimmicks to justify their survival. The natural scientists were, therefore, resistant to change initially, although the project document emphasized participatory research within a holistic farming system context, including all production systems. At a later point in the project, a staff researcher who had been with the project for a year hosted a visit from a team of foresters, including some of her former colleagues, taking them into the field to meet farmers collaborating in the research. At the end of the visit, two of her ex-colleagues commented "so you have started talking like a social scientist – you have stopped being a forester – you no longer talk like us". Recounting this event to the team, she mentioned that their comments had come as a surprise to her, as she was not aware of the changes they had pointed out.

Source: Sutherland et al. *(1997).*

CASE 11.4

ICM: INTERDISCIPLINARITY AS A REFLECTION OF REALITY

The need for an interdisciplinary approach was demonstrated when researchers met farmers in initial village meetings through the Integrated Cashew Management (ICM) Programme. It quickly became apparent that to farmers, managing cashew is just that, and the artificial boundaries that were invented by researchers were stitched back together again by farmers. In this situation, the interaction with farmers was the most thorough means of integrating knowledge developed by the individual sections, and aided the realization amongst researchers of the need to develop an approach that included researchers from several disciplines.

Source: de Waal (1997).

The ICM case exemplifies not only that the interdisciplinary approach is beneficial in addressing the multiplicity of issues involved in participatory agricultural research, but that it also facilitates the development of a user perspective and encourages consultation with stakeholders. The interaction of a team with users further strengthens collaboration between researchers, increases each individual's knowledge of other disciplines, and enhances a team approach. This is true not only for a better understanding among team members, but also between the team and other collaborators (from other line ministries, NGOs, etc.).

CASE 11.5

KFSRE: PARTICIPATORY RURAL APPRAISAL AS A TOOL TO ENHANCE INTERDISCIPLINARY COMMUNICATION

During June–July 1999, the Kavango Farming Systems Research and Extension Project initiated a series of PRA workshops in different extension wards and invited staff members from other regional stakeholder agencies to participate. During these joint field stays (each lasting 4 days) more interdisciplinary communication occurred than during all previous meetings of the Kavango Farming Systems Unit (the KFSRE-initiated regional forum for co-ordination of all rural development-related activities in the region).

It was clear that farmers faced numerous problems in their daily lives (such as broken boreholes, difficulties in obtaining identity cards, shortage of grazing land, cattle theft, etc.), and are disappointed with the government's compartmentalized way of dealing with issues (the extension technician dealing only with agriculture, the health worker only with vaccination, etc.). By having representatives of different agencies present in the village, farmers had the opportunity to address a range of issues during the PRA exercises without always being told "This one does not fall into our domain".

Source: B. Adolph, personal communication (2000).

An alternative approach which fostered interdisciplinary team work was followed by another component of the KFSRE project.

CASE 11.6

KLIG: AN INTERDISCIPLINARY FORUM

Through participatory appraisal, the importance of livestock was recognized as a key resource, yet the level of technical expertise in animal husbandry amongst technicians and farmers was identified as being weak. Large co-ordination meetings between livestock researchers and vets in extension activities were poorly attended due to a low perceived benefit. Thus the Kavango Livestock Interest Group was formed, drawing in those from different disciplines who had an interest/skill in livestock. To make KLIG as unthreatening as possible, no action points were recorded on the minutes, and thus there were few resource or budgetary implications; it was purely a forum for the discussion of livestock problems in a farming systems context. The group met every 2 months, commencing with a briefing from a member on their activities or animal husbandry methods. Meetings would go on to discuss a range of pre-arranged subjects of mutual interest.

Why did KLIG work? In the past, meetings were general in scope. The topics discussed were wide-ranging and, while interesting, were not of any particular relevance to livestock, nor did the matters discussed address some of the issues that livestock researchers or vets wished to discuss in detail. In essence this group was focused on a single subject, or a range of topics with a linking theme. Participants saw there was a direct benefit to themselves; it either directly addressed their terms of reference or their mission, or increased their coverage by linking up to other disciplines and institutions.

Source: H. Bagnall-Oakeley, personal communication (2000).

11.3 BUILDING COMPETENCIES THROUGH TRAINING

The provision of staff training within a project team, as with fostering a sense of team 'ownership', can have both positive and negative effects on team performance.

Training provides an opportunity to equip team members (collectively or individually) with additional concepts and skills required for more effective implementation of project activities. Training has further spin-offs when it is provided to the team as a whole. It can provide a shared experience which further reinforces team identity, and provide a new set of concepts and skills about which team members can exchange opinions and ideas, thereby further fostering communication between team members. Moreover, training tends to level out relations of hierarchy or seniority and draw out existing skills of team members. For example, a senior researcher may struggle to master new computer software, while a young technician may be a model software student and become a mentor to the senior researcher in this area after the training.

The most effective training for providing complementary skills directly relates to project activities that are ongoing or about to start. The type of training offered by DAREP may fairly typically reflect the range of training for a team conducting participatory agricultural research in a process type of project (Figure 11.1).

In the DAREP example, the sequence of training follows the research cycle, starting with investigatory methods (for studies and trials), moving on to methods for managing data, and to methods for data analysis and presentation. Participatory skills, learning through study tours and exchange visits from other projects

Year 1

- PRA methods as part of first diagnostic survey (research team)
- Field trial methods (field staff)
- Joint study tour (with extension) of other dryland agriculture projects (research team)
- Livestock health (collaborating farmers and field staff)

Year 2

- Basic computer skills (research team and technicians)
- Basic electronic data storage principles (as above)
- Study tour of other participatory research projects (research team and technicians)
- On-farm trial methods (field staff and collaborating farmers)
- Pest and disease identification (technicians and field staff)
- Site Committee operations (field staff and elected farmers)
- Water harvesting technology principles (field staff and farmers)
- Open day planning and facilitation (field staff and farmers)

Year 3

- Advance statistical methods for on-farm data (research team and technicians)
- Communication skills (research team and technicians)
- Tree propagation methods (collaborating farmers and field staff)
- Animal draught cultivation methods (farmers)
- Participatory approaches and skills (field staff and technicians)

Figure 11.1 Calendar of DAREP team-level training activities over 3 years. Source: Sutherland *et al.* (1997e).

undertaking similar activities, and training of collaborating farmers (in technical, methodological and leadership skills) continue throughout the project (A.J. Sutherland, personal communication). The CRP project in Tanzania had to give similar emphasis to equipping technicians used to on-station work for the challenges of participatory approaches off the research station.

CASE 11.7

CRP: PROVIDING TECHNICIANS WITH COMPLEMENTARY SKILLS

When the Integrated Cashew Management (ICM) Programme in Tanzania was being developed, it was recognized that the technicians involved would play a more demanding role than they had previously under the Cashew Research Project. Initially, researchers misjudged the ease with which technicians would cope with new procedures, particularly in communicating with farmers. The lack of experience in this area was counteracted through a retraining programme which involved a combination of researchers staying with technicians and helping them to solve problems on the job, and through specially developed training courses at Naliendele Agricultural Research Institute. These training courses brought all the technicians together to learn group facilitation skills and conflict resolution, and to analyse their new roles including the ways in which they communicated, and with whom they communicated. In the field, the use of video filming farmer–researcher dialogue aided a greater understanding of farmers' cashew management through retrospective analysis, enabling the development of appropriate extension material, and communication and facilitation skills.

Source: De Waal (1997).

Achieving a balance between theory and practice in training team members is important, as the KFSRE project demonstrates.

CASE 11.8

KFSRE: BALANCING THEORETICAL AND PRACTICAL TRAINING

The Kavango Farming Systems Research and Extension Project fulfilled a vital function of giving Ministry of Agriculture-wide training at all levels, from top management to extension staff. Training varied as appropriate, from the theoretical with a small practical component, to practical with a small theoretical component. It was considered vital that senior staff know and can visualize what the project is about and what it is trying to achieve. It was felt that improved comprehension of 'project reality' by senior staff leads to better support for the project and less dissent over the need for training in certain skills.

For the grassroots extension staff, theoretical training was kept to a minimum and always supported by practical training, either on the job or in large training exercises. For these staff members, the best approach was to adhere to the 'can do' principle. This gave added meaning, with staff members appreciating the methods and realizing the relevance of the output. The rationale was that training cannot be undertaken in isolation, it must be seen in a context as part of an ongoing programme. It is also important that training is followed up, to ensure the new training is being implemented. It was noted that frequently this follow-up is lacking.

Source: H. Bagnall-Oakeley, personal communication (2000).

The negative side of training is evidenced when project team members are taken out of the project for significant periods of time. For example, a 3-year project which allows a key team member to undertake a postgraduate training programme could be very costly to the project.

CASE 11.9

DAREP: INFLUENCE OF LONG-TERM TRAINING ON THE TEAM – A MIXED BLESSING?

Less than a year into the project the Dryland Research and Extension Project lost its first team leader and agronomist to a PhD programme. Later, the agroforester took up an MPhil programme, and three other team members took up master's programmes, all within the space of 3 years. Fortunately for the project, other staff were provided to substitute for the loss of these key staff. Nevertheless, this training (not included in the original project design) did affect the continuity of some activities. On the positive side, both staff members (in the project area) undertaking higher degrees by research only undertook substantial field research as part of their studies, focusing on priority problems identified in the initial diagnostic surveys. One of the master's degree students undertook a dissertation on gender relations in relation to participation in the research programme, involving fieldwork with some of the collaborating farmers. Another master's degree student used experiences with the expert farmer panels to inform a dissertation on methodologies for farmer participatory research, while the third master's student used the agronomic data and experiences with on-farm trials in their dissertation. It was noticable that staff coming back into the project having undertaken a higher degree returned with increased confidence and effectiveness, particularly in terms of analysing and writing up results, which was particularly useful during the exit phase of the project.

Source: Sutherland et al. *(1997e).*

In such cases, decision-makers may need to look beyond immediate project objectives, and weigh these against the importance of developing staff capacity in national research systems.

Thus the purpose and utility of training must be carefully considered. In projects with an emphasis on institutional capacity-building, postgraduate training in particular can often be a double-edged sword. This type of training is often necessary to equip individuals to take up and effectively perform the functions that may have been undertaken by expatriate or senior national staff in a mentoring role. At the same time, once acquired, this training affords the individual an opportunity to leave the organization for opportunities elsewhere, leaving a vacuum in the project. This situation arose in the KFSRE in Namibia and the ARPT/FSRT programme in Zambia, where failure to hold on to a number of national team members at a time when several expatriates were also leaving, combined with the departure of some senior national staff members to pursue research degrees, resulted in a seriously depleted team, and innovative work almost ceased (Drinkwater, 1997).

In summary, the utility of longer-term training (such as out-of-country postgraduate degrees[1]) must be carefully considered, and in many cases can only be justified either if it is a necessary incentive to draw in appropriate personnel and the training will add significant value to the performance of the staff member on return; and/or the project has a significant capacity-building component that explicitly states training as an output. Where the latter is the case, project teams must be flexible enough to cover gaps when staff leave for training.

It is important not to overlook the training needs of more junior staff members who may not be considered due to lack of seniority or official qualifications. Fostering the abilities of these staff members is clearly crucial both for the project's success and the individuals' personal development.

In summary, training is a useful tool to build the capacity and spirit of project teams, but it needs to be planned and managed carefully. Project design (in the narrative and budget) should indicate whether or not staff training (internal, external, home or overseas) is to be included and factored in accordingly. In the case of DAREP in Kenya and the Farmer Participatory Research Unit in Uganda, the funding source excluded training as a matter of policy. In such cases there is a need for creativity, either by providing training from existing expertise within the team, by combining with other projects, or by sourcing other training funds to provide essential training inputs.

NOTES

1. A shift away from 'out-of-country' (largely postgraduate) training has been noticeable amongst some development agencies and donors, emphasizing instead the importance of in-country universities and training institutions. It is noted by

Box 11.1 Team launching and equipping – lessons and tips for project team management

- ✔ Project documents should be used as a guide, but must be applied flexibly as assumptions and activities stated may be out of date or overtaken by events.
- ✔ Team leaders need time to develop a *modus operandi*, particularly if staff have been assigned to the project by host institutions.
- ✔ Joint planning is vital: hold team-building exercises as part of, or prior to planning.
- ✔ Job descriptions or terms of reference must be clear to the job holder, and the team leader should ensure each member of staff has terms of reference at the outset. If not, they should be drafted from a generic job description and from their perception of what the project is about. Terms of reference must be agreed by senior management and the team leader/s. Existing terms of reference can be reviewed at the start of the project, and also mid-way through, to reflect the job holder's responsibilities in relation to an agreed strategy and work plan.
- ✔ During planning, give priority to activities that engender team spirit, build cohesion, and clearly fulfil the project's mission (purpose) and objectives (outputs).
- ✔ Interdisciplinarity does not usually come naturally, but from conscious effort. Devise strategies, meeting venues and activities that help the other side to see where you are coming from.
- ✔ Make interdisciplinary activities as unthreatening as possible.
- ✔ In promoting interdisciplinarity, focus on a single subject or group of subjects with an underlying theme.
- ✔ Those promoting interdisciplinary working must have a positive answer to the 'what's in it for me' question. Participants must be able to discern clear benefits and/or advantages. Generality for its own sake is doomed to failure.
- ✔ Interdisciplinarity involves interpersonal relationships. These must be built on a solid foundation of mutual respect, trust and commitment to sustaining communication when relationships are strained.
- ✔ Training does not only mean formal training. Informal, practical, on-the-job training and *ad hoc* training have crucial roles to play in building team capacity. For example, study tours are training.
- ✔ Overseas training options need careful scrutiny: are they necessary, are there local alternatives, what are the language and academic requirements, costs and benefits, etc.
- ✔ All training undertaken needs to be followed up, to ensure that training is properly implemented and benefits seen.

some practitioners that those natural scientists who have undertaken overseas training at MSc level and above become used to a well resourced and controlled research environment. Arriving back in their own countries, where resources are often scarce, they may experience difficulties in readjusting. If overseas training is undertaken, the fieldwork must be undertaken in-country, and consideration should be given to whether or not it is paid for by the host country. Greater attention is now being paid to distance learning. There are several issues related to the feasibility of this, including support in comprehension from visiting lecturers. Nevertheless, in some cases overseas training is looked upon as a reward, with the focus of attention less on the learning experience than an opportunity for a change of scene.

12 Team consolidation and operation

Several related facets of team operation constitute effective teamwork in participatory agricultural research. These include enhancing interaction and communication, fostering project ownership through monitoring and review exercises, effective team leadership and management, addressing issues of hierarchy, and open management of project resources.

12.1 ENHANCING INTERACTION AND COMMUNICATION

Structural approaches to enhanced communication need to be considered during the design of a project, and developed during the inception phase. With many projects having a significant turnover of staff, new team members will rely on existing mechanisms both to learn what has happened within the project to date, and to integrate into the new team environment. Good interaction and communication, which leads to the establishment and continuance of a permanent team for the duration of a project, can greatly enhance the commitment of the team members and the likelihood of project success. Team consistency allows individuals to develop an understanding of each other, build confidence and share ideas.

Successful interaction and communication by-and-large occurs when a project establishes a pattern of regular meetings (monthly, fortnightly or weekly) which include all appropriate staff.

CASE 12.1

LGB: 'IS THE MILEAGE ALLOWANCE ENOUGH?'

The Larger Grain Borer Control Project, for example, demonstrated that brainstorming sessions and monthly meetings improved the self-confidence of national staff and their subsequent willingness to propose new research ideas. All LGB research staff and collaborators (20–30 people) met in monthly meetings for about 3 hours. District staff had a financial incentive to attend, with travel and subsistence payments for the month allocated on the same day as the meeting. National project management was also represented at most meetings. During the meeting, all staff were asked to report on progress and discuss plans for the forthcoming 2 months. This provided some unspoken peer pressure for the achievement of stated goals, and also brought any misunderstandings out into the open. During the future planning session, a large calendar was put on a whiteboard at the front of the room and gradually filled in as study organizers called out their plans and personnel needs, and staff called in other commitments such as leave and meetings. This not only made everyone aware of all planned project activities, but also made the process of competing for staff and facilities at peak times transparent, and forced the project to prioritize openly. Recurring discussions included such subjects as 'Is the mileage allowance enough to cover motorbike costs?' and 'How can we prevent overuse of the photocopier?'. Thus the meetings helped to foster team spirit as well as improve communication.

Source: Compton and Motte (1997).

CASE 12.2

CRP: REGULAR MEETINGS ENHANCE UNDERSTANDING OF BOTH SOCIO-ECONOMIC AND BIOPHYSICAL ISSUES

The Cashew Research Project in Tanzania utilized monthly, quarterly and annual meetings as an opportunity for exchanging ideas and making recommendations to other sections' research programmes. As a result, senior researchers developed a fairly good understanding of both the socio-economic situation of cashew growers and the various natural science perspectives of cashew production.

Source: de Waal (1997).

CASE 12.3

FPRP: WEEKLY MEETINGS ESSENTIAL

The Farmer Participatory Research Project in Uganda found regular weekly meetings essential. The second project team leader noted "when there was a lot of fieldwork, team members might be out all week in different parts of the project area and might not see each other. Thus it was vitally important to build into the timetable regular briefing meetings, otherwise the programme could easily drift. Effective communication is so essential and won't happen unless it is prioritized".

Source: Salmon and Martin (1997).

CASE 12.4

12.4 KFSRE: WERE WEEKLY MEETINGS TOO LONG?

The Kavango Farming Systems Research and Extension Project had a weekly team meeting with a rota for chairing and minute-taking. It worked very well while the team was relatively small. However, after the project moved to Rundu and new team members joined, the weekly meetings became very long, sometimes taking up entire Monday mornings. Eventually, the team began to discuss alternatives (such as more written communication so that announcements did not have to be made during the meetings, and separate meetings of sub-teams working on particular issues, who would then report as a group to a monthly team meeting). However, the latter might result in compartmentalization of the team along disciplinary lines (e.g. sub-team agronomy, or sub-team livestock). Consequently, the team was somewhat divided into those who wanted to continue with a weekly team meeting, and those who wanted longer intervals between meetings.

Source: B.Adolph personal communication (2000).

The use of common terminology and a minimal use of jargon further enhances effective communication between team members (Janssen and Goldsworthy, 1995). The Dryland Research and Extension Project (DAREP) case (see Case 11.2) highlighted the need for sharing concepts, methods, terminology and acronyms from different sides of the scientific spectrum to facilitate common understanding and acceptance. Training by providing shared access to new and relevant concepts also significantly improves intra-team communication.

Other mechanisms for improving or maintaining communication between team members include regular review sessions and briefings, and the constructive use of media. In the case of the latter, good documentation of project history and planned events includes keeping open files containing communications and plans that can be accessed by any team member; the circulation of trip reports, interim reports and working papers within the team[1]; the use of notice boards for forthcoming events; year planner charts to indicate forthcoming events and plan annual leave for team members; making and displaying maps of project sites; photographing events not attended by some team members; and electronic mail and video documentation where necessary and feasible.

Communication and interaction are not always constructive. Within project teams that contain staff of varying ages, experience and background, it is not uncommon for clashes between individuals to occur. Besides interdisciplinary friction, there are numerous reasons for disagreement, including differing opinions on appropriate methodologies, private and professional rivalries, differing levels of commitment to the project, competition over shared resources, and perceived lack of respect for team leadership and verbal contracts made between team members. Conflicts are potentially detrimental to the project if they hinder interaction either between the individuals concerned or, more importantly, influence interaction in the team as a whole.

There are a number of methods to manage such conflicts, one or more of which may be used together.

CASE 12.5

FPRP: STAFF VALUE A CLEAR DIVISION OF LABOUR

The Farmer Participatory Research Project in Uganda found that a clear-cut division of labour between (interdisciplinary) team members became extremely important for team confidence-building. Each team member took on key areas of responsibility relating to their disciplinary background, including developing their own work plans, yet within the context of a unified effort which was co-ordinated by the team leader. The lesson from this example is that clarity in individuals' roles and responsibilities is likely to enhance motivation and decrease the likelihood of internal disputes.

Source: Salmon and Martin (1997).

CASE 12.6

LGB: CAN DIFFERING VIEWS ON METHODOLOGY ALWAYS BE RESOLVED?

In the Larger Grain Borer Control Project in Ghana, the most common disagreements were methodological. These were openly debated in meetings where study plans were discussed, but ultimately the study co-ordinators took the final decision on how to proceed. A more serious conflict arose when a team member failed to persuade the rest of the team that a conventional questionnaire survey was the most appropriate approach for a particular study, and as a result left the project shortly afterwards "partly because he felt his personal contribution as an 'expert' was undervalued."

Source: Compton and Motte (1997).

Case 12.6 illustrates that not all conflicts will be resolved amicably, and that team members who are unwilling to compromise on important issues pose a potential threat to teamwork that requires skilful management by the team leader. At times conflicts may arise between team members outside team meetings. For example, it may be agreed at a team meeting that two members will share transport during a field visit with two separate activities ongoing. One member may decide not to collect their colleague and go to the field alone, leaving their colleague frustrated. Such a case may be discussed at a team meeting, but may more profitably be resolved by the team leader meeting privately with the two staff members concerned, talking over the issue, and agreeing how a repeat performance can be avoided. Disciplinary proceedings should be enacted only as a last resort, and may be an indication that the team leader/s have not been as proactive in conflict prevention or resolution as the role demands.

12.2 FOSTERING PROJECT OWNERSHIP

Team membership will not automatically foster a strong sense of ownership, particularly if project resources are administered in an autocratic fashion, activities are individually planned, and horizontal communication between team members is minimal. Project ownership is fostered by giving specific responsibilities to individuals, a well co-ordinated planning process, regular communication between team members, understanding and appreciation of each other's disciplines, and effective team leadership.

A sense of project ownership by team members is an important element in the development of a strong team ethos. One of the positive spin-offs of joint planning is the enhancement of personal identification with the process and objectives of the project. As team members plan together, they start to envisage activities, motivation increases and the commitment to complete the task is raised. If joint planning is followed by joint implementation of an activity, it can be a very powerful tool for building ownership of a project. Where a project document clearly indicates how the project team could plan and implement activities together, the chance for improved co-ordination between team members from different organizations is improved. The DAREP case exemplifies this situation, where the project document contained a work plan and terms of reference that referred to the joint design and implementation of certain key activities. Following this plan strengthened the links between team members, in both an interdisciplinary and inter-institutional manner. While the LGB project document emphasized a more singular disciplinary approach, the project design still enabled enough flexibility for the team to revise their terms of reference and research programme structure so as to conduct more activities through an interdisciplinary mode. Making such adjustments may require both a high level of confidence among senior members of a team, and a flexible and supportive attitude by the more senior managers representing donors and national government.

CASE 12.7

KFSRE: SUB-TEAM TO ENHANCE OWNERSHIP

The Kavango Farming Systems Research and Extension Project split into two sub-teams: 'team agronomy' and 'team livestock'. Each had a leader and a team of technicians. Each team was responsible for drawing up plans that were in line with agreed government objectives, implementing plans, and collecting and reporting on the data. At the national research planning conference, team members were assigned to report on different activities. This built confidence and further cemented the team, in addition to conferring ownership of the activities undertaken.

Source: H. Bagnall-Oakeley, personal communication (2000).

CASE 12.8

KFSRE: DELEGATING PROJECT REPRESENTATION

The Kavango Farming Systems Research and Extension Project found that an effective way of fostering project ownership is by encouraging team members (especially local staff) to represent the project team at national/regional/international meetings. This is particularly effective if the project is going well, as it can build on (and boost) team members' self-confidence through representing the project, presenting its successes, and thus being identified with it.

Source: B. Adolph, personal communication (2000).

The flip-side of 'ownership' arises in situations where one or more parties seeks to control the project, rather than share in its management. This may happen if the team leader starts to operate in a top-down, dictatorial fashion, or if individuals within a team become particularly defensive of their research programme. This may be compounded when a team becomes protective of project resources to the point where it becomes closed to inputs from other parts of the organization, or from linked organizations. Alternatively, the opening-up of ownership to all parties, a truly participatory and multi-stakeholder approach, can have the effect of disabling decision-making.

There is clearly a need to strike a balance between ownership of a project by the team and openness to a wider sphere of influence and inputs. If a team feels project ownership to the point of effectively excluding other members of the organization from its activities, soon it may become too closed to external inputs and thus limit its effectiveness in drawing in external expertise, and in forming strategic linkages. At the other extreme, teams may become disparate entities (geographically, socio-culturally or otherwise), with little sense of ownership or responsibility by any party, resulting in an unproductive and ineffective project.

Project ownership is also often intimately linked to the physical resources that come with a project, such as vehicles, computers, photocopiers, etc. Whereas some projects are under-resourced, others are well resourced yet located in organizations with very limited capital. A more open view of project boundaries can enable the development of pragmatic arrangements for sharing such project resources through creative partnerships.

CASE 12.9

DAREP: SHARING EQUIPMENT AND TRAINING RESOURCES

The Dryland Research and Extension Project used the photocopier belonging to another project at the research centre, and in turn procured a duplicator that could be used by other projects at the centre. It placed some of its computers in a common room where anyone could use them. Its members had access to an e-mail service owned by another project. Together with the other project, it designed and organized a training series on data organization and analysis methods that was also attended by other scientists at the centre who were not in either project. At times it swapped vehicles with other projects or programmes, most commonly when a certain type of vehicle was required, for example, one that could carry more people for a field tour, or a pick-up to move certain equipment or materials.

Source: Sutherland et al. *(1997e).*

The more complex the organizational arrangement, the more effort required to foster a sense of ownership amongst the team. Certain organizational structures may foster a stronger sense of ownership than others, and this is linked to the boundaries of team membership. In the Zambian Adaptive Research Planning Teams (ARPTs), team membership was very clearly defined. Staff were allocated by senior research management to specific positions in particular teams, or seconded from other parts of the Ministry of Agriculture. A sense of ownership emerged very quickly, even to the point of arousing suspicion and envy from some quarters (Drinkwater, 1997; Kean and Ndiyoi, 1999). The DAREP team took longer to develop a strong sense of ownership.

CASE 12.10

DAREP: FOSTERING A SENSE OF OWNERSHIP ON A MULTI-ORGANIZATIONAL TEAM

The Dryland Research and Extension Project drew team members from four collaborating institutions. Salaries and personal matters were handled by the parent institution of each member, potentially aligning these individuals more closely with that institution rather than the project. This did little for enhancing a sense of group (team) ownership at the start of the project. Over time, the situation was altered by the gradual intensification of team meetings, leading to joint planning, interdisciplinary interaction and, ultimately, an improved unity of purpose. A further unifying factor was payment of a hardship allowance to the national staff in recognition of the additional responsibilities and long working hours in harsh conditions. On occasion other scientists were invited to join in certain activities. Such involvement built their ownership of the project, but they did not regard themselves as team members.

Source: Sutherland et al. *(1997e).*

CASE 12.11

KFSRE: GROWING AWARENESS OF COMMON PURPOSE

At the start of the Kavango Farming Systems Research and Extension Project, due to an uneasy integration of staff from two government directorates with differing management and organizational structures, there was not a good integration of staff within the project. This has changed over time due to several factors. First, farming systems research and extension became the national strategy, thus senior Ministry of Agriculture, Water and Rural Development (MAWRD) management made more of an effort to streamline procedures between different directorates (notably research and extension). Secondly, team members realized that differences between directorates within MAWRD were relatively small when compared to differences between line ministries. As the project started to collaborate more with other ministries (especially Environment and Tourism), the MAWRD staff began developing greater internal cohesion.

Source: B. Adolph, personal communication (2000).

CASE 12.12

NARP II: OWNERSHIP AND LOCATION

In the case of the National Agricultural Research Project, Phase II, the regional research programmes were an integral part of the host institute's mandate, so the issue of membership of a distinct team separate from the host institute was less sharply defined. The project theoretically supported all researchers at a regional research centre, and also collaborating extension staff in the mandate areas of the centre. Other projects (including DAREP) also contributed to the regional research programmes, and scientists and extensionists could have two or three projects with differing funding sources – membership at this level was to the regional programme and to the Kenya Agricultural Research Institute (KARI), rather than to individual projects.

Source: A.J. Sutherland, personal communication (2000).

Boundaries can be helpful as they define lines of accountability, and help to avoid problems that may arise when staff have multiple functions within an organization and report to more than one person. But they may also stand in the way of improved collaboration, particularly if there are special privileges associated with permanent membership that are not available to people providing less regular inputs.

12.3 JOINT MONITORING AND REVIEW ACTIVITIES

As a team starts to perform effectively, and the confidence of individual team members increases, joint monitoring and review activities can further consolidate performance and also expand ownership beyond the core team. The simplest form of joint monitoring takes place when two members of a team go to the field together in order to monitor progress in the implementation of field experiments and other research activities. More formal and explicit joint monitoring and review activities may be also be organized, as the case below documents.

CASE 12.13

DAREP: INVOLVING COLLEAGUES IN EXPERIMENTAL MONITORING AND REVIEW

In the Dryland Research and Extension Project, the team joined with the local extension staff to conduct mid-season monitoring of the experimental programme, including an assessment of the performance of field staff in each of the 10 research sites. Monitoring sub-teams were formed, which usually paired an extensionist with a researcher, who were then given the task of monitoring and evaluating a particular aspect of the research programme. At the end of the field visit and interview with the local field staff, the extension member of the monitoring team filled in an evaluation form, which involved assigning scores and comments to various aspects of this activity. The researcher was not involved to minimize any personal biases that might exist towards particular field staff. The results were then discussed with the member of field staff involved in the implementation, who was given an opportunity to make comments and suggestions about how various weaknesses identified could be improved. This exercise strengthened links between team members, and between teams and district extension staff. Setting the criteria for monitoring, and jointly analysing the results, provided further room for team-building.

Midway through DAREP, a peer review of the main research activities was undertaken. For each of the main technical components a resource person was identified and invited to participate in the review. This was either a KARI researcher within the research centre, or a specialist from the provincial extension office. Guidelines for undertaking the review were compiled, including an evaluation form for each of the research activities. These were discussed at the start of the review, and it was agreed that while the guidelines were useful, the process itself would be on the informal side. The review team spent 4 days together in the field visiting the activities at various sites. Each evening, the team met to discuss what they had seen and to make suggestions for further improving the programme. As a result of the peer review, several of the experimental designs were changed, some experiments were dropped and some new ones initiated, including one to address a major problem raised by farmers. This experiment brought in a senior researcher who had not previously been involved in the project's field activities. The other benefit of the review was an increased knowledge and awareness of the project's research activities among other researchers at the research centre, further facilitating the exchange of information and new products to test with farmers, and greater collaboration in related research activities.

Source: A.J. Sutherland, personal communication (2000).

Exchange visits between teams or projects with similar objectives are also a means of consolidating team identity and, at the same time, fostering linkages beyond it.

CASE 12.14

ARPT: THE EXCHANGE VISIT PROGRAMME

In the Zambian Adaptive Research Planning Teams, exchange visits were organized between the various provincial ARPTs. One would visit the other and spend up to a week reviewing activities in the field and exchanging ideas and experiences. The following season, the team visited would pay a return visit. This system worked well in terms of consolidating team identity, fostering a spirit of healthy competition, and spreading new ideas between the provincial teams, minimizing unnecessary duplication of research, and improving the design of ongoing activities.

Source: A.J. Sutherland, personal communication (2000).

Joint monitoring can also help integrate field-level extension staff into the wider project team.

CASE 12.15

KFSRE: FOSTERING A SENSE OF BELONGING AMONG FRONTLINE STAFF

In the Kavango Farming Systems Research and Extension Project, the joint monitoring of field trials by farmers and extensionists was always a key feature which helped extensionists at field level identify themselves as part of the project team. Farmers assessed all varietal trails; initially KFSRE core team members facilitated this process. As confidence and skill levels increased, Ward extension technicians were further integrated into the assessment days. They were trained by KFSRE staff to facilitate the assessment process, both in taking notes and in the facilitation of the meeting.

Source: H. Bagnall-Oakeley, personal communication (2000).

12.4 TEAM MANAGEMENT

Enhancing project teamwork in inter-institutional and interdisciplinary environments is a challenging task. The need for an effective team within the context of participatory agricultural research corresponds to Woodcock and Francis's (1994) rating system, in which a team achieving an 80% score is described as "A team in which all members must work together although each has distinct areas of responsibility".

In this context, team management should be differentiated from, but not disassociated with, project management. If a project team is managed effectively, then the chances of a well managed project increase. Likewise, where a team is disparate and unstructured, certain aspects of the project may function, but it is unlikely to be successful as a whole.

The major responsibility for management within a project team rests with the team leader. The selection of an appropriate person for this position will depend to some extent on the nature of the project, but the key qualities and skills have been discussed above. Typical issues and problems faced by a team leader include:

- management of incentives and raising team morale
- managing team members with different disciplines, experiences and backgrounds
- managing members with different conditions of service
- resolving conflicts between team members
- managing limited resources while avoiding accusations of bias towards certain team members
- difficulty in delegating tasks
- timely technical and financial reporting
- giving due recognition to personal efforts without compromising the team spirit.

Management training may be needed to address these issues, to include areas such as participatory planning skills, budgeting and conflict management. Regular team meetings in which all members feel free to express their views will help to address many of these issues. Such meetings can be used for prioritizing activities and developing shared schedules of activities contributing to shared outputs.

12.5 ADDRESSING ISSUES OF HIERARCHY

The structure of management, decision-making and communication within organizations and projects varies considerably, but is often categorized into two distinct groups, horizontal and vertical. Examples of the former are typically drawn from private-sector commercial companies where teamwork is identified as constituting an important part of organizational change; most commonly the shift (more or less temporary) to a 'flatter' organization with more flexible, less hierarchical management structures, increased horizontal communication between departments, and more delegation of decision-making.

Government research or extension institutions, however, are often noted as erring on the side of

"Management is about making decisions. Decisions at whatever level, are made based on the context and the objectives. The person making a decision will use his/her judgement to make a decision. Making no decision is in reality a decision. It a decision to do nothing, and that the present situation is satisfactory. Deferring decisions up the hierarchy means that the senior management becomes over-loaded with micro-level decisions. It also indicates the the people concerned do not have the confidence to make the decisions. The support being given by the supervisor to the people reporting to the supervisor is called into question."

Source: H. Bagnall-Oakley, personal communication (2000).

Figure 12.1 The essence of management, a team leader's view vertical relationships. It is not uncommon for a participatory agricultural research project to be located within a public-sector organization that has a hierarchical and bureaucratic management culture. Senior management may agree to host projects because of their interest in technical outputs and extra physical and financial resources, rather than in the participatory aspects of the project process and the new approaches it is designed to introduce. Active research staff may see the project as an opportunity for more research, involving fieldwork to be largely implemented by technicians sent into the field to implement a set of instructions. If this is the case, the project team, and particularly its leader, will need to think carefully about how to address relations of hierarchy, both upwards and downwards.

The strict, hierarchical way of working that is typical of many conventional research and extension organizations can be counterproductive in applied participatory agricultural research. Whilst transforming the entire structure of an organization may be unrealizable in the short term, a participatory research programme may work constructively within a hierarchical management in a way that gently challenges and seeks to change elements of it.

The LGB project in Ghana, for example, working with the support of some senior government staff seconded to the project, found several ways to do this effectively.

CASE 12.16

LGB: STRATEGIES FOR DEVOLVING RESPONSIBILITIES

The Larger Grain Borer Control Project challenged the hierarchical ethos that existed in the institutions in which it was housed by devolving research and extension responsibilities among staff as much as possible. Ministry of Food and Agriculture technical officers and district post-harvest officers were encouraged to make substantial inputs into the design and implementation of studies and trials, and to question objectives and methods. All staff, alongside their work programmes, were encouraged to become involved in manual fieldwork (such as shelling maize or carrying baskets of cobs), especially at peak times of year. This helped to win the confidence and enthusiasm of technical staff, who had previous experience of senior staff disappearing into a cool office to do something 'more important' when any hard labour was to be done. It was important to maintain this atmosphere as new staff joined the project. One interview technique devised by the technical staff – which deterred at least two applicants – was to ask interviewees to join other staff in the field labour. The willingness of several senior staff members on the project to share ideas with all staff, to discuss and question methods, and to participate in field labour was a critical factor in the success of the anti-hierarchical approach.

Source: Compton (1997a).

Intermediate Technology Development Group (ITDG), operating from the perspective of an NGO empowering local farmers to articulate their service requirements to the public-sector research and extension services, used a somewhat different approach from the LGB project, informed by the 'discomfort model'.

CASE 12.17

ITDG-CHIVI: A DISCOMFORT MODEL APPROACH TO HIERARCHY

The experiences of the Intermediate Technology Development Group's Chivi Food Security Project found that the most effective method for addressing issues of hierarchy were through a 'discomfort model' approach. This approach looked at alternative ways of sensitizing farmers to create a demand structure, and put pressure on the service providers (researchers and extensionists) to be guided by the farmers in the experimentation process.

The project acted as a facilitator:

- linking farmers with government researchers and extensionists
- exposing researchers and extensionists to the knowledge and skills of farmers, including their innovations
- strengthening the capacity of farmers to articulate their priority needs with both researchers and extensionists.

In practice, the project facilitated the community (farmers) to become better organized and to develop confidence in sharing their knowledge with service providers at all levels. Training for transformation[2] was used as an empowering tool in addition to other techniques such as participatory rural appraisal (PRA). In the end a number of strategies were used by the project to change attitudes and perceptions of hierarchical management towards farmers.

Farmers demanded that technicians undergo training for transformation to enable them to change their attitudes. Having received training, the technicians requested their senior management should attend similar courses, as well as some of the farmer-organized events such as the mid-season evaluation of farmer-led experiments, field days, seed fairs, community-based planning workshops and meetings. These opportunities led the managers within hierarchies to see new challenges in their work and to seek ways of addressing them. When the project was evaluated, farmers suggested the external evaluation team should consist of personnel from the senior management team in research and extension. One chief AGRITEX training officer and three senior researchers in farming systems research were part of the team assigned to evaluate the project. To ensure, as far as possible, that they were also going to develop new insights into the work, they were asked to participate in the evaluation process for 3 weeks alongside well respected international researchers with proven experience in participatory agricultural research.

Although the project was not located in the hierarchical and bureaucratic management of a government research or extension institute, farmers took a lead in inviting all staff from the two government institutes to participate actively throughout the process. Farmers were able to relate to different levels of staff in research and extension, and in the end they knew which level to interact with, when, and for which kind of issues.

The improved relationship between farmers, researchers and extensionists resulted in the latter two always using the Chivi community as an example of their activities with farmers when receiving visitors from outside Chivi.

Source: K. Murwira, personal communication (2000).

Some of the tactics to enable participatory projects to operate more effectively within hierarchical organizations are summarized in Box 12.1.

12.6 INCORPORATING SUPPORT STAFF AND EFFECTIVE DELEGATION

Participatory projects often start their training in participatory approaches at the upper end of organizational structures, with the management team and senior staff members. The assumption is that this will 'trickle down', with those who have received training, in turn, passing that training on to those for whom they are responsible. Unfortunately, this process does not always occur, with those trained being too busy to follow through, lacking confidence in the approaches to do the training, lacking budget, or even feeling that such training may threaten their own position and work methods. This approach can also be problematic if training of other staff is not explicitly part of the job description of those who are trained, as the experience from KFSRE illustrated.

Box 12.1 Tips for working in a participatory way within hierarchical organizations

- ✔ Respect the host organization's established modes of communication and meeting procedures.
- ✔ Invite management to observe or officiate at events (e.g. project planning meetings, farmer open days, workshops, training programmes) at which more participatory methods are used.
- ✔ Include training for management in participatory approaches in the project budget.
- ✔ Spend time explaining project activities to senior managers, including new approaches being tested.
- ✔ Remember to consult with senior management regarding decisions that are sometimes taken at team level (e.g. rules for use of project vehicles and equipment, dates for events, who to invite to events).
- ✔ Keep senior management fully informed of all team activities and plans, perhaps through a steering committee that includes key management representatives.

CASE 12.18

KFSRE: TRAINING OF NON-TRAINERS?

The Kavango Farming Systems Research and Extension Project in Namibia trained two extension technicians who had been with the project since the beginning. These technicians were expected to train other technicians (through formal training courses and on-the-job training). However, training other staff members was not part of their job description. An additional problem consisted of the fact that staff from the Ministry's training directorate received higher salaries than the extension directorate. The technicians did not want to do a job that others were paid more to do, and that was not part of their job description in the first place. This again illustrates the necessity to negotiate terms of reference for team members and to be able to amend these if required.

Source: B. Adolph, personal communication (2000).

Initial exclusion of support staff from the decision-making process was a feature of both the CRP and DAREP.

CASE 12.19

CRP: EMPOWERING TECHNICIANS

In the Cashew Research Project most technicians had no knowledge of the work of other sections, as they were excluded from meetings and the flow of information from senior researchers was poor. In addition to questions of communication, there was a clear need for the technicians to become involved in debates about agricultural development. Technicians had not, in the course of their work, discussed or been asked to think about issues and general principles such as the role of researchers and farmers in agricultural development, differences in wealth and status between farmers, notions of trade-off and sustainability, the strengths and weaknesses of monoculture versus intercropping, or even different ways of experimenting. The Integrated Cashew Management (ICM) Programme of the CRP attempted to change this through a training process (in which technicians focused upon their role as service providers to farmers), and by raising their status and inclusion through being identified as important agents within the project process.

Source: de Waal (1997).

CASE 12.20

DAREP: BRINGING THE FIELD STAFF ON BOARD

In the Dryland Research and Extension Project, most of the technical support staff (numbering over 20) were located at remote field sites, while the research team had its offices at the regional research centres. Moreover, these support staff were not formally trained in agriculture, and had been recruited as school leavers by a previous project and given hands-on training in experimental management and extension work by this project. From this point of view, neither KARI nor the Ministry of Agriculture was responsible for their staff development needs. At the start, the field staff were effectively excluded from the planning process and also from the formal training activities which involved professional staff and research station technicians. Specific training was provided to the field staff on an annual basis, but in the first 2 years this was mainly technical training, designed to address issues raised during experimental implementation. While the field staff had been involved in using participatory methods in the course of project implementation, they had not received any formal grounding in the rationale and principles behind these methods, or in the range of methods available. Only half-way through the project was more thought given to formally training field staff in the philosophies, concepts and methods associated with participatory research.[3] Training was organized in the third year, and despite the short time to the end of the project, this radically changed the confidence levels of many field staff. In the final year of the project they began (with encouragement) to initiate their own research and development activities in parallel with those planned by the project team, and some were identified as potential future community-level trainers in participatory approaches by a local consulting company.

Source: A.J. Sutherland, personal communication (2000).

By contrast, the ITDG-Chivi project, being informed through some disappointing experiences of on-farm experimentation by its partner conservation tillage project (Hagmann *et al.*, 1997), started training for transformation programmes with their field staff and collaborating farming communities. As a result the field staff were quickly able to interact in a constructive and more open way with members of the research team, with each other, and with members of other communities.

The art of delegation is a key confidence- and team-building function that facilitates the incorporation of support staff. Notwithstanding how naturally confident or not a person is, they must feel confident enough to make a decision without deferring the decision-making function higher up the structure.

CASE 12.21

KFSRE: PRACTISING DELEGATION

Within the Kavango Farming Systems Research and Extension Project, the team leader strived to build confidence and decision-making power at lower levels. When the team leader was asked what the individual should do next, the questioner was asked what s/he recommended. A recommendation was usually given and questioners left to implement their suggestions. After a time, the team leader devolved to team members certain core functions such as the disbursement of petty cash, organization of field days, organization of study tours, planning of trials, etc. This boosted their confidence and encouraged them to recruit other members to undertake different functions.

Source: H. Bagnall-Oakeley, personal communication (2000).

The practical implications of incorporating staff with support roles into team decision-making need careful consideration. Depending on the size, location and institutional complexity of the project, time management, logistics, cost and final decision-making are all affected by more dispersed decision-making processes and structures. More often than not, compromises have to be made by the team management, the key being retention of the maximum feasible participation with the minimum cost in work time lost and other costs. Set against this cost is the need for training, and the need to encourage discourse between all stakeholders.

12.7 PROJECT RESOURCE MANAGEMENT AND INCENTIVES

Budgets and expenditure regulation

Certain resource aspects need to be carefully planned in advance and controlled during project implementation, whilst others are best negotiated according to circumstance. The overall co-ordination of budgets and regulation of expenditure falls into the former category, and is a clear responsibility of the team leadership. Where a project is reliant on multiple sources of income, this can become a complex task and thus requires even more careful management. This was demonstrated in the case of the FPRP in Uganda.

CASE 12.22

FPRP: FINANCIAL COMPLEXITIES AS A PROJECT RISK

The Farmer Participatory Research Project proposal at the outset referred to the division of inputs between ActionAid Uganda (AAU) and the Natural Resources Institute (NRI), within funding from the then UK Overseas Development Adminstration (ODA). The overall budget included funds to support the NRI recruited team leader, the procurement of project vehicles and other capital equipment and running and maintenance costs. At the beginning of the project it was clear which institution was funding what, but in practice aspects of the management of the budget became quite complex, involving different people from different institutions and varying accounting systems.

The normal budget preparations and regulation of expenditure for routine team and grassroots operations with the FPRP initiative were relatively straightforward. Team members and the team leader shared the job of preparing the budget, and the team leader was responsible for presenting it and responding to the donors' financial officers. Having the AAU Finance Department and the British High Commission's Project Support Office involved was extremely helpful for the team leader. However, it was not always clear who was responsible for managing what, and where and how it was meant to be charged.

However, major difficulties arose concerning the annual reporting of the financial position of the project to the funders since the AAU and the funders operated with different financial years and it was difficult in practice to consolidate the accounts in time to meet the financial reporting deadlines. This complexity nearly stifled the project and now has been recognized as a major risk in projects with local institutional collaborators.

Source: Salmon and Martin (1997).

While complex budgeting arrangements need to be well managed, it is still possible to involve team members in the budgeting process and spread some of the responsibility.

CASE 12.23

DAREP: SHARING THE BUDGETING TASKS

Within the Dryland Research and Extension Project each team member was required to prepare two types of budget: a budget for each of his/her approved research protocols, and a quarterly budget for the forthcoming 3 months. The team leader's role was to consolidate these individual quarterly budgets into a team budget, and incorporate overhead costs and the cost of joint activities such as open days and study tours. Emphasis was placed on researchers taking individual responsibility for spending only within their budget estimates for the indicated period. All expenditures were approved by the Centre Director according to KARI regulations and the terms of the project agreement. Whilst this worked reasonably effectively, both in terms of spreading responsibility and regulating expenditure, variations in expenditure did occur. For example, a research initiative was activated by the team leader without full consultation with other team members, and this did cause some initial feelings of resentment. After the issue was discussed further in a team meeting, they pointed out that while the activity itself was valuable, it should have been more thoroughly discussed within the team before it was initiated and funds committed to its implementation. The lack of stipulation in the initial project document of how quarterly reports and budgets would be organized within a team framework required some early initiative-taking and internal discussion by team members to avoid confusion and poor management.

Sources: *Sutherland* et al. *(1997e); A.J. Sutherland, personal communication (2000).*

Reflecting on the experiences of the FPRP and DAREP, tips for practitioners in similar project initiatives include being very careful about how a specific project fits into a wider programme. In the case of the FPRP, it would have perhaps been better to have kept the project's finances more independent, although this was not acceptable to ActionAid at the outset of the project. This would have simplified the administration, although it would have required increased time input by the project team leader. The team leader did not have the necessary experience to take on this responsibility, and under the terms of reference did not have the time. The benefits of being more closely aligned to AAU included the procurement of equipment, vehicle servicing and interlinking with the existing financial management system. Thus a trade-off is recognized along the continuum of independence in budgetary management at one end, and full financial integration at the other, with the associated benefits and disbenefits highlighted. For example, DAREP suffered on occasion from the late release of funds, but benefited from the general openness of the team leader and Centre Director in discussing financial management and making contingency arrangements to ensure that planned programmes were not delayed for financial reasons.

12.8 RESOURCE ALLOCATION AND MANAGEMENT

The use and control of project resources often forms a focal point for the understanding of intra-team dynamics. Arrangements for vehicle use, office sharing, and access to typists, computers and advanced communications (e-mail, fax and telephone) may reflect team membership boundaries, pecking orders within the team, and interpersonal rivalries between team members. Most projects are constrained by the quantity and quality of equipment provided, and the regulations governing its use. Creativity and transparency are needed in order to achieve effective and equitable use of these resources.

Table 12.1 Factors that can help and hinder budget management

Helping	Hindering
Project design stipulates quarterly financial reporting requirements	Linking into different financial systems without very clear guidelines and understanding about how to operate within them – critical factor is the timing of financial years
Having people qualified in financial management to assist the team in budget preparation – preferably the team leader	Poor division of labour between people involved
Being able to fit into a functioning financial system which can assist with managing a project budget	Poor communication between stakeholders
Creating a clearly structured budget	Ill-defined budget structure and framework
Good communication and mutual trust between those involved, particularly if it is a multi-institutional initiative	Team members lacking budgeting experience
	Late release of funds by donors or intermediaries

CASE 12.24

DAREP: BOOKING AND NEGOTIATING FOR TRANSPORT

In the Dryland Research and Extension Project, most of the key decisions on transport and equipment allocation were arrived at by negotiating a consensus during weekly team meetings. Transport was booked by individual team members during the previous week using a desk diary. This diary was initially located in the team leader's office, and during the weekly team meetings bookings in the diary served as a starting point for negotiation of vehicle allocation for the next week. About a year into the project, day-to-day vehicle monitoring was delegated to the lead technician on the team, and the diary was relocated in the technician's office. Minor adjustments to an agreed allocation schedule were often made through further negotiation between different team members and the lead technician. Requests for transport from other projects were handled through the team leader. At the start of the project there was a shortage of drivers for project vehicles, and drivers were allocated on a daily or weekly basis by the centre's farm manager. This arrangement made accountability for vehicle maintenance difficult. Through negotiations with the Centre Director, who effectively negotiated a transfer of additional drivers from other research centres, an arrangement was made so that drivers were allocated on a semi-permanent basis. With this arrangement it was possible to allocate a driver to each vehicle. This helped a lot with vehicle maintenance.

The discussion of transport and equipment issues at team meetings enhanced the team spirit through shared ownership of decisions made, and by helping team members to understand each other's plans and work pressures and be more tolerant in waiting for access to scarce resources. The meetings also provided an opportunity for individual team members to gain support during the meeting to obtain resources for specific activities, rather than having to depend on the decision of one person.

Source: Sutherland et al. *(1997).*

Management of project resources, including the skills of team members, is typically related to the project cycle. In the first part of a 3-year research project, field-oriented resources (particularly transport and the language and communication skills of team members) are key, as the emphasis is on access to and dialogue with rural communities. Team members with driving or vehicle maintenance skills and good rural verbal communication skills will be particularly valuable and able to assist others lacking these competencies. As the pressure for documentation and writing up results increases in the second and third years, more office-based resources are required such as computers, photocopying and duplication facilities, and data analysis and written communication skills. Team members who helped others with fieldwork resources may be helped by others to analyse and write up their data, further generating dependencies between team members.

12.9 MANAGING INCENTIVES

In team-based initiatives it is important to try and provide training opportunities and incentives, whatever they may be. This will provide an enormous motivational boost to a team whose members are normally expected to work very hard and spend time away from their families whilst in the field. The planning of a project should incorporate a training budget, and the team leader should make a concerted effort to identify suitable training opportunities.[4] In addition to training, the management of project resources should also provide a way of enhancing incentives within the project team for hard work.

CASE 12.25

LGB: MANAGING OFFICIAL AND UNOFFICIAL INCENTIVES

Staff in the Larger Grain Borer Control Project worked much longer hours than most of their Ministry of Forestry and Agriculture colleagues, and lost additional sources of income (for example, they had no time to plant their own farms), so incentive payments were meant to compensate for these sacrifices. Official incentives to national project staff included overtime payments, travel and subsistence payments, purchase of project motorbikes at effectively a subsidized rate, in-service training (especially computer training), and long-term overseas training. Unofficial incentives (some of which were financed personally by technical co-operation officers or better-paid Ghanaian staff, as they did not fall within budgetary guidelines) included driver's licenses for three staff; post-project education for two long-serving non-government staff, a second-hand radio cassette to make repetitive laboratory work pass more easily, drinks and snacks for long meetings and long days of laboratory work, and limited access to project vehicles and computers for personal use. Other non-financial incentives were the feeling of doing useful work for farmers, and the enjoyment of being part of a hardworking and friendly team.

Decision-making on incentives was largely in the hands of the senior staff, who were highly paid and had the final decision over any incentive payments to their low-paid colleagues. Overtime payments were made on the 15th of each month to help lower-paid staff with their personal cash-flow problems. Each individual completed separate forms for overtime and overnight subsistence These were passed to individual study co-ordinators for checking before payment. This decentralization of the 'policing' function reduced pressure on the manager responsible for making payments. Claims were generally fair and rarely disputed, and in the few cases where this happened the matter was generally resolved privately between the study co-ordinator and the individual, and the claim modified before reaching the manager.

Source: Compton and Motte (1997).

The KFSRE project similarly made efforts to use increased resource management responsibilities as a part of incentive management.

CASE 12.26

KFSRE: ROTATING VEHICLE MANAGEMENT

In the Kavango Farming Systems Research and Extension Project, Monday morning meetings were held to allocate vehicles in the light of the week's tasks. The chairperson of the meeting rotated, as did the minute-taking. All project staff were issued with a small petty cash imprest for which they had to account, and usage was governed by government rules. Whilst the issuing of petty cash required responsibility and a degree of trust, the revolving chairpersonship in the control of vehicle usage against competing demands gave all staff a chance to manage an aspect of the project.

Source: H. Bagnall-Oakeley, personal communication (2000).

The management of incentives within a project team is largely a task for the team leader, who will be wise to consult both with senior management and with the team members, and perhaps take on the role of a broker in this process. It is important not to set precedents that are unsustainable[5], and to listen to, but not give in to, unreasonable requests and pressures from vocal team members early on in the project. Projects should allow space for team leaders to exercise discretion in this area, particularly during times when morale may be lagging, such as during the period prior to project closure.

12.10 TEAM CONSOLIDATION AND OPERATION – LESSONS AND TIPS FOR PROJECT TEAM MANAGEMENT

The building of a cohesive and effective team is central to the performance of a project or initiative. The following points are key in ensuring that this takes place.

Team objectives. Ideally a single overriding objective should be defined, but this is often unrealistic. For this reason the team's core objectives must be clearly understood by all. This will take some time; it is not a question of one meeting, but a series of meetings and follow-ups. But it is crucial that team members know what they are working for. It is also essential that a compromise is reached over the importance of core objectives and the different methodologies to be used to achieve them.

Confidence leading to delegation. Team members must have the self-confidence to carry out assigned tasks. This comes through training and knowledge of their subject area. Confidence also comes through the team leader delegating tasks. If a team member is assigned a task, the individual must be fully responsible for following it through and reporting on activities, but should also feel empowered to ask for help or advice if needed, and to be supported if things go wrong.

Roles and responsibilities. This issue is bound up with the project objectives. Each member must clearly understand what his/her task is, the resources available and the expected outcome. Team members must have the confidence to carry out the assigned task, and to link up and liaise with others (work in a interdisciplinary way).

Decision-making capacity. Projects and organizations vary in their control over decision-making at different levels. It is essential to ensure staff are aware of the boundaries of their decision-making roles, and that they are encouraged to act on these without feeling hampered by those more senior. It is important that this is understood, and that senior management support any decisions they make in their domain. Too frequently, a culture is seen where all decisions are passed up, and senior staff become frustrated with the amount of micro-level management they have to do. A decision to delay making a decision is, in fact, a negative decision.

NOTES

1. The KSFRE project had a resource centre where all these types of files were kept and could be accessed by team members and non-members. However, it was not used as thoroughly as hoped, due in part to some team members being rather slow and reluctant in documenting field visits and overall work progress (B. Adolph, personal communication, 2000).

2. This is training based on the ideas of empowerment of rural people through a process of conscientization using participatory learning methods, pioneered in Latin America by Paulo Friere in 1970 and further adapted for community development programmes in southern Africa during the 1980s.

3. This was also the case in the KFSRE project. Technicians who worked in the team received training in both the conceptual and methodological issues of participatory research, but field staff in the extension wards received more training on the practical aspects/use of PRA methods. The project did not reach the stage where field staff were also trained in the philosophies/concepts of participatory research, which would have been beneficial (B. Adolph, personal communication, 2000).

4. The issue of training has been discussed in greater detail in previous chapters: see sections 10.3 and 11.3.

5. There is debate over whether or not the giving of financial incentives is a helpful (or necessary) practice, particularly in projects that are located within government structures and/or use government staff who will return to their posts after the project is completed. If a project cannot function without having to pay these inducements, it is viewed by some as a poor reflection on design or staffing, implying it is unlikely to be sustainable. Capacity-building projects, in particular, are aimed at facilitating the system, not 'raising the stakes' of staff inclusion, thus any use of incentives needs to be carefully thought through.

Team closure – facing the inevitable

13

The majority of projects have relatively limited time spans, and sooner or later the team has to face up to the prospect of project closure. Ending projects smoothly is a challenging task both externally – how the project (team) manages the transition with the partner stakeholders – and internally within the institutions and team that are running the project.

13.1 PLANNING AN EXIT STRATEGY

Ideally, the planning of an exit strategy should be incorporated in the project planning phase and revisited during the life of the project, making adjustments as necessary. Projects are by their very nature time-bound interventions, and this must be made clear in the formulation of activities aiming at specific outputs.

The National Agricultural Research Project, Phase II (NARP II) provides an elaborate example of planning and preparation for its exit strategy, with the development of logical frameworks, work plans and budgets by all team members covering the exit period of the project, in an attempt to ensure all participants did everything necessary to maximize the impact and sustainability of project initiatives. Part of the NARP II's overarching logical framework (Table 13.1) demonstrates this.

The need for adequate budgetary provision for the exit strategy cannot be over-emphasized. Again, NARP II may act as a learning point for other projects, providing an example of how impact may be reduced or delayed by leaving the detailed planning of the exit strategy until the latter part of the project.

CASE 13.1

NARP II: BUDGETING AHEAD FOR EFFECTIVE EXIT THROUGH A DISSEMINATION STRATEGY

Participants in the National Agricultural Research Project, Phase II at eight regional centres (with funding from the UK Department for International Development (DFID) and the Netherlands Government) successfully developed 95 different information materials for farmers of both local and national relevance, based on work with farmers and farmer research groups, and identified uptake pathways and/or delivery systems for their dissemination. One year after finalizing the information materials themselves, the Kenya Agricultural Research Institute (KARI) and DFID were still planning ways to fund mass production, delivery to uptake pathways and monitoring and evaluation of dissemination. Few participatory research projects manage to achieve such impressive outputs for potential dissemination – if production and distribution costs had been realistically estimated at the beginning of the project, it might have been possible to ensure that the exit strategy was not only well planned, but also adequately funded and effective!

Source: D.J. Rees, personal communication (2000).

An effective project will have established strong linkages with a number of farming communities/groups and other agencies involved in agriculture, including government extension services, NGOs, international agricultural research centres, other research institutes, agricultural universities and colleges, planning agencies, and relevant parts of the agribusiness

Table 13.1 NARP II Logical Framework

Narrative summary	Objectively verifiable indicators
Goal	
Increased livestock and crop productivity by small-scale producers. (from overall project logframe)	1. 4.5% per annum increase in livestock productivity (meat, milk, hides, etc.) by 2005 (at least 30% aggregate from baseline 1997) 2. 4.5% per annum increase in crop productivity by 2005 (at least 30% aggregate from baseline 1997).
Purpose	
KARI/DFID NARP II exit strategy completed.	At least 40% of farmer research groups continue to function effectively after December 1999 At least 70% of transferred technologies continue to spread through delivery systems after December 1999 NARP III project proposal on schedule for submission to DFID Strengths and weaknesses of the KARI/DFID NARP II described and quantified by December 1999
Outputs	
1. KARI/DFID NARP II activities completed as appropriate	1.1 All fieldwork that has been completed by April 1999 reviewed with partners in field days by July 1999 1.2 Potential partners, identified under NARP II, selected for dissemination activities by June 1999 1.3 Dissemination materials produced under NARP II reviewed and handed over to delivery systems by September 1999 1.4 Documentation of project activities and outputs produced and disseminated electronically by September 1999 1.5 Activities suitable for completion after April 1999 reviewed and completed by October 1999 1.6 All existing partnerships reviewed by June 1999 and strategic support activities completed by November 1999 1.7 Project activities and outputs reviewed by project staff

community (traders, seed companies, input suppliers, etc.). An exit strategy should define how to deal with each of these agents, which may include the phased passing-over of responsibilities and/or assets.

CASE 13.2

KFSRE: HANDING ON FIELD ACTIVITIES TO EXTENSION

The Kavango Farming Systems Research and Extension Project in Namibia, whilst making clear that the project was a limited intervention, developed through two fairly distinct phases. An initial period of intensive training was given by external facilitators, followed by a close supervision phase during which the technical assistance became gradually less active in the field. Namibian government extension staff increasingly took over the monitoring visits and undertook the trials. The (expatriate) technical assistant made periodic monitoring visits, and used reports to further monitor the situation. This ensured that the information collected was relevant, needed, and could be passed on.

Source: H. Bagnall-Oakeley, personal communication (2000).

A major challenge for a project and its leadership is sustaining team morale and commitment during the period leading up to closure. It is natural for some team members to look ahead to life after the project, and it is usual that some leave prematurely. However, they are less likely to adopt the 'leave a sinking ship' mentality if they have a strong sense of ownership, are fully involved in exit activities, and have good interpersonal relations with other team members which they value strongly.

The whole team should be involved in planning the exit. This will make the process relatively complex, but the time spent will be well worth the effort. If resources permit, a workshop format can be used to plan an exit strategy. Provided the team (researchers, extension specialists and technicians) is not larger than 20 people, 1–2 days should be adequate. An external facilitator may be helpful but is not absolutely necessary. Planning will probably need to involve the following elements:

- review of progress so far against expected outputs and identification of incomplete activities
- prioritizing the remaining work
- development of a strategy for disseminating results and handing over activities and equipment
- allocation of responsibilities within a time-frame.

Some of these points, and others, are illustrated in the following account of the Dryland Research and Extension Project (DAREP)'s exit planning workshop, as written by the facilitator.

CASE 13.3

DAREP: PLANNING FOR THE END – IF NO ONE KNOWS, WHAT'S IT WORTH?

'Every cloud has a silver lining' is an expression in English that means that even bad things can have a good side. In this case my job was to help write a project document for the last phase of an agricultural research project in Kenya. Sad, because the Dryland Research and Extension Project was doing good work on both the technology and methodology fronts. The silver lining was that a definite project end date had been identified sufficiently far ahead to ensure that the processes of completing or handing over the research, and documenting and disseminating its findings, could be properly planned.

Lesson One: plan the dissemination phase 18 months in advance, to a specified end date

The way we went about the process of planning the dissemination phase seemed to work in our particular circumstances, but may need modification to your own.

First, a consultant from outside the project team was asked to lead the writing of the phase document. Having a neutral person draw up schedules and budgets reduces the risk of bias or conflict that could have resulted if these had been done by a project member. The consultant was also familiar with the documentation requirements of the funding agency, and with the history and work of the project.

Lesson Two: contract a neutral person familiar with the project to lead the planning of the dissemination phase

Most projects operate at two levels: the local field level, and the lead institution's headquarters (HQ) level. It is very important that both these groups of stakeholders are involved in the process of planning. In our case, this required a series of meetings with HQ before and after the local planning meetings. The meetings before, together with stipulations from the funding agency, set the parameters for the planning. The meetings after confirmed to HQ staff that the proposed plan was within their guidelines, while leaving room for them to modify any component they felt uncomfortable about.

Lesson Three: involve local and HQ stakeholders in planning

At the local level there was a second group of stakeholders: project staff, other researchers, government extension staff, NGOs and research managers. The most effective way of giving all these a voice in planning was to invite all these interests to a workshop.

Lesson Four: workshops are an effective way of giving a voice to diverse stakeholders in the planning process

Our workshop reviewed recent project progress, and presented a tentative programme for winding down research activities and providing for adequate documentation and dissemination. The workshop lasted 3 days. It was deliberately held away from the project office in a quiet location. Flip charts were the main aid to communication and memory.

Lesson Five: use some means of making information available to workshop members to ponder or discuss at leisure

As each project member outlined their proposed programme, so a master list of activities and resources needed was compiled using flip charts. At the end of the workshop these activities and the time and finances needed were added up. Surprisingly they came to only 25% more than the financial limit set. It was, therefore, comparatively easy to prioritize and cut back to the predetermined limit (including a contingency).

Lesson Six: ensure everyone is aware of the main planning parameters

The main outputs from the workshop were:

- a list of activities to be conducted by each component of the project against a series of expected outputs
- a list of important milestones (deadlines) during the project period (Table 13.1)
- a suggested matrix for deciding on the format and quantity of dissemination materials (Figure 13.1).

Lesson Seven: distil planning workshop findings into a small number of easily understood tables or figures that clearly define lead responsibilities

Table 13.2 contains a number of interesting points:

- staff felt that to contribute effectively to the dissemination phase they needed training in communications, written and spoken

Medium	Audience	Number	Cost	Deadline	Collaborators	Lead responsibility
Reports –						
Technical						
Annual						
Final						
Workshop proceedings						
Journal papers						
Extension materials						
Videos						
Leaflets						
Manuals						
Radio programmes						

Figure 13.1 Matrix for planning dissemination outputs

- a dissemination workshop is planned; this will bring together research and extension agencies to plan the format and content of dissemination materials
- the experimental programme is due to finish 7 months before the end of the project, giving sufficient time to document the research, prepare dissemination materials and hold workshops.

Conclusions

I was lucky in this assignment in that I was working with an enthusiastic team that had good research results to share, and felt a responsibility as scientists to ensure research results were translated into a form helpful to a range of users, to the ultimate benefit of smallholder farmers.

So often we, as conscientious researchers, are wrapped up in the research until the last minute, and what we as individuals have learned is lost to the greater institutional memory. I believe that joint planning of the dissemination phase well in advance of the project's end can increase both the value of the research and the professional satisfaction we gain from it.

Table 13.2 Important milestones to end of project

Activity	Deadline	Lead responsibility
Communications training	Apr 1996	Socio-economics advisor
Soil and water management workshop	May 1996	Soil and water engineer
Dissemination workshop	Jun 1996	Agronomist/research–extension liaison officer
Complete experimental programme	Aug 1996	Section leaders
Methodologies workshop	Aug 1996	Socio-economics advisor
Decision on fate of research sites	Oct 1996	Project leader
Contribute to national conference	Oct 1996	Research Centre Director
Completion of technical reporting	Dec 1996	Project leader
Final project workshop	Jan 1997	Workshop committee
End of project	Mar 1997	

Expected outputs from the dissemination phase

- Research on improved techniques for rainwater harvesting and water conservation tillage documented and disseminated.
- Research into improved methods for selection and management of appropriate genetic resources documented and disseminated.
- Soil fertility limitations identified and researchable opportunities documented.
- Strategies for increasing productivity and reducing risk for livestock keeping in semi-arid crop/livestock systems documented and promoted.
- Limitations to on-farm tree establishment and propagation diagnosed, and initial research to address these documented.
- Experiences in participatory methods for technology identification, evaluation and sharing documented and disseminated.

Source: B. Pound, personal communication (1996).

As case 13.3 illustrates, the team's review of progress is likely to include assignment of responsibilities. These include responsibilities assigned to individual team members, and those involving the team as a whole. The former will involve self-assessment, and this is a good way of sustaining individual team member commitment to seeing the activities, for which they have lead responsibility, through to completion. For activities involving the team as a whole, such as dissemination events, more effort will be required to foster team commitment, otherwise these will tend to fall back on an already over-burdened team leader. This can be achieved by drawing up an outline for such activities, during which responsibilities are allocated for the main aspects.

In allocating responsibilities for team-level activities, it is particularly important to assign all team members a role, especially technicians and field staff who are likely to be under-utilized as experimental activities are wound down. One way of involving technicians is to get them involved in writing and commenting on papers documenting the project outputs.

In planning an exit, it is useful to arrange closing events that can involve the whole team and its main collaborators. This may include exhibitions, dissemination workshops and farmer open days. Such activities help to sustain team focus and interaction at a time when team members could become isolated during writing up. Field activities that do not require large amounts of researchers' time, such as demonstrations and verification trials, are a means of keeping farmers and field staff engaged, and of increasing opportunities for other projects picking up and using local capacity built by the project.

13.2 DOCUMENTATION OF THE PROCESS

A useful method of encouraging the team to reflect on what they have learned through the project is to ask them to document the learning process during its final stages. This was done in DAREP by organizing a workshop at which the technical scientists discussed aspects of the process they went through in conducting pieces of research, rather than presenting the technical research results. Researchers were assisted in doing this through a set of questions to address in documenting the research process. This was followed by discussions on topics and issues arising.

A similar approach was used in the Farmer Research Project (FRP) in Ethiopia, with the additional element of peer review of the research reports and activities being undertaken as part of a travelling workshop (FARM Africa, 1998). Joint authorship of papers and reports is another good way of keeping the team together and interacting during the final stages of a project. In addition, if the project is located at a research centre, an editorial committee can be established involving other non-project scientists to review papers, as was done with the DAREP and NARP II projects. Such an arrangement improves the quality of written outputs and also motivates individual researchers to document their findings.

Encouraging team members to write may be a capacity-building exercise in itself. It was noted by some case-study authors that there was a reluctance by some team members to write, whether through lack of interest or lack of self-confidence. Thus, on reflection, drawing all team members into documenting their work and experiences from an early stage in the project would help identify those that require extra support and/or encouragement for what ultimately will give all participants a sense of pride (i.e. having a written text ascribed to them), greater project ownership, and vitally, ensuring that knowledge has not been lost.

13.3 HANDING OVER ACTIVITIES AND RESOURCES

It is rare for a project to complete everything it has started, and for it to leave nothing behind. The exit strategy should identify which useful activities might be handed on to other organizations. If the research has been very effective in generating technology, there will be a need to market this with potential uptake agencies such as local NGOs, agribusiness or relevant extension specialists. To an extent, this type of handing over can be undertaken by team members, and may form a basis for continued collaboration and perhaps formulation of a new project to carry ideas forward, helping the team members involved to see their labours bear fruit and motivating them to continue up to the end of the project.

CASE 13.4

KFSRE: HANDING-OVER ACTIVITIES

The Kavango Farming Systems Research and Extension Project was one of several projects that helped persuade the Namibian Ministry of Agriculture to adopt the farming systems approach, resulting in the progressive establishment of six farming systems units throughout Namibia. It was automatically assumed that KFSRE would become one of these farming systems units, and this would cover the Kavango Region of Namibia. The project was thus moved into the Minstry of Agriculture, Water and Rural Development office in the provincial capital, Rundu, from the project base at Mashare, 53 km away. Thus the project was effectively switched to a proto-farming systems unit. This transfer was effected in February 1999. It was 1.5 years before the project was terminated. This allowed the team members to adjust to the change and allowed the management of the Farming Systems Unit (FSU) to be transferred to the Chief Agricultural Extension Officer, who was the designed FSU team leader.

Source: H. Bagnall-Oakeley, personal communication (2000).

CASE 13.5

DAREP: HANDING OVER RESOURCES – PHYSICAL AND HUMAN

The Dryland Research and Extension Project was somewhat unique in terms of the infrastructure of sites for research activities, and the human resources built up around these. This resource was extremely enabling in terms of getting research and dissemination activities off the ground quickly, and achieving a wide coverage and high level of experimental replication. When it came to closing down, however, it also became a heavy responsibility. In each of the sites, the project sites and their staff had become a valued part of the local community, but one which depended on external funding for their continuance. The task of telling the local communities that the project was closing, and with it the local site facility, fell to the team leader. This was done during the project farmer open days, when large numbers of farmers and community leaders were present. This process actually started in the second year of the project, and having had their expectations raised through the formation of a local site committee, many community leaders and members could not understand the reasons for the closures. The team leader's job was somewhat easier in sites that operated up to the end of the project. This was because the site committees in these areas had met to discuss issues around exit, and some had made positive plans for the future. At these sites he was able to explain that all things had an ending, and point to the benefits of what had been achieved, together with the plans made by the site committees for continuation of some activities on their own. There were complications in some cases, particularly where the sites were established on school land, clan land, or on land belonging to individual farmers. The previous project had built prefabricated houses and stores, and had fenced these sites, and handing these over to individuals aroused some jealousy in the local communities. On the positive side, written agreements between the project and the owners of the land made the issue of ownership of these assets clear, and protected the project team leader from allegations of favouritism by other members of the local community. Two of the sites were retained by other research projects at the same research centre, in order to continue with trials for a further 2 years.

The project staff stationed at the DAREP sites did not have clear career pathways. Where other research projects took on the sites, in some cases they also took on the staff who had been employed by DAREP. In other cases, local NGOs offered the staff jobs. Other staff returned to their home areas, or tried to search for help elsewhere. In order to strengthen the position of these project field staff, the project team leader provided them with written references. In addition, they all received an intensive training course in participatory approaches for which they were awarded a certificate. Some of the collaborating farmers continued to collaborate with other research programmes operating in the area, but in most cases they did not have this opportunity, as many of the sites were in areas considered too remote by most researchers.

Source: A.J. Sutherland, personal communication (2000).

13.4 FAREWELL OPPORTUNITIES

The interpersonal, non-technical dimension of project closure should not be neglected. The project team's interest and enthusiasm can be bolstered by the planning of a series of farewell events, both amongst the team itself and with collaborating partners, notably farmers. DAREP achieved this through farmer open days, where farmers were addressed by the team leader, and the team and farmers joined together to sample food and beverages cooked by collaborating teams of farmers and extension staff using technologies (new crops, varieties and preservation methods) developed by the project. Saying goodbye to other team members may be handled less formally, perhaps by a small gathering during a weekend or an evening. Saying goodbye to collaborating organizations may better be done at an end-of-project workshop in which they are participants.

While a project has to end, the team members can keep in contact. Often they may be fellow researchers based in the same centre. The working relations developed through the project (assuming they were amicable and productive) may be continued into future collaborative activities. When teams come from different organizations it is more difficult to stay in touch, but one way is to continue writing together, including articles for publication. Alternatively, more spontaneous and less formal e-mails, now a widely available form of communication, enable people to continue to share their ongoing experiences.

13.5 TEAMWORK: A NEGLECTED DIMENSION

The agricultural research environment is increasingly interdisciplinary and inter-institutional. The benefits of drawing together team members from different academic and organizational backgrounds are identified both in the way issues and problems are addressed, and through the creation of uptake pathways for knowledge dissemination. However, the benefits of this inclusive approach to agricultural research are only borne out in a situation where the team functions effectively. The challenge of bringing people together from different backgrounds, approaches and institutions is substantial. Although technically relevant qualifications and experience are prerequisites for employment, teamworking skills are often assumed rather than assessed. As the examples from projects in sub-Saharan Africa illustrated in this section have shown, effective teamworking can only be accomplished by the preselection of individuals who hold certain intrinsic values, combined with a managed process of team-building. The individual qualities necessary include an openness to innovation, willingness to accept the measuring of success based on collective rather than individual work, a belief in collective intelligence and the use of collaborative work styles, and flexible thinking. As Peter Senge notes:

> "Dialogue can only occur when a group of people see themselves as colleagues in a mutual quest for deeper insight and clarity... Colleagueship does not mean that you need to agree or share the same views. On the contrary, the real power of seeing each other as colleagues comes into play when there are differences of view. It is easy to feel

collegial when everyone agrees. When there are significant disagreements, it is more difficult."
Source: The Fifth Discipline, cited by Liebler (1994).

The reality is that teams are rarely made up of individuals containing all the qualities necessary for instantly effective teamwork, and even in teams that do contain individuals with the appropriate attributes team-building is necessary for effective collaboration. Team-building can occur through spontaneous actions, but generally needs a stimulus and is most effective when managed and monitored throughout the project's life. Enhancing interaction and communication between team members; fostering a sense of ownership of the project's values, aims and objectives; addressing issues of hierarchy; building team members' competencies through training; and incorporating support staff are all facets of the team-building process, and some or all of these have proven invaluable for maintaining or improving a project's performance.

However, as technology improves and agricultural research becomes increasingly specialized and cost-conscious, the nature of teamwork is changing. The new media for interaction and collaboration is through remote access, with electronic forms of communication in many circumstances replacing face-to-face contact. This development poses an interesting contradiction, with research technology becoming more specialized and distant, yet with techniques used to disseminate new knowledge more participatory and open. In many ways this reflects the job market at large, where people are required to have increasingly specialized knowledge of a (sub) sector, yet need interpersonal skills for management–customer relations as more enterprises become service-orientated.

With technological advances, communication between increasingly specialized disciplines may remain an obstacle. If agricultural research continues to move towards problem-focused approaches, bringing together scientists to work on a specific issue, the need for training in teamwork methods will continue.

PART THREE Institutional relationships and working with other stakeholders

Part Three of this book deals with the important dimension of relationships and linkages between different institutions which are necessary for successful participatory technology development. It is based on a number of sources; the case studies developed for the 1997 Participatory Technology Development Forum in Kenya, the discussions around these, plus additional case material and contributions from the authors.

Chapter 14 explores the issues around identifying and establishing working relationships between institutions which are often disparate. The strategies for establishing relationships are reviewed and the benefits, problems and difficulties arising from linkages and inter-institutional collaboration are examined. The challenge of maintaining and further developing relationships once these have been established, is dealt with in Chapter 15. With the help of case material, this chapter examines the issues and constraints on collaboration between the main stakeholder institutions in participatory research.

Chapters 16 and 17 deal more specifically with institutional change. Chapter 16 draws together much of the material from previous chapters to explore the ways in which experience can lead to institutional learning and the sustaining of participatory approaches. Efforts by various projects to change institutions in sub-Saharan Africa are presented as case studies and discussed in relation to areas of change in research organizations. Chapter 17 identifies practical challenges projects face when institutionalizing participatory approaches within agricultural research and lessons relating to each of these challenges. Overarching issues relating to the future development of participatory research programmes and cross-cutting strategies for more effective institutional change management conclude this chapter, and the book.

Linkages in participatory research – their establishment and relevance

14

14.1 INTRODUCTION

This chapter covers the issues associated with identifying stakeholder institutions and establishing working relationships, often in the context of very different institutional structures and mandates. It examines the benefits to be gained by inter-institutional collaboration, the problems and difficulties which can occur, and presents some tips for overcoming these and for developing linkages.

This topic constituted one of the areas for discussion at the Participatory Technology Development Forum in Kenya (NRI, 1997), for which the case study papers were written. Hence the following analysis reflects the views of the participants and practitioners at that event.

The concept of 'stakeholder' has become an important aid to identifying the range of agencies (both government and civil society), informal groups and individuals who have an interest in a particular area of activity and influence. When considering the participation of other stakeholders in agricultural research, it is important to recognize that this category potentially can include a wide range of organizations and individuals who have an interest in, or may make a contribution to, the research process. Different stakeholders often have different interests and values with respect to their engagement in agricultural research. They may evaluate outcomes differently. Therefore, it is important to establish stakeholder relationships on a sound basis through discussion and negotiation to reach clear understanding of roles, responsibilities and expectations.

Institutional linkages in participatory agricultural research have received less attention in the literature of the 1990s than the issues surrounding farmer participation. Research–extension linkages were given prominence in a comparative study of client-oriented agricultural research conducted in the 1980s (Ewell, 1989). Some accounts of the operation of more participatory research and extension projects in the 1990s have clearly shown the importance of developing effective collaboration with other stakeholders (Scarborough *et al.*, 1997; Hagmann *et al.*, 1998).

More recently, the idea of partnerships has come to the forefront. A partnership implies something stronger and more ambitious than a linkage. It moves participatory agricultural research projects more directly into a collaborative mode of operation, with two or more agencies directly involved in implementation. A mutual unwritten understanding may change into a more permanent arrangement, possibly including co-financing of specific activities, supported by written contracts or a memorandum of understanding specifying the responsibilities of different parties.

Project documents often assume that linkages will take place, but rarely outline strategies and methods for achieving effective linkages or developing these into partnerships. While the perspectives on collaboration differ according to the organization hosting a project, broadly similar strategies apply for improving linkages and collaboration. However, establishing and maintaining collaborative linkages are often costly in terms of the time and resources required. This fact further highlights the need to develop a well designed strategy for a project. The discussion below centres on linkages and assumes that an effective linkage provides the basis for developing a partnership.

14.2 IDENTIFYING OTHER STAKEHOLDERS AND BUILDING WORKING RELATIONSHIPS

To start with, some form of institutional analysis such as stakeholder analysis (Grimble, 1998) can be used to develop a project's strategy for collaboration and linkage. Stakeholder analysis is a useful tool in helping a team to develop and manage a linkage strategy, and to make explicit the purpose of a linkage and the benefits anticipated by all parties.

In this context, neutral facilitation at stakeholder meetings held on neutral grounds or at rotating venues can help to develop joint ownership and shared understanding of project objectives. Moreover, a stakeholder analysis should include examination of differences in organizational philosophy, image, power relations, and past and current linkage mechanisms.

Who the other stakeholders are depends very much on which organization is hosting and leading a project, as well as the purpose and objectives of the project itself. For example, if an NGO is the host, other stakeholders may include key individuals or research centres in the national agricultural research organization (NARO), research organizations outside the country, including international centres, local and specialist national government extension staff, researchers from local universities, other NGOs, private-sector input supply companies, or marketing and credit agencies.

Stakeholder analysis includes developing an understanding of the different interests of stakeholder organizations and the implications these have for projects. For example, the research community places high value on 'good science' and validation of existing knowledge, with the expectation that research results may be 'generalized' for particular agroecological zones. Farmers expect new and useful knowledge, attention from prestigious outsiders and, at times, material benefits. A third set of expectations may come from extension, agricultural credit agencies, agribusiness and local NGOs who are looking for new messages, packages or products to take to their client group. Finally, donors also often expect research outputs to be presented in a way that supports their corporate image of being at the cutting edge of development approaches by addressing core issues (e.g. sustainability, gender and poverty), or showing evidence of impact to justify further expenditure on research.

An important basis for initiating inter-institutional linkages is the existence of personal contacts between the staff of different institutions, deriving from common professional interests, or from having studied or worked together in the past. Often such relationships provide the impetus for interest in project-based collaboration, and much rests on the ability of these individuals to extend involvement in collaboration across their institutions. This is demanding of time and requires continuity of staffing if it is to be the foundation for broader partnerships.

Another important strategy for better collaboration is to involve relevant stakeholders in the planning and implementation of project activities. For example, the Dryland Applied Research and Extension Project (DAREP) brought together a range of institutions through collaborative diagnostic surveys, research planning workshops and experimental programmes (Mellis, 1997; Ouma *et al.*, 1997; Sutherland *et al.*, 1997a, b). Once involved in planning, stakeholders are more likely to contribute resources and participate in the actual implementation of these programmes, particularly if they can see a clear benefit to the achievement of their work plans. If involvement in planning is not possible, other stakeholders can be invited to participate in diagnostic surveys, study and field tours, open days, staff appraisals, writing technical papers, and peer reviews of experimental activities and impact assessments (Sutherland and Sandford, 1998). This approach was also taken by the Kavango Farming Systems Research and Extension (KFSRE) Project which, at an early stage of the project, invited a range of researchers to participate in developing regional profiles and carrying out diagnostic surveys.

Collaboration is also required in order to establish participatory technology development activities, including farmer research groups, on a more sustainable basis. It helps to link the identification of demands and needs at grassroots level with more appropriate provision of services and training. Therefore, strategies and methods for achieving effective linkages are important ingredients for successful participatory agricultural research.

However, there are significant constraints and difficulties in forming effective institutional linkages.

14.3 FACTORS INHIBITING LINKAGE DEVELOPMENT AND COLLABORATION

This section identifies the main constraining factors to the development of linkages, and suggests some ways in which these can be tackled.

One of the important factors inhibiting linkages is the barriers created by perceptions and attitudes, particularly between government organizations and NGOs. Other differences between organizations can also hinder collaboration, for example, differences in terms of general philosophy, geographical scale and operational procedures make for very different perspectives and approaches.

A further important consideration is the balance between the benefits of linkages with stakeholders versus the cost, resources and time required to make and maintain linkages. Problems with allocating limited resources and associated competition, inequalities in conditions of service, and differences in financial policies and allowances are common obstacles to constructive collaboration. Some organizations operate with restrictive information policies; many lack knowledge of how to conduct a thorough stakeholder analysis, or are unable to put effective co-ordination mechanisms in place. There is generally a lack of clear guidelines for monitoring and evaluating linkages and collaboration.

Image and perceptions of different institutions

Important factors influencing the participatory research linkages between NGOs and research organizations include the different perceptions each has of the other, and the motivations for and value placed on research. These differences can, in the worst cases, lead to a lack of respect between different stakeholders which has to be remedied if linkages are going to be effective.

NGOs often feel they have a negative image in the minds of government research and extension staff, who may perceive NGO involvement in research as a threat. NGOs typically regard government organizations as rigid, slow in decision-making, and working to different priorities.

Institutions with a basic or strategic research mandate often do not incorporate linkage aspects in their programmes. They may, therefore, view collaboration with other stakeholders, particularly in participatory projects, as extra unplanned activity lying outside their official agenda or acceptable project design. The hierarchical forms of state agricultural institutions contrast with the more fluid and responsive institutional forms of many NGOs. While NGO structures and modes of implementation run the risk of creating an image of arrogance and autonomy, those of government organizations may be perceived as fostering delays in decision-making and action, and creating obstacles to the accessibility of key individuals.

Competition for resources and recognition between NGOs on the one hand, and government departments on the other, leads to lack of collaboration. Underlying competition for resources and recognition is often reflected in territorial behaviour and negative stereotyping, common obstacles to developing productive partnerships.

Difference of philosophy, scale and procedures

There is frequently a lack of symmetry in the relationship between NGOs and government organizations. They operate at different levels and with different approaches and methodologies in working with their client groups.

NGOs often work with local community-based organizations (CBOs), placing emphasis on working through existing groups and the need to understand community dynamics as part of a holistic development approach. In some cases they act as intermediaries between these CBOs and government research and extension. From the NGO perspective they are in a position to assess CBO capacity, both organizational and technical, and to identify research/extension needs more accurately than government organizations. They can represent and lobby for delivery of these needs and take an active role in promoting participatory technology development.

Some government research and extension organizations view NGOs and their relationship with CBOs as offering a cost-effective way of developing community-based natural resource-related activities. From this perspective, the NGOs' role is seen primarily as one of facilitation, monitoring and dissemination, and there is a tendency to undervalue their technical contribution. In contrast, government researchers and extensionists, who have operational resources and regional mandates, may see no need to work with NGOs, and would rather seek direct relationships with farmers and CBOs through the extension structures.

In terms of procedures, there are differences in planning processes which, in the case of national research organizations, are often lengthy and linked to national priorities and strategies, as opposed to the local-level, bottom-up planning often favoured by NGOs. Different stakeholders may have different financial management policies and procedures, for example, relating to field allowances. Such differences are sometimes hard to reconcile.

The gaps in understanding over differences in philosophy and methods can be addressed, at least in part, by training other project stakeholders in participatory technology development (PTD). This would also help to increase ownership of the project process and outputs.

Resource issues

Further hindrances to effective stakeholder collaboration include the time and resources required to establish and maintain linkages. There are also problems of how best to allocate resources between a range of potential collaborative activities, recognizing that, in most cases, linkages only happen if funded. Extension departments are not usually funded adequately to allow for attendance at meetings or for participation in other joint activities. As government budgets and development aid becomes tighter, there will be increasing competition between institutions for funds to implement natural resources research projects. Indeed, many donor organizations are introducing competitive research grants. Increased competition has the potential to reduce collaboration and information exchange. To reduce unhealthy competition, there will be a need for more partnerships between institutions in the implementation of research activities. Greater decentralizing of funding could improve collaboration at field level, as local managers and field staff would have more flexibility in utilizing funds to mobilize local networks and organizations in implementing participatory research activities. Moving participatory research into a partnership mode of operation is likely to require co-financing of specific activities. Joint budgeting may not be easy, as it is likely to raise such issues as different allowance rates.

Communication and information

The restrictive information policies of NGOs and some government organizations, including fear of information piracy, can inhibit information release and exchange. Poor flows of information between research and extension, and lack of awareness of each others work plans, make co-ordination very difficult.

Additional problems relate to the publicity given to research successes or, at the other extreme, the apparent lack of relevance of the contribution of research. For example, the various partners in a collaboration may compete to take credit for a particular research outcome; extensionists and NGO staff may resent individual researchers if they see them claiming the credit for a particular technology. Conversely, they may claim that researchers make few efforts to share their knowledge and take a very long time to come up with technical solutions to the problems reported to them. If NAROs are not active, they will have little information or new technology to supply to extension, and there will be little incentive to develop linkages.

Management and mechanisms for co-ordination

Organizations often lack effective mechanisms for co-ordination and ways of managing linkages. Ineffective co-ordination mechanisms often account for the premature demise of collaborative efforts. From the national agricultural research system perspective, the main problem is poor linkages with extension systems. Moreover, a hierarchical, bureaucratic chain of command within extension hampers horizontal communication. It may be difficult for adaptive programmes to access a wide range of technologies from the specialist and commodity research programmes which they can test with farmers. Competition over ownership of project activities may be an issue at this point. The responsibility for maintaining linkages is often not clear, and ambiguity exists over which of the collaborating institutions should take the lead.

NGOs often lack information on the available potential linkages. They lack well established communication channels to access information on what other organizations are doing. Linkages are often formed on a rather *ad hoc* basis, out of personal contact rather than strategic direction. NGOs have problems with allocating time and resources to managing co-ordination with other bodies.

There is a need for institutional structures and management skills to facilitate linkages. Project staffing and recruitment would need to consider selecting or assigning staff with a positive collaboration record. Collaboration and linkage responsibilities should be included in staff terms of reference. Moreover, the project budget should include provision for training in collaboration skills, linkage activities, and instruments such as telecommunications facilities (radio, TV, e-mail), meeting places, seminars and workshops.

14.4 EXAMPLES OF STRATEGIES FOR BUILDING LINKAGES

The first case study illustrates how a project in newly independent Namibia worked to bring a range of stakeholders into the adaptive research and extension process in the Kavango region.

CASE 14.1

KFSRE: BROAD STAKEHOLDER IDENTIFICATION AND CREATING INTERDISCIPLINARY LINKAGES

The Kavango Farming Systems Research and Extension Project in Namibia placed great emphasis on the participation of stakeholders in project activities for a number of key reasons: to help ensure an integrated approach to rural development in Kavango; to contribute to the development of strong institutional structures for future work; and to maximize the project's effectiveness by involving those with relevant knowledge, skills and experience. Broader stakeholder participation was also seen as ensuring that the needs of different target groups were met, by involving them in project planning and implementation. Robust linkages were thought to facilitate the sharing of experience and learning as widely as possible, so that others might benefit from the project.

The project framework (revised version January 1997) makes explicit reference to other stakeholders and development of these relationships. Building the expertise and capacity of stakeholders, particularly researchers, extensionists and other development agents, in farming systems approaches and methodologies and participatory research was a significant component of the project outputs. The development of linkages to encourage participation in training, diagnostic surveys, joint planning and field research was essential to address this objective. Linkages were also seen as essential to fulfil another of the project's outputs, the dissemination of the results of project activities.

Major stakeholders and their roles

The main stakeholder groups identified were:

- technical component/strategic researchers from government ministries and other institutions
- government extension workers and extensionists associated with donor-funded projects
- other farming systems projects in the region
- NGO stakeholders, including development NGOs, farmers and church organizations
- international development organizations and bilateral donors; universities, international agricultural research centres and overseas research bodies (as sources of expertise and advice and channels for dissemination)
- policy and planning bodies and research and extension planning fora (in order to ensure that KFSRE activities were fully integrated into the regional and national development plans)
- service organizations, including banks and development corporations
- training institutions, such as universities and agricultural colleges (they should be aware of the farming systems research and extension approach in order to incorporate it in their own training activities).

Practical results from linkages

These organizations were mostly operating within the Kavango region and served the population with whom KFSRE was working. Through their knowledge of the project area, they were able to assist in regional zoning. This was followed by research, extension and local NGO staff participating in diagnostic surveys and farming system characterization exercises. Introductory workshops on farming systems research and extension were held for Ministry of Agriculture, Water and Rural Development (MAWRD) staff, and a steering committee representing key stakeholders was formed. Regional research evaluation and research planning meetings were organized to which main stakeholders were invited. Collaboration on adaptive research and for focused surveys (on blacksmiths, San bushmen, livestock and ethnobotany) was planned and implemented.

A specific linkage initiative

A key question for the KFSRE project and the other farming systems projects in Namibia was how to establish links with collaborators to bring about an interdisciplinary approach to problems of mutual interest. The project found general meetings with key collaborators to be of limited success, as they covered a broad range of general topics, and were time-consuming and of little direct benefit to participants. Other ministries perceived the farming systems approach to be a MAWRD initiative, designed to meet its objectives but not necessarily to help those of other ministries. It was, therefore, difficult for collaborating institutions to justify attending these meetings. In the absence of a decentralization policy, the notion of horizontal collaboration between the different line ministries at a regional level appeared to be difficult. Options considered were to develop a joint project; to have officials from different ministries working with the farming systems group; or to establish an interest group. The first two options met with resistance, but the third was implemented.

Source: KFSRE (1996, 1997).

Case 14.2, from southern Zambia, shows how a working collaboration can bring advantage to both sides: for the farmers, access to new seeds and planing materials; for researchers, access to farmers' assessments and feedback.

CASE 14.2

LFSP: STRATEGIC LINKAGES WITH PLANT BREEDERS

CARE established important linkages with national research teams. A food legumes breeder, based in the Southern Province, has provided the Livingstone Food Security Project with greengram and pigeonpea seed, both of which farmers are trying out. In addition, the root and tuber research team, based at Mansa in Luapula Province in the north of Zambia, made contact with CARE as they wished to test some of their sweet potato and cassava varieties bred for the dry areas of Zambia. These are currently also being tried out and multiplied by farmers. Finally, the sorghum breeder responsible for breeding the variety Kuyuma has also discussed with CARE the possibility of providing another new, early maturing white variety. LFSP's strategy is to disseminate varieties whose broad suitability is known, after which farmers will make their own choice.

Joint participation of CARE staff and researchers in participatory rural appraisal (PRA), and the common understanding which developed, undoubtedly contributed greatly to the building of productive, collaborative relationships during the on-farm research process. A huge amount of training in participatory methods was conducted, and a wide range and number of institutions participated in the exercises; overall some 125 people, excluding farmers, participated from over 20 organizations.

Source: Drinkwater (1997).

Case 14.3 from Chivi in Zimbabwe illustrates how establishing linkages with other organizations can be a successful strategy to improve farmers' access to information and technologies.

CASE 14.3

ITDG-CHIVI: BUILDING LINKAGES TO IMPROVE FARMERS' RANGE OF CONTACTS

In Chivi, the building of new linkages and the strengthening of existing ones between farmers and gardeners in Ward 21, and other institutions and individuals, has always been fundamental to the Intermediate Technology Development Group's Chivi Food Security Project's approach. The project has regarded its role as that of a facilitator, assisting the local community to improve and develop relationships with a wider world; relationships that would increase farmers' and gardeners' access to information, inputs and markets.

Multiple linkages have an effect on technology choice and use. The Chivi project had linkages with research organizations that helped to promote technology uptake of water-conservation practices for field crops and vegetable gardens. The main linkages were through the Institute of Agricultural Engineering, Mutoko (who introduced tied ridges), Makaholi Research Station (for mulching and ripping), and Chiredzi Research Station (for clay pipes for sub-surface irrigation). Mulching was introduced from Fambidzani Organic Training Centre (an NGO), and shallow well improvement from Zvishavane Water Project (an NGO).

AGRITEX, the government extension service, has been an important stakeholder and from the outset has been regarded by the project as a key partner. Traditionally, AGRITEX extension messages have been based on results from research station trials. They have focused on cash crops and high-yielding varieties that require expensive inputs of fertilizer and pesticides. There is little attempt to adapt messages to different physical and social environments, nor is there encouragement to experiment with or adapt techniques. Women's vegetable gardens are usually completely ignored by the extension service, which failed to recognize the valuable contribution vegetable production makes to household food security. In addition, extensionists focus on Master Farmers, a scheme that involves training over at least 2 years. Master Farmers tend to be drawn from the more affluent households. Extensionists spend so much time with Master Farmers that most community members do not have access to extensionists.

AGRITEX, like many government bureaucracies, works through hierarchical structures with a fixed chain of command, down which extension messages move. This method of information delivery means that the extensionist in the field (let alone the farmer) is far removed from the researcher who is conducting trials. It is hardly surprising that many farmers find the extension messages irrelevant to their situation. Worse still, even where relevant messages exist they often do not percolate down to the farmers rapidly, and farmers receive information that is out of date. In some instances, relevant information never reaches farmers.

These shortcomings (or at least their end result – farmers do not adopt recommended practices) have been recognized by many for some time. One of the project's objectives has been to explore an alternative approach to extension. This approach would explicitly try to respond to the needs and priorities of marginal farmers. It would try to incorporate and foster a more equal relationship between farmers, extensionists and researchers. It would respect farmers' own knowledge. It would emphasize direct contact between researchers and farmers. Most importantly, it would seek to involve government structures (particularly AGRITEX) to promote sustainable changes in extension practices.

Source: Croxton and Murwira (1997).

The DAREP example (Case 14.4) has some similarities to the CARE project example in Case 14.2, in that researchers were a source of seed materials. Of interest is the fact that relationships between agencies developed from personal relationships.

CASE 14.4

DAREP: BENEFITS FROM USING PREVIOUS CONTACTS

The Dryland Research and Extension Project had two features that put it in a strong position with regard to establishing linkages with other stakeholders. First, as a continuation of a previous project it was able to sustain some of the valuable linkages already established. Second, it engaged some experienced national scientists who were able to use their existing contacts and networks to enrich the research programme.

Building on an established institutional link

The agronomist on the previous project had established a good relationship with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) regional programme for sorghum and pearl millet, and also with the national research programme for these crops. Through this informal relationship, the project was able to obtain promising varieties of sorghum and pearl millet to test out with farmers. ICRISAT was also keen to use the project sites to conduct some pearl millet pathology trials which were implemented by the project. When the project started, this informal arrangement with ICRISAT continued. As a result of this linkage, new varieties were made available to the farmers at an early stage. The project also contributed to the national variety dissemination effort, as one of the varieties of pearl millet first tested by the project was later recommended by the national research programme for dissemination and for relief seed programmes. The relationship strengthened over time with a series of jointly planned activities. These included training of DAREP frontline staff, by ICRISAT and national experts, in variety selection and breeding methods and disease and pest identification in millet and sorghum; setting up expert farmer panels to evaluate new lines of millet and sorghum; visits by ICRISAT and national programme scientists to interact with the expert panels; visits by the expert farmer panels to the regional and national millet breeding site to assist with variety selections; and jointly writing papers to report the research outputs for national and regional scientific conferences.

Building on pre-existing professional networks

Each of the DAREP team members brought to the project a set of contacts with researchers and programmes outside the Embu Research Centre, which proved to be invaluable in terms of gaining access to new technology and expertise to feed into the project activities. The most striking example of this was the series of project agronomists, each of whom introduced new technologies to farmers in the project area. For example, the first Kenya Agricultural Research Institute (KARI) agronomist nominated for the project had a previous interest in testing out cowpea varieties, and obtained a kit of over 30 varieties through his contact with the International Institute for Tropical Agriculture (IITA). On being called for PhD studies shortly before the project started, he passed this on to the replacement KARI agronomist, who himself introduced new varieties of cassava and sweet potato which he had been working with previously in another research programme. Some of these varieties proved to be adapted to the drier areas. When this agronomist also left for PhD studies, his replacement arranged to obtain new varieties of chickpea which farmers were requesting, through a previous contact he had with a scientist working at International Center for Agricultural Research in Dry Areas (ICARDA). This agronomist left before the chickpea kits arrived, to take up another job, and his replacement brought additional adapted varieties of cowpea which he had been testing in an area adjacent to the project.

Source: A.J. Sutherland, personal communication (2000).

Linkage strategies

Some successful strategies for establishing linkages, illustrated in the case studies above, are summarized in Box 14.1. The implementation of these linkage strategies should lead to improved project design and working relationships.

14.5 DISCUSSION OF BENEFITS FROM LINKAGES

The following section draws on the case-study material to outline the main functions and benefits of a range of different institutional relationships. These are summarized in Box 14.2, which is followed by a more detailed discussion.

Links for more effective participatory technology development through gaining access to knowledge, ideas and information, and research outputs

Linkages, both nationally and internationally can secure efficient and effective access to information and experience, particularly for

Box 14.1 Tips on strategies for developing linkages

- ✔ Undertake broad stakeholder identification and encourage the active and practical participation of stakeholders in planning and implementing project activities, such as participatory appraisals, surveys and characterization activities and site selection (Case 14.1).
- ✔ Accept and foster linkages for the participatory testing of planting materials or to carry out joint adaptive research on technologies developed in research institutions (Cases 14.1–14.4).
- ✔ Provide training and workshops for invited stakeholders in participatory methods and systems approaches (Cases 14.1–14.3).
- ✔ Develop focused collaboration rather than broad-based meetings, through the formation of interest groups or interaction with expert farmer panels (Cases 14.1 and 14.4).
- ✔ Involve stakeholders at a strategic level through membership of steering committees, monitoring and evaluation panels, and regional research planning meetings (Case 14.1).
- ✔ Involve project staff in technical training provided by researchers (Case 14.4).
- ✔ Pursue personal and professional contacts with other stakeholder institutions and develop linkages at different management levels (Case 14.4).

Box 14.2 Potential benefits from collaboration

- Maximizes access to knowledge, experience, skills and ideas through sharing of literature, information and methodologies.
- Broadens access to materials and technology choices, and brings additional resources and skills into programmes, such as finance and technical expertise.
- Facilitates wider participation in research agenda setting, increasing its relevance to the needs of different target groups incorporating farmer-based technology assessments and creating wider ownership within the research process.
- Establishes dissemination and uptake pathways for sharing of experience and learning.
- Builds capacity through training and learning-by-doing.
- Integration with, and influence over planning processes and regional development plans.
- Longer-term influence on agricultural policy.

remote projects. The case studies show the importance of exchange of information and materials with NAROs. For example, the ITDG-Chivi project in Zimbabwe obtained useful information on water management technologies from the research institutions. Such links for technology testing and access to varieties were also important for the NARP II (Kenya), CARE LFSP (Zambia) and KFSRE (Namibia) projects. International agricultural research centres and other outside research bodies have been accessed by NARP II and KFSRE as a source of crop varieties and methods. There were variable degrees of two-way exchange involved in these relationships, those established for joint technology testing being the most interactive compared with those that accessed varieties from national and international research.

Linkage for provision of inputs and services required to ensure feasibility of technical options, and resources and funding for implementation

There are similar arguments that linkages improve access to inputs and services. However, in general the case-study projects have had limited contact with service organizations and the private sector, other than for seed supply (the KFSRE, CARE LFSP and ITDG-Chivi projects accessed seeds from the private sector, and NARP II interacted with the Kenya Seed Company). As well as their importance for accessing inputs, linkages can be vital for efficient marketing of produce, necessary in cases where there is increased supply of new or altered products. The Larger Grain Borer (LGB) Control Project, Ghana, worked with market traders to evaluate the effects of various treatments on grain. Linkages to obtain funds for PTD were not particularly evident in the case studies, but the discontinuation of several projects indicates the importance of linkages for funding purposes.

Improving the research agenda of national agricultural research systems through participatory teams and farmer research groups acting as pressure groups

Linkages can create the conditions for influencing the research agenda based on farmer-defined priorities. They can provide opportunities for debate in the context of research priority-setting, which itself is part of a broader strategy for agricultural research and development. An example is given by the KFSRE Project where farmers participated in NARO planning meetings, although their contribution was small. DAREP farmers in Kenya also participated in research planning.

Dissemination of new information from participatory technology development teams through varied uptake pathways

The notion of pathways for dissemination and uptake is an important one for projects that seek to maximize the impact of their findings. The extension department is one of the obvious uptake pathways, and hence a crucial link for PTD teams in seeking wider impact of their work. The KFSRE project made a particular effort in dissemination to extension and research through training, papers and workshops. International dissemination through publications and participation in conferences such as the regional farming systems research and extension conference was also important.

In some cases the channels for uptake can be more direct. Approaches such as open days and site visits can help to disseminate findings to farmers in the immediate localities. For example, DAREP invited farmers and farmer research groups to request information from the research sites. The case studies contain limited reference to NGO, service organization and private-sector linkages for dissemination, nor does there appear to be research on dissemination and adoption itself.

Training of farmers and researchers involved in participatory technology development

Linkages can facilitate access to training for researchers, extensionists, NGOs and farmers. Examples include NARP II's links with national training institutes such as Egerton University. Both the KFSRE and ITDG-Chivi projects arranged 'training for transformation' for their extension teams and community groups /extension teams, respectively. KFSRE organized PRA and farming systems training for research and extension, and supported social science training at the University of Namibia.

Links to gain and maintain political space and freedom to do participatory technology development

Linkages with local government and traditional leaders can create a 'political space' for participatory approaches. The ITDG-Chivi project found that the increased experience of farmers through participatory approaches gave rise to demands for greater accountability on the part of local government, and more active efforts by farmers to lobby and influence policy. An example was the attempt by the Farmers' Union to influence marketing boards and their relationship with local government. This confidence-building can, in turn, enhance the sustainability of the participatory approaches and farmers' research groups.

Improved policy formulation

Those involved in participatory research are well positioned to influence agricultural policy formulation in their area by providing information, publicizing issues in the media, and facilitating farmers to function as a pressure group. Policy bodies received regular reports from NARP II, and the KFSRE Project provided reports for the Directorate of Agricultural Planning, Co-operatives and Marketing and the National Planning Commission.

14.6 CONCLUSIONS

Despite the factors that can make establishing linkages a difficult process, it is clear from the case-study examples and discussion of the benefits from linkages that there is much of a positive nature to be gained by fostering collaboration which is built on good mutual understanding between stakeholders.

In order to understand the benefits of collaboration, there is a need to evaluate the contribution of linkages and collaboration, recognizing the different types and objectives of linkages, whether primarily task-oriented or relationship-centred, or whether short-term and time-bound or long-term in intention.

Managing and sustaining the collaborative process

15

15.1 INTRODUCTION

This chapter analyses in more detail the issues and constraints that apply to collaboration between different stakeholder groups, and discusses strategies for overcoming them. The key players in collaborative participatory research are identified, and case-study material is presented which illustrates aspects of the working relationships between these players. The national agricultural research organizations (NAROs) which employ natural scientists and plant and livestock breeders, and the national extension departments which have a variable institutional relationship with national research, are the players focused on in the earlier cases documented here. The discussion then focuses on other important players: NGOs, universities, training institutions and international research bodies, followed by policy and planning bodies, service organizations and the private sector. Finally, some points of advice on managing and maintaining linkages are summarized.

15.2 LINKAGE WITH NATIONAL AGRICULTURAL RESEARCH ORGANIZATION SCIENTISTS

National agricultural research organizations generally have national responsibility for research which addresses the priorities defined by the national agricultural research policy. In addition, a number of countries have regional research centres which have more specific mandates for adaptive research appropriate to their different internal regions. There are broad differences in capacity and size between the different NAROs, largely influenced by historical factors, the importance of the agricultural sector, and differences in agricultural research policy, donor support, and educational policy. Where national capacity is limited there is a greater need to develop working linkages with other organizations in order to extend capacity for participatory and adaptive research activities.

CASE 15.1

KFSRE: LINKAGES WITH RESEARCHERS

The institutional context and policy for placement of researchers in Namibia was very unfavourable to the development of regionally based farming systems research and extension activities. The research agenda was developed at the national level, and the process lacked effective mechanisms to incorporate regional priorities. However, the Kavango Farming Systems Research and Extension Project's efforts to draw researchers into regional diagnostic and planning activities have yielded benefits.

Centrally based researchers involved largely with on-station work, and interacting mainly with commercial farmers, may feel threatened by the farming systems approach. They lack experience and confidence in farming systems research (FSR) and participatory rural appraisal (PRA) methods. Training workshops in FSRE approaches have been useful in familiarizing researchers from the crops, horticulture and livestock departments and the Farming Systems Research Unit (FSRU) with farming systems approaches, and in increasing their confidence to work together with the regional team.

Positive examples of collaboration with technical researchers included:

- Regional planning meetings involving crops researchers and facilitated by KFSRE. These were developed as a starting point for including regional agendas in national planning.
- The participation of crops researchers in diagnostic surveys, technology screening and monitoring and evaluation activities with farmer research groups. This was particularly successful with a roots and tubers researcher and a legume (cowpea) researcher, but less so with cereals where the researcher had reached the final year of advanced testing, required statistical rigour, and was just beginning to discuss on-farm trials by the end of the project.
- The assignment of a research officer to the project region for 1 week of each month during the cropping season in the second year of the project. A lack of manpower had resulted in minimal researcher input to on-farm trials in the first year. This had demonstrated the need for higher levels of individual personal liaison between project staff and researchers in subsequent activities.
- Collaboration with livestock researchers and the Northern Livestock Development Project (NOLIDEP) through participation in baseline surveys and range management activities in the NOLIDEP focus communities. The large number of these focus communities was problematic when it came to trying to incorporate them into the work of the extension department, nor was it possible for them all to become KFSRE focus communities. Instead the project worked with three NOLIDEP focus communities.
- Collaboration with forestry through the Kavango Agroforestry Working Group.
- Collaboration with the draught animal power unit for a blacksmith survey and on-farm testing of weeding technologies, although its management was indifferent to off-station work.

Most livestock researchers were Windhoek-based. Collaborative work between NOLIDEP, KFSRE and a poultry researcher from the Ministry of Agriculture, Water and Rural Development (MAWRD) developed in the later stages of the project. The project had recruited a fishery specialist through the UK Department for International Development (DFID), which promoted better collaboration with the Ministry of Fishery and Marine Resources (MFMR). However, MFMR had severe staffing problems and there was no MFMR presence in inland regional centres. The DFID recruit fulfilled a crucial role in strengthening knowledge of inland fishery. Unfortunately, there were no instances of MFMR staff involvement in needs assessments or developing a research agenda. This was because there were no research personnel stationed in the region (or available to work there) as livestock, fisheries and forestry researchers were centrally based in Windhoek. Poor accommodation and food at the project base further discouraged researchers from spending more time there. Joint research activity with the National Botanical Institute was also constrained by staff shortages in their department. Other collaborative projects which were considered floundered on the problem of jointly managing resources from different ministries.

The monthly plant production co-ordination meetings tended to be unpopular, and were not perceived as bringing tangible benefits to the participating institutions. The long distances between the respective locations of the regional team and the researchers exacerbated the inter-institutional communication problems.

With the establishment of the farming systems units in Namibia, the possibility of full-time attachment of staff from other ministries and directorates was created. However, these opportunities were not taken up by the relevant institutions, as no ministry was prepared to assign staff on a full-time basis to the farming systems unit (FSU). An alternative was for the FSU to develop activities which directly impinged on ministry terms of reference and mission. A synergy was clearly perceived. This allowed the target ministry to increase its coverage through access to Department of Extension and Engineering Services staff. This went some way towards facilitating the achievement of their objectives, while at the same time KFSRE was able to influence their agenda through advocacy.

Source: Matsaert et al. *(1997).*

CASE 15.2

ITDG-CHIVI: IMPROVING LINKS BETWEEN RESEARCHERS AND FARMERS THROUGH PARTICIPATORY RESEARCH

The Intermediate Technology Development Group's Chivi Food Security Project has facilitated improved links between NARO scientists and farmers and gardeners in Chivi District. In Zimbabwe, formal agricultural research is predominantly undertaken by the Department of Research and Specialist Services (DRSS) which has research stations as well as a farming systems research unit. There are two DRSS research stations in the semi-arid area of southern Zimbabwe, at Chiredzi and Makaholi. The project has deliberately drawn these research stations into the technology development process by inviting researchers to join in experiments, and facilitating and organizing visits by farmers' and gardeners' representatives to research stations. The FSRU also has a history of work in the district. The project has also developed links with the Institute of Agricultural Engineering in Harare.

Makaholi Station is situated close to Chivi District, and had established programmes of work in the area long before the ITDG project started. The relationship with Makaholi has been extremely beneficial. Strong links have developed with their CONTILL (conservation tillage) Programme. Here an interesting model of research and extension has developed. Over time, the project has built up a relationship with farmers that has enabled problems and ideas to be discussed far more openly than in the past. The project, however, has no specific research capacity; and in contrast, the research station has no specific extension capacity. Previously, the extension route for research station outputs was through AGRITEX, whose extensionists provided prescriptive, 'blanket' messages to farmers, but did not provide a channel for farmers' concerns and ideas to feed back to researchers. The project's approach has been to build on the complementarities between researchers' knowledge and skills and those of farmers and gardeners. The result has been a new type of relationship developing between research station staff and cultivators, involving a more direct interchange of ideas and a growth of mutual respect. This, in turn, has resulted in a remarkable uptake of certain techniques developed on research stations, which were not adopted to the same degree in the past.

Boosting farmers' and gardeners' self-confidence through an approach that values their skills and knowledge has provided two major inputs to the research process:

- research has been able to focus more precisely on, and be more accountable to, the needs of farmers and gardeners
- farmers' own research and experimentation has been harnessed more effectively and included in the dissemination process.

From time to time, problems did emerge as the project attempted to develop linkages between farmers and researchers/extension staff. Most of these problems were related to attitudes of staff and lack of adequate resources on both sides. Part of the problem was solved after sending some of the government staff on training for transformation courses.

Source: Croxton and Murwira (1997).

CASE 15.3

NARP II: LINKS BETWEEN NATIONAL AND REGIONAL RESEARCH

Applied and strategic research for the National Agricultural Research Project, Phase II is carried out within the Kenya Agricultural Research Institute (KARI) through the national research programmes (NRP), co-ordinated either from the Nairobi headquarters or from the national agricultural research centres. Most of the scientists involved in the regional research programmes also implement KARI's national research programmes. For instance, the maize breeders at Kitale are responsible for developing maize hybrids and varieties for the humid highlands, and the same scientists are engaged in evaluations of new releases and advanced lines with farmers through the regional research programmes (RRPs). Feedback of farmers' opinions is automatic in this case.

However, such linkages are not so strong in all cases, particularly where the NRP co-ordinator is based at a different centre. In the worst case, the NRP co-ordinator simply sends 'kits' (collection of germplasm, inputs and instructions for testing) to the designated scientists at other centres, analyses the data and sets the research agenda, with little feedback from the scientists on the ground. This problem varies from programme to programme, and is largely due to funding levels. Meetings of all the scientists involved in particular NRPs have been organized in the past, but are currently very rare as a result of financial constraints.

Source: Rees et al. *(1997a).*

CASE 15.4

FPRP: LINKAGES BETWEEN NATIONAL AGRICULTURAL RESEARCHERS AND AN NGO

The ActionAid Farmer Participatory Research Project in Uganda made vigorous efforts at the beginning of the project to contact different research stations and their commodity programmes. However, these initial links proved difficult to develop. National agricultural research organization scientists visited the project's on-farm trials from time to time when invited to attend meetings and showed quite a high level of interest, but this did not develop into a commitment by scientists to provide regular input to the project, although the project budget included funds to cover the costs of such input.

Before the end of the project, the unit began looking more critically at why these links did not develop as desired. It became clear that several factors were involved. The loss of a key individual, the AAU Agriculture Programme Officer, was significant because he had the connections and insight into the national research and extension structures and could have helped promote linkages.

There were practical and logistical difficulties in communicating with the research stations. For example, Namulonge Research Station, where the National Cassava Programme was based, was a one and three-quarter hour drive away and without a telephone connection. Postal services were extremely slow. Researchers were liable to be called away up-country at very short notice, so planned meetings often proved fruitless. This was a time-consuming, costly and frustrating process.

The relationships that developed were made between the unit and individual researchers, rather than agreed and approved at institutional level. The project staff concluded that a memorandum of understanding between AAU and NARO might have created more possibilities for participation with the project. It would also have encouraged dialogue and the development of a shared understanding about the project, the operation of NARO and its respective commodity programmes. This, in turn, could have led to joint planning with AAU as the basis for active involvement of NARO scientists. However, whatever the formal arrangement, collaboration would have had to accommodate the national programmes' responsibility to address research priorities at country level, as well as being able to respond to more local problems.

Source: Martin and Salmon (1996); Salmon and Martin (1997).

Discussion

The case studies emphasize the challenge of training and building awareness of participatory approaches among national agricultural researchers in order for collaboration to have a sound basis. An important strategy to engage NARO scientists in participatory research is to convince them that it is of relevance and benefit to their concerns. It must be clearly seen that active linkages with other organizations will assist them in achieving their objectives. This is a particular challenge where a focus on the needs of client small farmers is comparatively new in terms of research policy and practice, as in the Namibian case, or where institutional mandates address problems at different scales – regional or national – as in the Kenyan and Ugandan examples.

Researchers generally lack practical experience of participatory research, and staff availability for such training is frequently limited. Strategies to overcome this included running training workshops in participatory approaches for building confidence and familiarization at different levels of management (Cases 15.1 and 15.2).

The methods for encouraging researcher/farmer interaction discussed in Part One of this book are also relevant here, for example, encouraging researchers to interact with farmers during farmer visits to research stations, encouraging researcher participation in planning and monitoring of on-farm trials, joint evaluations, and so on.

Another factor is that limited national research capacity is concentrated in very few institutions, while research planning is frequently a centralized rather than a devolved regional responsibility. Often, when it is devolved, approval must still be sought from headquarters. This is problematic, particularly where communications and logistics are difficult, and makes it difficult for researchers to respond to a particular regional agenda which may differ from their focus within the national research strategy (Cases 15.1 and 15.4). This is less of a difficulty in situations where there is overlap between national and regional research responsibilities, for example in the National Agricultural Research Project, Phase II (NARP II), where responsibilities for strategic and adaptive research were based at the same centre (Case 15.3). Strategies to sustain collaboration include regional co-ordination meetings and longer-term attempts to influence policy to assign researchers to regions.

Lack of resources to sustain the operation of linkages is another issue. Several of the case-study projects found that lack of funds constrained participation in meetings and limited opportunities for feedback between national researchers and field-level projects (Case 15.3). However, although resources to support linkages with research are necessary, they are by themselves insufficient. The ActionAid farmer participatory project budget included funds to support researchers' participation, but other institutional factors were at least as significant in constraining participation (Case 15.4). In Namibia, researchers complained of donor funding favouring extension rather than research. The role of strategically placed individuals in facilitating linkages with research organizations and supporting collaborating staff should not be underestimated (Case 15.4). However, this can constitute a serious weakness in collaborative relationships if they are based solely around individual linkages without wider institutional recognition or participation. Formalization of inter-institutional relationships through a memorandum of understanding can be useful, although in some cases may be found to be too rigid as a starting point.

One of the most straightforward linkages between the case-study projects and national researchers was through the provision of seeds and planting material. There were fewer examples of interaction based around joint research on complex, knowledge-intensive technologies involving adaptations in management and changes in understanding (Case 15.2 gives a good example).

15.3 LINKAGE WITH GOVERNMENT EXTENSION WORKERS

Extension departments vary in their structural and functional relationship with research, sometimes being part of the same ministry as crops or livestock research, while in other cases they are separate. They vary, too, in their degree of regional autonomy. Linkages between participatory research and extension are very important if the results and recommendations arising from research are to be scaled up for a wider impact. The case studies raise issues of the compatibility of extension methodology with participatory research approaches and the different capacities of extension institutions, yet emphasize their key importance.

CASE 15.5

KFSRE: INITIATIVES FOR WORKING WITH EXTENSION

The Kavango Farming Systems Research and Extension Project's interaction with extension staff was in many ways easier than with technical staff, because extensionists, like the project team, were regionally based. In addition, agricultural extensionists had a strong commitment to developing a farming systems and participatory approach in their work. The involvement of government extension in the project was assisted by the inclusion of staff originating from both research and extension departments in the project, and by the supportive attitude of the local Deputy Director of Extension and the Chief Agricultural Extension Officer.

There were, however, a number of limitations to extension involvement. Agricultural extension staff had little understanding, training or practical experience in farming systems research and extension approaches. In addition, they were heavily burdened with non-extension activities such as the sale of inputs, servicing of loans, tractor hire, etc. There were many ministries and projects operating in Kavango region, and this often resulted in a lack of co-ordination and replication of effort, particularly as extension co-ordination meetings were held only infrequently.

Joint activities with government extension workers included co-ordination meetings (which also included other stakeholders), on-farm activities, participation in study tours and courses facilitated by KFSRE, and membership of working groups. However, with the exception of some contact in the livestock working group, there was a disappointing lack of contact with extension staff from other departments (Environment and Tourism, Rural Development and Rural Water Supply, Community Development, Department of Health and Social Services and Forestry extension staff). Problems arose due to the infrequency of co-ordination meetings, different project approaches, and the lack of job descriptions for extension staff. Despite efforts by the Chief Agricultural Extension Officer, co-ordination meetings were seen as a talking shop that wasted valuable time. All extension staff had job descriptions, but these were generic rather than specific. Co-ordination was non-existent; this was not seen as anyone's task. Therefore, there was little incentive to link to other institutions. It is only recently that the need for involving health and other ministries was acknowledged. This is on the agenda to rectify.

Interest groups as a stimulus to collaboration

The Kavango livestock interest group, loosely associated with the Kavango Farming Systems Unit, was a multidisciplinary group with participants from the Directorates of Veterinary Services, Forestry and Extension, the Ministry of Education, Agribank, farmers' organizations, and representatives of donor-funded projects. Group rules were established at the outset: monthly activities of different participants would be tabled at each meeting; each meeting was themed and included a short presentation from the person best qualified in that area. None of the conclusions or recommendations reached was binding and there were no budgetary obligations. This made the meeting as unthreatening as possible.

Farming systems perspectives were maintained by the inclusion of non-livestock-related disciplines and farmers' representatives. An example of achievements relating to the core interests of the group was the agreement by participants that basic animal husbandry skills were weak, including animal husbandry extension. The vets and researchers identified these more specifically and wrote extension messages. Training for extension agents and farmers, and a dissemination campaign, were planned. Most importantly, each of the different collaborators could see a clear benefit from participation. The coverage of different directorates in a region was increased. The Kavango livestock interest group produced five extension messages and went on to develop three research project proposals.

Source: Matsaert et al. *(1997).*

CASE 15.6

ITDG-CHIVI: TRANSFORMING EXTENSION APPROACHES

In Chivi District the agricultural extension department, AGRITEX, was in a good position to respond to the external stimulus of the Intermediate Technology Development Group's Chivi Food Security Project. Key staff had acknowledged that their conventional extension approaches (a variant of the training and visit approach) had failed to bring about widespread adoption of new technologies. This was combined with declining government funding, necessitating a review of cost-effectiveness. In addition, senior AGRITEX officers in Masvingo Province were able to see tangible results and learn from the experience of participation by projects active in the Province, including ITDG-Chivi project, the German Development Agency's GTZ/CONTILL (conservation tillage) project based at Makaholi Research Station, and the Integrated Rural Development Programme (IRDEP) in Gutu.

In contrast, the project has had little effect as yet on the extension approach of the Department of Veterinary Services, which provides an animal health extension service to farmers. It is still common practice for veterinary extension assistants to wait for farmers to approach them, and they rarely go out and share knowledge with farmers.

Building communication channels with AGRITEX

The project sought to engage with AGRITEX at different levels: at field, district and provincial level. At field level, the project worked closely with the Ward 21 extension workers who were included in community meetings and planning workshops and attended training for transformation courses. Training and feedback workshops were held in order to share the approach, as it developed, with the extension workers and to demonstrate to more senior AGRITEX officials that field extension staff could adopt such an approach. Both ITDG and the GTZ/CONTILL project facilitated this training.

AGRITEX officers and senior officials at both district and provincial level were informed of the aims and progress of the project. At district level this was done through regular reporting to the District Development Committee, circulating reports, inviting them to visit the project, and through verbal and written reports. Provincial AGRITEX officers kept national-level officials informed of the project.

Beyond training for transformation

The response to this was an increasing level of interest in the project's approach. Training for transformation was recognized as providing skills that allowed the extension workers to work more effectively with farmers. In 1994, AGRITEX obtained funding from GTZ to send all the district's extension workers on these courses. By mid-1996, 19 of the 33 extension workers, all the district's supervisors and four of the district's officers had been trained.

Although AGRITEX was quick to recognize the benefits of training for transformation, it took longer for it to be recognized that the project's approach (and successes in promoting the widespread adoption of some new techniques) was based on more than just training for transformation. The continued sharing of information at provincial and district level slowly helped to put the message across. Masvingo provincial officers began to cite the ITDG-Chivi project in national fora as an example of participatory approaches to development.

In addition, extension workers began to make demands on their supervisors, demanding more and different training so that they could do their job more effectively. These demands percolated upwards through the AGRITEX hierarchy. The end result was action to initiate change in AGRITEX at provincial and district levels.

In 1994, AGRITEX organized several workshops to review their extension methods in Chivi District, inviting representatives of other stakeholder groups. For example, the workshop held in April 1994 focused on farmer's priorities, the constraints of concentrating only on Master Farmers, and the effectiveness of imposing extension messages on farmers. It was attended by all AGRITEX district staff, district councillors and one farmer from each ward. The farmer representative from Ward 21 assisted in facilitating the meeting.

Scaling-up to provincial and national level

In early 1995, an all-staff conference was held at provincial level to share experiences. ITDG and the CONTILL project staff were invited to attend. By now, many of the district and key provincial staff had visited the project. The following resolutions were made at the conference:

- a participatory approach would be initiated in all seven districts in Masvingo Province
- training for transformation and training in PRA techniques would be used to change extension staff's attitudes and provide them with tools for more participatory working
- the Chivi, CONTILL and IRDEP projects, based in Gutu District/Masvingo Province, would be used as models that could be used to support AGRITEX work in all the Province's districts
- the Master Farmer training would be reviewed with the aim of making it more inclusive of, and relevant to, marginal farmers.

AGRITEX went on to develop a strategy to test and adopt a more participatory extension approach in Chivi District, initially based around the two wards (21 and 4) where ITDG had been working. This involved training for extension workers and their supervisors in implementing a participatory approach to extension, and regular feedback workshops with farmers to support the planned extension work.

A great strength of this plan is that it has been developed by AGRITEX at district level. It has not been devised or imposed by ITDG. This implies a considerable feeling of ownership of the process, and also ensures that the strategy for change is appropriate to the needs and resources of AGRITEX. ITDG and the Chivi project will support this process, providing training and distilling lessons learned in way that brings out the implications for AGRITEX staff. However, ITDG will no longer be directly involved with the communities in these two wards.

There is also increasing evidence of interest from AGRITEX at national level. Masvingo provincial officers have used their experience and knowledge of Chivi to lead the debate on participatory approaches at national level. During a recent visit to Zimbabwe by senior agriculturists from the Caribbean, AGRITEX arranged for them to visit Chivi to see a more participatory approach in action. AGRITEX Head of Training was invited by ITDG to join the external team that evaluated the project in 1996, and has since become an enthusiastic advocate of key elements of the approach.

Need for cost-effective participatory extension

The opinions of farmers and gardeners, and practical results in the Chivi project, indicate that farmer-to-farmer dissemination is the most effective. The project has strengthened local farmer-to-farmer dissemination capacity by building self-confidence, and also by building links with other institutions that can supply information and expertise for further dissemination by farmers. Exchange visits have been an important method of sharing information. However, they are expensive. Current budget constraints mean that AGRITEX will almost certainly not be able to replicate such activities at a similar level of intensity. New ways of encouraging sharing of the experiences of researchers and innovative farmers, as well as funding look-and-learn visits, need to be found.

Source: Croxton and Murwira (1997).

CASE 15.7

NARP II: MECHANISMS FOR RESEARCH–EXTENSION LIAISON

The KARI/ODA National Agricultural Research Project, Phase II's documentation placed great emphasis on links and collaboration with the extension services. The memorandum of understanding between KARI and Kenya's Ministry of Agriculture, Livestock Development and Marketing (MALDM) required joint planning, implementation and review of regional research activities. Key features of this collaboration were the establishment of Research Extension Liaison Officers (RELOs) at each research centre, of Regional Research and Extension Advisory Committees (RREACs), and of Centre Research Advisory Committees.

The research–extension liaison officers were staff members of MALDM's provincial agricultural office, reporting both to the Provincial Co-ordinator for Agriculture and to the KARI Centre Director. At Kisii, the RELO was based at the research centre, while at Kitale the RELO was based at the district agricultural offices. At both centres the liaison officer was involved in planning, implementation and review of regional research activities, and was specifically responsible for organizing joint meetings together with the regional research programme co-ordinator. As a result of their different backgrounds and greater interaction with other extensionists, the RELOs' perspectives tended to reflect the training and visit approach to extension and research.

Originally, the RREACs were intended to plan and review joint research–extension activities (surveys, on-farm research, training, field days and demonstrations), whilst the Centre Research Advisory Committees were intended to review all the research activities of the research centres. Many centres combined these into one review and considered the possibility of including an overview of extension activities in RREAC meetings.

Membership of the two committees included the centre scientists; district- and provincial-level Heads of Departments of Agriculture, Livestock Production and Animal Health; RELO, NGO and government representatives (in some cases); and 'representative farmers'. There were no formal criteria governing the selection of NGO, government or farmer representatives. The latter tended to be the managers of Farmer Training Centres, and so were themselves employees of MALDM. Membership of the Centre Research Advisory Committees was also extended to experts from local universities and international and local agricultural organizations.

At both Kisii and Kitale centres, the two committees were combined and taken seriously, particularly with regard to the regional research programmes. These were formulated by scientists, extensionists and other 'experts', and were later subject to farmer validation. Several proposed activities were rejected or revised by the RREACs before farmer validation, either because the RREAC did not consider them technically sound, or because of duplication of effort with other projects/programmes. This latter point was probably the most important contribution of the RREACs and Centre Research Advisory Committees, which were the principal fora where scientists, (senior) extensionists and research managers gained an overview of all the activities of the centre, and to a lesser extent of the mandate region. The main weakness of the committees was the 'transfer of technology perspective' of most of the senior personnel, as opposed to a more collaborative partnership approach.

All the regional research programme's field activities and on-farm technology evaluations were undertaken in collaboration with the local extension representative, usually the frontline extension worker. Some of the extensionists were more interested and committed than others; for example, at two sites the frontline extension workers lived at some distance from the area for which they were responsible.

The extensionists had other responsibilities and activities, and there had been complaints of lack of co-ordination between the researchers and the frontline extension workers. The project planned to address this issue by jointly defining and agreeing upon the roles and responsibilities of the researchers, the farmers and the extensionists, perhaps in the framework of 'community research groups', before the start of the following season.

Source: Rees et al. *(1997a).*

CASE 15.8

ARPT/LFSP: AN EVOLVING RELATIONSHIP WITH EXTENSION

A key institutional issue was that the Adaptive Research Planning Team in Zambia never really established effective linkages with extension, through which it could have ensured the lateral spread of the work of the farmer research groups (FRGs). Although the FRGs were clearly effective and had longer-term potential, the benefits of the on-farm trials remained limited and localized. The Extension Branch, which not only had capacity problems of its own, but was being pressured down the training and visit route at this time, was not able to utilize the type of interactive group approach being tested with the FRGs. The fact that these groups were few in number, and thus the demonstration effect was relatively limited, was undoubtedly a constraint.

Key staff of ARPT left the organization in the mid-1990s, and bureaucratic delays in recruitment meant that there were few new staff with significant experience to carry on the work that had been initiated. As a result, innovative work in Zambia in the field of farmer participation in adaptive research and extension passed on to other institutions and projects, of which the CARE Livingstone Food Security Project is one.

CARE Zambia was facing the challenge of assisting farmers to adapt to the new realities of structural adjustment, which had resulted in the demise of the previous parastatal institutions supporting the subsidized production of hybrid maize with fertilizer. Farmers needed help in developing economic or non-subsidized livelihood systems. The dynamics of extension, especially when the training-and-visit system was being strongly encouraged, were more suited to dealing with certainties – fixed messages being pushed down through the system – and not dealing with changing circumstances on the ground. The challenge was to encourage the evolution of new institutional forms and systems that were viable in the more market-oriented economic environment. A substantial amount of interest was generated arising from CARE's institutional relationship with the Extension Branch. Three factors helped influence the way the LFSP's relationship with extension evolved.

The first can perhaps be seen as one of the outcomes of ARPT's earlier work, a large International Fund for Agricultural Development (IFAD)/World Bank-supported Southern Province Household Food Security Project. Consultants associated with ARPT and ARPT's direct staff had substantial input into the design of the project, which was promoting a participatory farming systems research and extension programme in Southern Province. Because of this participatory brief and the available funding, the Provincial Agricultural Officer became keenly interested in the CARE LFSP project as a pilot approach.

Second is the fact that LFSP went to scale quickly with the seed programme. Its large-scale demonstration effect generated a sharp interest in the project's approach in a short period – something ARPT was not able to achieve. Third, the LFSP demonstrated a community institution-based extension methodology which proved successful for the seed activity, and which did not need large numbers of salaried field workers. The LFSP used only a few diploma-level staff, each covering an area normally occupied by three or four certificate-level extension staff of the Ministry of Agriculture.

Because the IFAD/World Bank project was looking for new approaches which would make a difference, and because the Provincial Agricultural Officer was highly receptive, the LFSP was in an opportune place and time to be able to influence the Ministry of Agriculture. The LFSP provided training in participatory methods to the young ARPT in Southern Province, and to the extension staff in the two agricultural districts in which the project was operating. However, the Provincial Agricultural Officer wanted the project to train more widely in the Province, whilst in Lusaka, at the national level, the ministry talked of trying to pilot the project's community-based extension approach more widely. Certainly, in the context of the IFAD project, the Provincial Agricultural Officer adopted CARE's language, referring to village management committees rather than to farmer extension groups, which due to their weakness had disappeared as separate organizations in the LFSP project area. It will take much longer to see if the LFSP's methodology has a lasting influence on the nature of the extension system in the Province and perhaps more widely in the country, but the dialogue at this stage is more encouraging than was mostly the experience with ARPT.

Source: Drinkwater (1997).

Discussion

Some of the problems with linkages and interaction with NAROs, such as centralization, staff shortages and lack of experience in interacting with farmers, are less acute with extension. However, as with the researchers, extensionists often lack confidence in their ability to operate with participatory approaches. Several of the projects (Cases 15.5 and 15.6) had very positive experiences with training for transformation with extensionists (and farmers) as well as PRA training (Case 15.8), although the time scale needed to bring about broader changes in approach and attitude, rather than acquisition of specific tools and skills was, in the majority of cases, longer than expected.

There are also differences brought about by the extension approach itself. The regional base of most extension operations facilitates specific interaction around farmer-defined issues. But where extension operates with a relatively rigid training and visit system and with a bureaucratic chain of command, it appears to be more difficult for them to engage in the flexible interaction and learning processes associated with participatory research (Cases 15.6–15.8). Motivation is likely to be low unless such approaches are recognized and rewarded. One of the positive factors encouraging collaboration in the Chivi case (15.6) was the awareness within the extension service that there were shortcomings in the existing approach.

Whereas researchers are tasked with national-level strategic research, extensionists also have demands on their time from competing activities such as administration of agricultural inputs and ploughing schemes (Cases 15.5 and 15.7). In Namibia, the department of extension subsequently had its buying and selling functions removed. Where extensionists are working with a number of donor-funded projects there may be competition for their time, especially if co-ordinating mechanisms are absent. There may be an inconsistency in operational philosophy and procedures followed by different projects, for example, relating to input supply and subsidy. Conversely, when several projects operate in the same region, with similar participatory approaches, they can add to the impact and influence on the extension organizations. The additional synergy and encouragement this gives to participatory approaches are illustrated in the Chivi example (Case 15.6).

Efforts to create liaison positions between research and extension (Case 15.7) can be useful in encouraging joint meetings, but may be limited in their impact if there are obstacles to passing information from research to extension, and *vice versa*. Research–extension advisory committees can be very important in reducing duplication of effort between projects/programmes.

The case studies contain some successful examples of scaling-up participatory approaches through effective collaboration and support to extension (Case 15.6). Influences may take some years to show results, for example the ARPT project in Zambia had difficulties in establishing links with extension, while the subsequent LSFP project benefited from some changes indirectly brought about by the earlier project (Case 15.8). The most effective mechanisms for developing relationships with extension appear to be co-ordination meetings for joint planning and definition of responsibilities, joint activities on-farm, training provision, study tours, working groups, workshops involving staff at different levels, including senior officials, for training, discussion and review of methodology and for feedback. The creation of a livestock interest group was particularly successful in Kavango (Case 15.5). KARI/ODA's relationship with extension was defined by a memorandum of understanding with the Ministry of Agriculture (Case 15.7), while other projects had a more informal relationship.

An important issue is whether the participatory approaches developed and promoted by the projects are affordable by extension departments with limited financial and personnel resources (Case 15.6). The Kavango project also supported innovative approaches by ministry personnel, far in excess of what it could afford. The lesson is that projects must ensure the approaches they are advocating with extension can work within the recurrent operational budget.

There is a risk in participatory projects with a high degree of direct researcher involvement with farmers, that extension workers become marginalized and their professional role and confidence are undermined. This is particularly so if extensionists are not involved in problem diagnosis, testing or the adaptation of technologies. If they are excluded from the learning process with farmers, they may feel very insecure if they are challenged by farmers who know more than they do about a new technology received directly from national researchers.

15.4 LINKAGES WITH NGOs

NGOs are often in a pivotal position as far as linkages between researchers and farming communities are concerned, mainly because of their engagement at grassroots level. However, the great differences between various types of NGO with different mandates and approaches should be recognized. The following group of case studies illustrates some of the different roles and relationships involving NGOs in participatory research, relating to their different objectives and funding status.

CASE 15.9

KFSRE: FINDING AN APPROPRIATE FORUM FOR CO-ORDINATION

NGO stakeholders were identified at an early stage of the Kavango Farming Systems Research and Extension Project's life. The range included development NGOs such as CANAMCO (Canada Namibia Co-operation) which was also on the project steering committee, farmers' organizations, in particular the Kavango Farmers' Union, church-based NGOs such as the Evangelical Lutheran Churches in Namibia (ELCIN), and charitable foundations set up by private-sector companies (e.g. Rossing Foundation).

KFSRE made great efforts to involve NGOs in planning and implementation of project activities. For example, CANAMCO and Kavango Regional Farmers' Union staff participated in community diagnostic surveys. The project benefited from the local knowledge and wider perspective of the NGO staff, while the NGO participants gained PRA skills and improved their understanding of farming systems in their own work areas. The project found that many NGOs were managed and funded from external sources and had generous budgets. As a result, there was a tendency for them to forge ahead with planned activities without sufficient co-ordination with other NGOs and government organizations. Other NGOs were primarily interested in provision of credit, which was outside the remit of the project.

The project lacked a forum for interaction with NGOs on development issues; although regional (and district) development committees did meet on occasions, KFSRE did not have good linkages with those committees. They were not invited to join and did not receive information from the meetings. However, there was interaction with NGOs in the regional co-ordination meetings organized by agricultural extension, and in working groups. An example of the latter are the linkages developed with CANAMCO (now Lihepurura Kavango Trust), Rossing and ELCIN through the Kavango Agroforestry Working Group. Previously these organizations and the Ministry of Environment and Tourism were developing forestry initiatives in isolation. The formation of the working group helped the project to pool knowledge and resources and to develop a co-ordinated approach to agroforestry development in Kavango. The Lihepurura Kavango Trust was particularly active in the distribution of seed, which was supported by MAWRD as access to seed was seen as a key issue.

NGO stakeholders (Rossing, Kavango Regional Farmers' Union, CANAMCO) were invited to attend regional research planning meetings, bringing different viewpoints to the meeting (e.g. institutional and environmental) which complemented the narrower perspective of MAWRD personnel.

Source: Matsaert et al. (1997).

CASE 15.10

ITDG-CHIVI: NGOs IN TRAINING AND PROMOTION OF PARTICIPATORY APPROACHES

The training for transformation for extensionists arranged by the Intermediate Technology Development Group's Chivi Food Security Project was provided by Silveira House, a human rights NGO. Two other NGOs, Zvishavane Water Project and Fambidzani Training Centre, have proved valuable sources of ideas on technical innovations. Building links with organizations such as these, which are based outside the district, has strengthened farmers' and gardeners' capacity to seek support from others.

In addition, the project has worked closely with two other NGOs who are active in the Province and also adopt a participatory approach. These are the GTZ/CONTILL project involved in conservation tillage (at Makaholi Research Station), and the Integrated Rural Development Programme (IRDEP). Although the approach of both these projects differs from that of ITDG, much common ground has been identified. All three organizations now work together to promote participatory approaches to both research and extension within the Province. The project has also hosted visits from many individuals from other NGOs, both based in Zimbabwe and from other countries. This has resulted in the development of a strategic alliance among relevant NGOs to promote more participatory approaches to research and extension in local, national and international fora.

Source: Croxton and Murwira (1997).

CASE 15.11

NARP II: NGO INVOLVEMENT IN PARTICIPATORY RESEARCH ACTIVITIES

In the KARI National Agricultural Research Project, Phase II, both centres collaborated with agricultural NGOs in a number of different ways, mainly dependent on the objectives of the other organizations and the area of their activities. OXFAM was involved in the regional research programme activities in West Pokot, and CARE Kenya participated in work around Oyuer. Joint research activities on organic agriculture, agroforestry, livestock feeds and dairy management were undertaken with other NGOs by both Kitale and Kisii centres. The Kisii Centre Director is on the board of directors of a Christian NGO in the mandate region.

Factors hindering collaboration have been the reluctance on the part of some NGOs to become involved with a government organization such as KARI. Other responsibilities of the NGO staff, and sometimes lack of NGO staff, have restricted the time available for them to spend in collaborative activities. Differences in approach, particularly with regard to the provision of inputs, can be problematic. Some of the NGOs are not involved in research *per se*, but supply inputs and monitor the results. This has led to a degree of conflict and confusion between the regional research programme and an NGO, and amongst the farmers. Collaboration was facilitated where there were similar objectives, joint planning and similar areas of field operation.

Source: Rees et al. *(1997a).*

CASE 15.12

FPRP: NGO FACILITATION OF FARMER–RESEARCH COMMUNICATION

One important role of NGO–research collaboration is for the NGO to assist as a bridge-builder in the process of bringing farmers and researchers together. Some NGOs, such as ActionAid Uganda (AAU), are ideally placed for this. They have detailed grassroots knowledge and can provide helpful and speedy access for research programmes. They may not be research-oriented organizations, but increasingly are developing advocacy roles. In this case the National Cassava Programme certainly saw the value of linking in with AAU, as did the National Bean Programme.

However, the flexible approach of NGOs may be at variance with the more tightly programmed work of researchers. The AAU experience illustrates some of the difficulties of arranging NGO–farmer–researcher collaborative evaluations of on-farm trials. On one of the few occasions researchers came to one of these meetings it started 3 hours late, by which time the researchers had decided to leave. Farmers were late because a storm the previous night had badly damaged their banana plantations and they needed to rescue the bunches and deal with damaged plants. Researcher input was disappointing. This was partly due, at least, to difficulties of co-ordinating such input, as well as the competing schedules of researchers whose participation had not been formally agreed.

Source: Salmon and Martin (1997); Martin and Salmon (1996).

Discussion

NGOs can help to promote farmer-to-farmer knowledge sharing, and to strengthen farmers' and gardeners' capacity to seek support from government institutions (Case 15.10). They are a source of training skills and can also provide valuable ideas on technical innovation. Because of their grassroots contacts and knowledge, NGOs can play an important strategic role as a bridge-builder between researchers and farmers (15.12).

Project experience involving NGOs shows the benefits of joint planning. The capacity for influence and promotion of participatory approaches to research and extension is increased where linkages are developed between NGOs, and between NGOs and government organizations with an interest in participatory approaches. A process of joint planning is crucial. Problems can arise if NGOs plan without reference to other NGOs and government organizations (Case 15.9). Some NGO projects operate in an introverted mode, focusing solely on their own objectives and paying little attention to linkages. However, absence of joint planning is not always the result of oversight. It may result from real difficulties of co-ordinating planning among institutions operating within different time frames. The flexible approach of NGOs may be at variance with the more tightly programmed work of researchers, resulting in difficulties of co-ordinating such input and competing schedules (Case 15.12).

Collaboration is made easier if NGOs and potential partners have similar objectives and similar areas of field operation. NGOs can bring complementary perspectives, often based on their strength in local knowledge and institutional and environmental aspects, which complement the narrower technical perspective of government organizations (Case 15.9).

Factors hindering effective working relationships with NGOs include the reluctance of some to work with government organizations. This may relate to political differences, competing priorities, or different operational philosophies, for example, differences in approach to input provision (Case 15.11). Resource limitations, lack of staff and time may also be a hindrance.

15.5 UNIVERSITIES, TRAINING INSTITUTIONS, INTERNATIONAL RESEARCH BODIES

These bodies are useful sources of literature and information on methodologies and technologies, as well as sources of consultancy advice and skills to support projects. Projects have found that international linkages help to broaden their vision and encourage a comparative perspective.

CASE 15.13

KFSRE: RATIONALIZING LINKAGES IN RELATION TO THE PROJECT MANDATE

The Kavango Farming Systems Research and Extension Project staff developed linkages with the University of Namibia's multidisciplinary centre, mainly through sponsoring two undergraduate students and one postgraduate student (female). Student placements were considered, but the project recognized that these would be difficult while the KFSRE team was still young and inexperienced. Latterly these placements did take place, students participated in fieldwork, meetings, interviews and other PRA/FSR activities.

The project team was well linked to international bodies, and the project received visits from academic institutions in Namibia, the UK and South Africa. International contacts also provided access to literature. A study tour to Zimbabwe and Zambia was undertaken to make contact with other projects carrying out adaptive on-farm and FSRE research. Further contacts with other relevant southern African projects were made through visiting the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and attending conferences and workshops. Examples include the International Farming Systems Research Extension (FSRE) Conference in Pretoria, Southern and Eastern Africa Regional Farming Systems Research Extension Conferences held in Tanzania and Botswana and an Animal Traction Network for Eastern and Southern Africa (ATNESA) workshop in Namibia.

The capacity for networking was enhanced by the project's access to e-mail. However, distance and poor communications have inhibited linkages with many of these stakeholders.

The regional mandate of the project, combined with the expectation that the project should influence national-level farming systems approaches, sometimes led to difficult choices between a focus on activities in Kavango and invitations to participate in national and international activities. The project decided that linkages with international agricultural research centres were best made by national research units rather than regional teams.

Source: Matsaert et al. (1997).

CASE 15.14

ITDG-CHIVI: LINKAGES TO SHARE EXPERIENCE MORE WIDELY

The Intermediate Technology Development Group's Chivi Food Security Project developed links with two relevant departments of the University of Zimbabwe: the Institute of Agricultural Engineering and the Institute of Environmental Studies, Faculty of Agriculture. The University of Zimbabwe is now making use of research experiences from Chivi, which are shared with students and other researchers.

The project also hosted visitors from universities and research institutions in many countries, particularly from Europe and eastern and southern Africa. Some examples are: The Free University of Amsterdam (The Netherlands), Wageningen Agricultural University (The Netherlands), University of East Anglia (UK), University of Birmingham (UK), University of London, Wye College (UK), University of the North (South Africa) and University of Natal (South Africa).

Community representatives have also made visits to Dodoma and Moshi in Tanzania, and to South Africa (hosted by the University of Natal).

Project and other ITDG staff have written and shared reports and analytical papers. They attend conferences and seminars at both national and international levels. These fora are frequently an opportunity to share and discuss experiences with members of academic, research and donor institutions. In the past year Chivi has been used as case-study material in at least three text books aimed at development professionals and students. These books have been edited and produced by people from other research/development institutions, rather than by ITDG.

Source: Croxton and Murwira (1997).

CASE 15.15

NARP II: COLLABORATION FOR FIELD TESTING OF TECHNOLOGIES

The Kenya Agricultural Research Institute (KARI) has a long tradition of collaborating with universities, international agricultural research centres and other research institutions. KARI and Egerton University co-finance the Crop Management and Research Training Unit, and the International Maize and Wheat Improvement Center (CIMMYT) funded the first on-farm research activities by the national agricultural research centre, Kitale. The International Centre for Insect Physiology and Ecology (ICIPE) collaborates with Kitale in research on biological control of maize stalk-borer and maize streak virus, and with Kisii on evaluations of bananas and farmer participatory IPM. The International Potato Center (CIP) collaborates with both Kitale and Kisii in evaluations (both on-farm and on-station) of Irish and sweet potato. ICRISAT collaborates with Kisii in groundnut evaluations. The multi-donor-sponsored Agricultural Research Fund administered by KARI invites research applications of a strategic nature from any appropriate Kenyan institution.

The major limiting factors in these collaborations have been the late remittance of funds needed to implement jointly planned activities, and infrequent follow-up visits. The most successful collaboration between the RRPs and other agencies has been with CIP; CIP supports variety evaluations on-station under high management conditions, whilst the RRP supports the evaluations by farmers and researchers on-farm. CIP's well documented experience in participatory evaluations has assisted considerably in gaining acceptance of more collaborative approaches.

Source: Rees et al. *(1997a).*

Discussion

The knowledge and skills in universities, training institutions and international research bodies are useful to projects only if they can find the practical means to draw on them. Examples from the case studies included organizing study tours and exchange visits, encouraging international visitors, and participating in international conferences (Cases 15.13 and 15.14). The Chivi project particularly benefited by the dissemination of its outputs through its international linkages. The difficulties in sustaining these linkages arise from the distances involved and associated communication problems, although networking has improved with e-mail access.

With respect to linkages with international research bodies, there are sometimes contradictions between the international mandates of international organizations, compared with the national or (internal) regional focus of projects. The Kavango project concluded that international research linkages were best pursued through the national research units rather than through regional teams. This was in keeping with MAWRD's wishes. On the other hand, KARI collaborated directly with international organizations in joint training activities, research projects and on-farm evaluations (Case 15.15).

Maintaining linkages with universities has, in some cases, been very productive. The Chivi project's link with the University of Zimbabwe created opportunities for students to gain field experience. Project materials and research experiences were used for teaching purposes and have been used in a number of text books (Case 15.14). KARI scientists both provide and receive training at various institutions (particularly Egerton University and Manor House Agricultural Centre). The Kavango project sponsored students to study for a technical degree at the University of Namibia (Case 15.13), whilst insisting that students had exposure to social science. There was no social development component (such as social anthropology, gender or PRA/FSR methodologies), but economics was taught at the University of Namibia. The project attempted to plug this gap through practical experience and by liaising with the University of Namibia's multi-disciplinary centre.

15.6 POLICY/PLANNING BODIES

In relation to policy and planning, the two main dimensions raised by the case-study projects were the specific issue of linkages with agricultural research planning processes; and the broader issue of how participation can build confidence and raise expectations throughout civil society, and increase demands for accountability of local government and planning bodies.

CASE 15.16

KFSRE: LINKAGE THROUGH RESEARCH PLANNING ACTIVITIES

The Kavango Farming Systems Research and Extension Project has attempted to influence policy and planning through its participation in a range of co-ordination meetings for technical research, extension and training, as well as participation in planning fora. Examples of the latter were the International Service for National Agricultural Research (ISNAR) National Research Planning Workshops, a MAWRD donor conference, and a workshop to co-ordinate work with farmers' organizations.

KFSRE facilitated regional research planning and evaluation meetings at Mashare in 1996. These meetings assisted the team in integrating their work plans and pooling resources with those of other organizations working in the region and nationally. The on-station technical co-ordination meetings were particularly useful, as the format gave an opportunity for critical discussion and planning, and contributed to the development of an integrated approach to research and extension for Kavango. The Kavango Livestock Interest Group provided a useful vehicle to develop research plans at a regional level. Unfortunately there did not appear to be any mechanism at national level to take this forward. This was realized and was being discussed.

The main limitations on the project's ability to influence policy and planning were:

- the format of routine plant production co-ordination meetings which allowed little opportunity to critically review research activities, or to carry out research prioritization and planning
- limited interaction with the Directorate of Agricultural Planning and few opportunities for more general discussion and planning on natural resource management, as opposed to commodity-based programmes
- lack of integration into planning activities for freshwater fisheries, livestock, food security or environmental issues, or into regional or district development committee meetings. These committees were thought to have considerable potential to direct and co-ordinate development activities in the region, however, they appeared to be weak and poorly organized.

Source: Matsaert et al. *(1997).*

CASE 15.17

ITDG-CHIVI: PARTICIPATION AND GROWING DEMAND FOR LOCAL GOVERNMENT ACCOUNTABILITY

Chivi District, Zimbabwe was characterized by weak local policy and planning institutions. The Village Development Committees (VIDCOs) and the Ward Development Committees (WARDCOs) that are officially responsible for local-level planning and policy are relatively modern institutions, established since independence in 1979. They were preceded by a local authority based on tribal and clan leadership. The newer institutions are themselves weak and lack credibility for many members of the community. There is a tendency for local people to give greater respect to the traditional tribal leadership, but as government recognizes this as having only very limited powers, it remains weak. Many observers have commented on the organizational vacuum developing in the communal areas.

It is quite common for community members to comment on the inadequacies of local government structures, particularly the VIDCO and councillor. In addition, using Ven diagrams to illustrate institutional linkages, a clear change is depicted over the past 5 or so years, with community members feeling more distant from government structures. However, it is more difficult to determine whether disaffection itself, or merely the ability to articulate it to outsiders, is part of, or a result of, the project's participatory process. Almost certainly, increased self-confidence, a wider world view and the specific skills and attitudes gained through training for transformation have had an influence. Just as this has resulted in greater democracy within, and more efficient and effective management of farmer and gardener groups, so it has provided the basis for expecting and demanding similar democratization and accountability from local government structures.

Although such disaffection may appear to be just the sort of thing that might worry government administrators, this is not always the case. To a degree the desire to improve and increase the accountability of local government structures has been seen as a positive turn of events. For example, the District Administrator (the district's senior government bureaucrat) has spoken positively of people's growing awareness that officials can be changed through democratic processes, and that these same avenues have the potential to allow a distant government to target their policies and programmes more effectively. However, this example needs to be understood in the context of a policy environment that most farmers still feel lies far beyond their influence.

Source: Croxton and Murwira (1997).

Discussion

Only modest linkages were created with policy and planning bodies by the projects, mainly through links with ministries of agriculture. KFSRE participated in co-ordination meetings, donor conferences and regional research planning, but was frustrated by the lack of critical review and unsuccessful efforts to establish a bottom-up participatory research planning process (Case 15.16). One of the benefits of participatory approaches in the Chivi project was the empowering of local groups to take a more active role in interacting with local government, requesting greater accountability and democracy (Case 15.17). KARI presented progress reports on the centres' activities at District Development Committees, District Agricultural Committees, District Extension Committees and the Provincial Agricultural Boards.

15.7 SERVICE ORGANIZATIONS/ PRIVATE SECTOR

Relationships between research, extension, NGOs and service organizations and the private sector are of growing importance in the context of economic change and the contraction in the levels and coverage of government services.

CASE 15.18

ITDG-CHIVI: FARMERS' RELATIONS WITH SERVICE ORGANIZATIONS AND THE PRIVATE SECTOR

The Zimbabwe Farmers' Union (ZFU) is the service organization that probably has the potential for most impact on provision of input and marketing services to farmers and gardeners in Chivi. At local level the ZFU has tended to be elitist (for example, the focus on Master Farmers). At national level it appears to be ineffective as a lobbying organization, despite its potential role as a mouthpiece for its large membership in communal areas. Despite some progress in changing the ways farmers' groups operate in Chivi, making them more democratic and representative, there seems to have been little knock-on effect at national level.

The community groups use the Post Office Savings Bank to bank group funds. This Bank also provides a communication facility (for mail, telegrams, etc).

In the past, the Grain Marketing Board and the Cotton Marketing Board were the sole purchasers of grain and cotton in the district. Although intermediary organizations such as co-operative unions and individual business people who could assist with marketing were around, they were often constrained by cash flow problems. Grain marketing was rather centralized, and in Chivi (as in many other communal areas), depots were operating only for short periods of time because there was assumed to be little marketable surplus. Currently, following deregulation of the grain marketing sector, new buyers of grain and other commodities are beginning to emerge. However, farmers have sometimes found them very unreliable. Farmers in the project area, with increased self-confidence, have now started to lobby the ZFU to assist them in negotiating directly with these buyers.

A number of multinational seed companies (e.g. Cargill, Pannar, Pioneer) supply a variety of hybrid seed to farmers in Chivi District. These include seeds for grain, oil and legumes. Each of these companies has sales representatives active in the district; they sometimes travel in the company of extension staff, to help persuade farmers to buy their seeds. Farmers are increasingly self-confident in dealing with these representatives, asking questions and demanding relevant information before deciding whether or not to purchase seeds.

Source: Croxton and Murwira (1997).

CASE 15.19

LFSP: FACILITATION OF MARKET LINKAGES

On the subject of market institutions and the development of market relationships, the Livingstone Food Security Project's current major donor, the United States Agency for International Development (USAID), has been helping CARE to facilitate new farmer–market institutional linkages. It is essential to the eventual success of the LFSP that this takes place – that the increased production of sorghum and cowpea (and potentially other crops as seed volumes increase) can be sustained by these crops finding good commercial markets, and thus becoming cash as well as food crops. This has always been the attraction of maize as opposed to some of these more traditional crops, and is the key to ensuring that the production of a wider diversity of crops contributes not only to improved food availability, but also to livelihood security by raising income levels as well. In the first small-scale irrigation scheme being developed along the Zambezi, it is interesting that after one harvest of vegetables, which was hard to dispose of in the still-limited market of Livingstone town, farmers are now growing paprika which they hope to market in a single transaction to a commercial processor.

Source: Drinkwater (1997).

Discussion

One of the difficulties cited in maintaining linkages, particularly with the private sector, is lack of information and channels to access appropriate organizations and companies for potential collaboration. An example of a strong linkage was between the Kenya Seed Company and KARI, where some directors are members of the Boards of Management of both bodies.

The existence of linkages with service organizations may relate to the stage of the projects. KFSRE expected that at the technology dissemination phase closer linkages could be usefully developed.

15.8 TIPS FOR MANAGING AND MAINTAINING LINKAGES

As discussed above, perspectives on linkages differ according to the types of organizations involved in participatory natural resources research. However, many of the underlying principles as to how to improve linkages apply more generally, and the strategies adopted to promote linkages are broadly similar. The following section summarizes some of the lessons learned on managing and sustaining linkages, derived from the case studies and from exchanges of views among practitioners.

Stakeholder and institutional analysis

The underlying principle is the need for a thorough analysis of potential collaborators. Those involved in developing participatory research initiatives should familiarize themselves with their institutional environment and identify stakeholders at an early stage in the project's life, preferably during project design. Stakeholder analysis should cover issues of institutional interests and philosophy, image, power and any current linkage mechanisms.

Additional tools can be useful in institutional analysis, for example SWOT analysis (which looks at strengths, weaknesses, opportunities and threats) and force-field analysis (which identifies directions of institutional change and the factors that facilitate or impede it). These tools can help to develop mutual understanding, which is the first stage in constructing a linkage strategy for a particular project.

Stakeholder workshops are additionally a forum for informing stakeholders of project aims and objectives, negotiating a consensus and making any necessary modifications. Workshops to explore stakeholder interests and views on the purpose and objectives of the project are best conducted with neutral facilitation and held on neutral ground. They can begin to establish the potential for collaboration, outlining potential roles and mutual benefits.

It is important to maintain the project's interest in stakeholders throughout its life. New stakeholder linkages can be made through contacts with similar initiatives as they are identified. Regular collection and review of the literature will give an insight into a broader international stakeholder interest group.

Implications for project design

Project design requires a thorough stakeholder analysis, as the views of stakeholders have an important contribution to make to the shape of the project, and this early participation helps to create a sense of ownership upon which subsequent collaboration can be built.

Project design needs to examine and specify the reasons for collaborative relationships, to identify collaborators and linked organizations, and how the linkages will be implemented. Occasionally the complexity of stakeholder relationships will require a longer investigation than can be accomplished in the preliminary planning stage. In these circumstances, a full stakeholder analysis should be undertaken in the project's inception phase.

An important part of collaboration in project design is the agreement of objectives and outputs and the joint planning of activities, associated staff and financial resources. These linkages and joint activities should be incorporated into the project's logical framework and objectively verifiable indicators should be agreed for all identified linkage activities. Monitoring and evaluation activities in relation to linkages should be included in the work plan. However, it is important to recognize that in process projects, the initial specifications of the logframe are likely to need some adaptation over the life of the project, and the objectives and indicators for linkages will require periodic review. A review of partnerships and linkages can be usefully conducted using stakeholder analysis as a tool for monitoring the effects of linkages on participating institutions. Particular attention should be paid to indicators that show change or the resolution of problems identified at the previous stakeholder analysis.

Agreement on collaboration

Views differ on the extent to which formal agreements rather than informal arrangements can facilitate linkages. Formalization of linkages, for example, through a memorandum of understanding, can help to give linkage activities legitimacy. In other circumstances this may create additional bureaucratic obstacles. Whatever type of agreement is deemed most appropriate, it should be developed jointly, agreed and implemented at all levels. In some situations the designation of formal liaison roles can assist, for example, research–extension liaison officers. Formal agreements and roles do not replace the need to develop and maintain informal personal contacts and networks across institutions. However, linkages based on personal contacts alone are difficult to sustain, especially where there are high rates of staff turnover.

Planning and implementing practical project activities

Collaboration is possible on a wide range of project activities – stakeholder analysis, choice of stakeholders, joint problem identification, problem prioritization, allocation of roles, joint planning, implementation and evaluation, scaling-up through extension, and so on.

The important point is to encourage the active and practical participation of stakeholders in the planning and joint implementation of project activities, such as participatory appraisals for joint problem identification, surveys and characterization studies, site selection for field activities, participating in on-farm trials and field days. Examples of linkages in relation to field trials might be to carry out participatory testing of planting materials or for joint adaptive research on technologies developed in research institutions. A more difficult challenge is to develop collaboration around complex, knowledge-intensive technology development, which often requires longer-term, more field-intensive involvement.

A further collaborative activity is the analysis and dissemination of results through monitoring and evaluation activities, exchanges, project reviews, dissemination workshops, joint publications, and training activities.

Management of collaboration

Whatever degree of integration a project aims for, regular information sharing and transparency are important. Arrangements and procedures need to be put in place for joint planning sessions to develop work plans with other collaborators, and for regular task-based co-ordination meetings between linked partners. Planning sessions should include issues of budgeting as well as joint activities if the aim is to develop a joint research planning structure and budgeting.

However, experience shows that successful collaboration is a slow process, taking up a lot of management time and requiring a considerable investment in human capital. The benefits are generally only fully realized in the longer term. To sustain interest, it is often better to develop focused collaboration rather than broad-based meetings, for example, through the formation of interest groups or interaction with expert farmer panels.

Co-ordination meetings, workshops and information sharing are useful for involving a wider range of stakeholders, including service organizations. If government departments are involved, such fora must be non-threatening and have zero budget implications. Collaborative objectives must be clear, with explicit short- and long-term benefits to collaborators and indications of how collaboration will help achieve their objectives.

Developing staff capacity and skills

It is a difficult challenge to build awareness of, and train staff in participatory approaches as the basis for collaboration, especially with national agricultural research systems and extension. One strategy for doing this is to provide training and workshops for stakeholders. Training in participatory methods and systems approaches is particularly effective where there is already an interest and commitment to change in extension approaches. Change will not happen immediately, but as a result of growing exposure to ideas and experience, through visits, reports and discussion using as many 'live' examples as possible. This exposure over time is necessary in order to change approaches and attitudes, as opposed to simply learning new tools. A further important dimension is to develop staff capacity to undertake their own critical review of approaches and methods.

Another lesson learned is that training should be addressed to different levels of management so that understanding of the approaches exists throughout the organization, and field activities are fully supported by senior management.

Collaboration during training between different partners can help to reconcile differences of approach or philosophy and increase ownership of the project process and outputs. Collaboration can also build the self-confidence of team members. This can be assisted by forms of training designed for empowerment, such as training for transformation.

The need for technical training and updating for project staff should not be neglected, and brings added advantages if it can be provided by project research partners.

There is a need for appropriate management skills to facilitate linkages. Project staffing should include recruitment or relocation of staff with a positive linkage record, and responsibilities for building linkages should be included in staff terms of reference. This would encourage staff to pursue personal and professional contacts with other stakeholder institutions. Personnel policies that encourage staff retention are important to support linkage strategies, as consistency of personnel is a precondition for developing working relationships across institutions.

Budgeting and resources

Projects should make the necessary provision to support linkages through allocation of funds and staff time. Budgets should include provision for training in linkage management; for the costs of telecommunications facilities (radio, TV, fax, e-mail); for public relations and media; accommodation for meetings; costs of training; workshops and other linkage events; and facilitation.

A more novel approach is for collaborators to agree to co-finance specific activities, for example, through joint budgeting. For this to operate smoothly, agreements have to be reached on, for example, field allowances. The question of allowances and incentive payments for staff undertaking activities outside their usual scope is potentially difficult. Demands for transport and allowances may scupper the limited budgets available for participatory research.

It is necessary to scrutinize the cost levels of participatory projects not only in relation to value for money, but also in relation to the recurrent budgets of their collaborating institutions whose approaches and methods they wish to influence. Participatory projects working in partnership with other institutions need to work within a realistic budget which is affordable and sustainable by their collaborating institutions.

Strategy for integrating appropriate stakeholders into existing decision-making fora

There is an important question as to how field-based projects can contribute to influencing national agricultural research and extension policy, particularly where this is highly centralized. The first requirement is to understand the planning structure and develop personal contacts, then to regularly 'brief' senior officials on what is happening in the field and on the answers to specific problems. Politicians also have influence over the research system. It is important to listen to the views and problems they prioritize and consider how these reflect the demands of their electorate, before engaging in discussion of how research and extension can respond to these problems.

Another strategy is to encourage regional planning activities. In conditions of centralized research decision-making, initiatives to encourage regional decision-making and co-ordination can be a useful start. For example, involve stakeholders at a strategic level through membership of steering committees, monitoring and evaluation panels, and regional research planning meetings.

Networking (regionally, nationally and overseas) is useful (though not at the expense of sound fieldwork and community-based activities).

It is important not to marginalize extension services, whose support is necessary for wider impact. Extensionists' professional role should be supported, and their confidence boosted through encouraging their participation in the learning process. Investigation of innovative methods and new alliances with the media (radio, video, TV, theatre, etc.) should be encouraged.

Institutionalizing participatory approaches – project experiences

16

This chapter starts with a discussion of institutional change in the context of agricultural research, before documenting some of the project experiences relating to institutional change. These experiences are then discussed in relation to the main areas of an organization which projects may be expected to influence.

16.1 WHAT IS INVOLVED IN INSTITUTIONAL CHANGE?

Institutionalizing participatory agricultural research involves incorporating new ideas, attitudes and procedures into existing organizations, including national research institutes, national extension organizations and NGOs. Institutional change in the direction of more participatory agricultural research is a complex process with many elements, and can be viewed from a range of perspectives. From the perspective of organizational development, four areas of institutional change can be identified:

- influencing organizational policy and strategy to embrace participatory approaches
- building human capacity within an organization to use participatory approaches effectively
- modifying organizational structures and procedures to accommodate increased participation
- realigning incentives and influencing organizational culture to foster participation.

Cross-cutting these four areas is attitudinal change. Attitudinal change has been identified as the key to changing the way in which development professionals operate (Pretty and Chambers, 1993). One cannot expect everyone within an organization to welcome change, but if the attitudes of the members are overwhelmingly negative progress will be very slow. This is likely to be the case even if the other four areas are addressed, and new policies, strategies, training, organizational structures, procedures and incentives are introduced. On the other hand, if attitudes towards change are largely positive, then significant changes in practice may be achieved more easily, even with relatively small changes to the four areas (Figure 16.1).

Institutional change is not simply a question of changing aspects of an organization. Participatory agricultural research implies a qualitative change in the type of organization, away from an emphasis on hierarchies and routines and towards a 'learning organization'.

> "The challenge for development is not to reject institutionalization, but to create a different kind of institutional organization which has the capacity to retain its abilities to facilitate, as well as respond to, change; one which is able to co-evolve in its relationships with the dynamic and complex environment in which it exists. As learning is the only process by which such a co-evolving relationship can be established and subsequently sustained, it is important that a learning approach to institutional and organizational development be explored."
> *Source: Bawden (1994).*

The idea of a 'learning organization', able to 'co-evolve' in relation to its environment, is intellectually appealing. It is possible to see a project as a type of mini-learning organization, providing space within a larger organization for individuals to explore new ways of working, and to do so within the relative security of a project framework having outputs which emphasize and focus on enhanced quantity and quality of participation. This opportunity raises the issue of

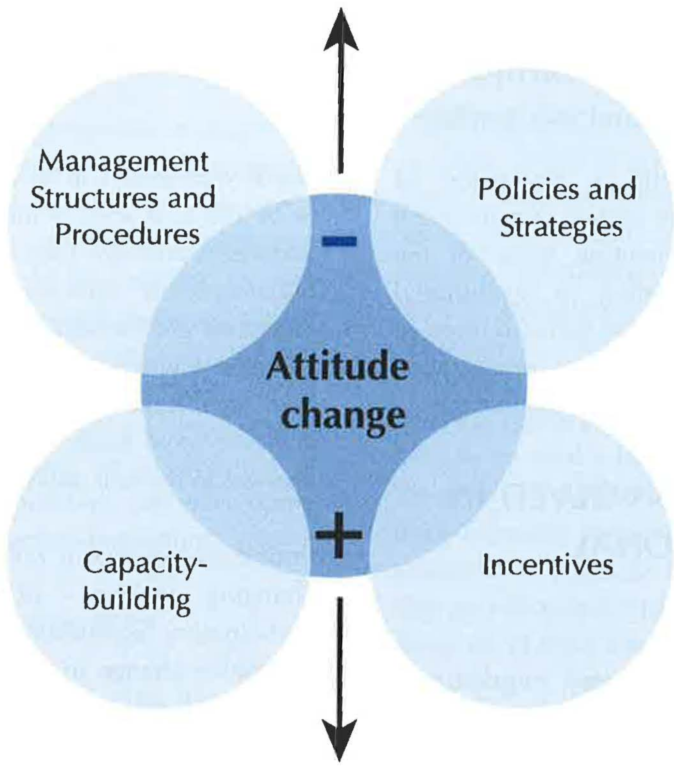


Figure 16.1 Key areas relating to the institutionalization of participating approaches within agricultural research organizations

the role participatory agricultural research projects can play in institutionalization.

16.2 THE ROLE OF PROJECTS IN INSTITUTIONALIZATION

Because projects come and go, a key question is 'what change has been effected as a consequence of these projects?' A related question is 'what have the implementing team and organization/s learned from the project?' Talking to practitioners and reading the literature, two viewpoints on the contributions projects make to institutionalization are expressed.

The negative perspective on projects

The negative view, from the perspective of a public-sector research or extension organization, can be summarized as "when the project ends, nearly all activities grind to a halt, and national staff are left feeling stranded. They may have learned something about new approaches, but they lack the resources and support to apply this new knowledge" (anonymous practitioner). This view applies particularly to projects within organizations which have very low levels of core funding, and where there is low staff morale. In such organizations projects are likely to be seen as an important means of supporting ongoing programmes and absorbing existing staff capacity. Under these conditions, projects are in some senses 'artificial' in that they bring expertise and resources to areas that are either institutionally weak or poorly supported, and for the life of the project these areas have the resources and are able to carry out tasks. The institutional change aspects of projects may be perceived as having secondary importance, but be agreed by management and senior staff in order to secure operational and capital funding. In such a context, projects may be effective in changing some management procedures and working practices and attitudes for a time. However, such changes may have limited lasting impact because those involved at the start were not fully convinced of the need for institutional change, and because at the end of the project the organization has limited financial and management support from government to sustain the change process.[1] Donors may ask 'can the new interventions be sustained on the existing government recurrent budget?' This concern is perhaps as pertinent to conventional research as it is to more participatory research, but it is nonetheless a serious one. The better-case scenario is that further funding is found for agricultural research, either through new projects or through increases in core funding, and that the newly developed capacity in participatory research will continue to be applied and developed further.

From a the viewpoint of community capacity-building, the negative perspective on projects is that once a project ends, whether its focus is participatory research or other development interventions, the local structures and processes established collapse or lie dormant, waiting for another project to come along. This may be as true for local structures (such as farmer research groups) built up by public research organizations as for those structures established by NGOs working at community level. The better-case scenario from this perspective is when groups or individuals transfer some of the skills, confidence and ideas gained through the project to other activities. In the context of situations in which the more enterprising and ambitious individuals are looking for a way out of rural poverty, this may include skills learned in other rural or urban environments.

A more optimistic view of projects

A more positive and optimistic view of the effectiveness of project teams as vehicles for organizational change originates in experiences from the private sector and also public sector reorganization in developed countries. Such organizations have chosen projects and project teams as a preferred vehicle for implementing organizational change (Holti, 1996). In this context, projects are time-bound structures that provide a more focused means of introducing change. In a situation of constant change, where new skills and perspectives are required to keep abreast with change, it can be argued that projects provide a cost-effective framework within which to organize changes in working practices and around which to focus human resources in the tasks of technology development and dissemination.

In public-sector organizations with reasonable levels of government funding, but which require external assistance with reorientation of outlook, projects provide a means of introducing new resources and approaches to an organization that may otherwise find it difficult to manage change among a group of professionals who have entrenched attitudes and patterns of behaviour, and are resistant to new ideas.

In developing countries examples from the public sector include the introduction of new approaches to agricultural extension, including donor-funded projects to introduce the train and visit system to Africa in the late 1970s and early 1980s (Howell, 1988; Moris, 1991) and the introduction of more participatory extension in the 1980s and 1990s (Thompson, 1995; Hagmann *et al.*, 1998). Such projects have the advantage of giving the project staff, acting as change facilitators or agents, an improved access to a range of levels within the organization, particularly extension organizations where hierarchies are strong (Hagmann *et al.*, 1998).

There is a related issue regarding how change agents and change-oriented projects fit into existing organizational structures. Often separate units are favoured, such as the farming systems teams set up in Zambia and Malawi in the 1980s (Ndiyoi and Phiri, 1998; Mwabumba, 1998; Kean and Ndiyoi, 1999; Orr *et al.*, 2000), the farming systems units in Namibia (Case 16.4 below); and the Farmer Participatory Research Unit set up within ActionAid Uganda's development programme (Case 16.5 below). In all these cases donor-funded projects were the chosen means of instituting change through separate units. A more radical approach has been proposed for Uganda's National Agricultural

Research Organization (NARO). As part of decentralization of services, NARO has proposed that a "project management mode of operation should ensure fair competition for resources available", providing a less hierarchical and more flexible and responsive type of national research organization (NARO, 2000).

We will return to the contrasting viewpoints on the efficacy of projects in organizational change in Chapter 17.

The cases below summarize various aspects of project experience with institutional development and change. They cover a range of organizational contexts and experiences, and compare experiences from projects implemented by public-sector organizations with those implemented by NGOs. These cases are mostly written from the perspective of practitioners who were directly involved in the projects, as project advisors, team leaders and/or team members. They do not necessarily reflect the views of other members of the organizations not directly involved in the projects.

16.3 EXPERIENCES OF PROJECTS WITHIN PUBLIC-SECTOR RESEARCH

The first set of cases covers the institutional change experiences of projects based in national public-sector agricultural research and extension. These cases document change efforts within the context of wider organizational and policy change within the host institution. Four projects are covered in this section, in chronological order. We start with the earliest, the Adaptive Research Planning Team (ARPT) established in the early 1980s, with assistance from a range of donors, as a specialist farming systems unit of Zambia's research branch. We then look at the experience of two more recent projects in Kenya: the Dryland Agricultural Research and Extension Project (DAREP) and the adaptive research component of the National Agricultural Research Project, Phase II (NARP II), which ran from 1993–97 and 1995–99, respectively. This section finishes with the Kavango Farming Systems Research and Extension (KFSRE) Project in Namibia, which ran from 1994 to 1999.

CASE 16.1

ARPT: MIXED EXPERIENCES OF INSTITUTIONALIZATION UNDER DECLINING LEVELS OF PUBLIC-SECTOR FUNDING

By the time of its independence in 1963, Zambia had a small group of expatriate agricultural researchers organized on disciplinary lines stationed in a modest network of research stations across the country, as a branch within the Department of Agriculture. Zambian nationals gradually began to join the research branch, so that by the late 1970s they occupied most of the senior management positions. By this time the extension branch within the same department had expanded rapidly following the administrative structure of provinces and districts, achieving a relatively comprehensive coverage of the country's vast rural areas, and with increased attention to servicing the smallholder sector with technical advice. Agricultural inputs and credit and marketing services were supplied to the smallholder sector by parastatals. Research had lagged somewhat behind the extension and parastatals in terms of targeting smallholder farmers with its services, and had been accused of doing the kind of research that mainly served the needs of large, commercial farmers.

Under a newly appointed assistant director of research, in the early 1980s the research branch shifted from a disciplinary to an interdisciplinary commodity focus, and was reorganized into commodity teams and specialist services. The Adaptive Research Planning Team was formed as a separate unit under the head of the Research

Branch, with the responsibility for undertaking adaptive research. Additional national staff, graduates in agriculture and social sciences, were recruited to form the ARPT, rather than reallocating the limited number of existing national scientists. The plan was that each of Zambia's eight (later nine) provinces would have an ARPT, comprising an agronomist and an agricultural economist. The provincial teams remit included the characterization of smallholder farming systems, problem identification, technology adaptation and testing, and the development of locally specific technical recommendations for the extension service. The idea, outlined in a policy document, was that ARPTs would pass on information on smallholders' problems and priorities to the appropriate commodity and specialist researcher teams (which were mostly supported by donors), who would supply 'on-the-shelf' technology for testing, and use the information on farmers problems to re-orient their own research programmes (Kean and Singogo, 1988). ARPT was expected to develop location-specific recommendations for the extension branch, based on the adaptive and verification trials it had conducted on-farm with farmers.[2] Descriptions below of support from senior decision-makers influencing researcher and extension colleagues, and of changing organizational and management procedures, illustrate aspects and challenges of organizational change.

Senior management support followed by policy documents

The ARPT programme was established through a series of decisions by senior management during 1977–81. These decisions were taken without any mention in national policy documents of the need for, and value of, farming systems research. In 1983 a policy document was produced providing a rationale for the ARPT (Kean and Ndiyoi, 1999). Nevertheless, ARPT was established under a favourable policy environment, in the sense that a restructuring of the organization of agricultural research was taking place against a backdrop of growing awareness among senior government officials and research managers of the need to improve uptake of research results by small-scale and resource-poor farmers. There was a recognition that their needs had previously been neglected in favour of large-scale, commercial farmers.

Support from donors

Within the ARPT programme, donor-funded projects were used in order to advance this change initiative. The ARPT was a vehicle that was used by a number of decision-makers, supported by international donors, to influence the way in which public-sector agricultural research was conducted in Zambia. With support from a number of donors, by the mid-1980s the ARPT was by far the largest farming systems research initiative of its kind in Africa, engaging over 30 of the 100 or so researchers located in the research branch. The donor projects supporting provincial teams provided substantial training and capacity-building inputs, and offered an ideal learning environment for the further development of farmer-oriented research approaches.

Lobbying within

The project teams implementing farming systems and participatory research did not need to lobby very senior managers in the Ministry of Agriculture, who were already committed to the new approaches. However, the project teams had many opportunities to lobby and influence existing research managers and scientists trained in more conventional research approaches, in terms of both the important research issues facing smallholders, and more appropriate methods for smallholder agricultural research. Sometimes this lobbying was not conducted very skilfully, and came across as arrogance from a group of less-experienced researchers.

Early success in influencing research planning

Despite its limited experience with change management, the ARPT achieved a measure of early success from 1985 to 1990 in initiating a programme of annual research planning which involved its researchers in intensive and rather informal dialogue with the specialist and commodity research scientists. This initiative proved more effective than long reports or large formal meetings, both in terms of influencing the research agenda of applied researchers towards smallholder problems, and also in obtaining technology (mainly new crop varieties) for testing prior to official release. The previous system of larger meetings had been characterized by rather fruitless presentations of research results, followed by confrontations between the on-farm and on-station researchers about whose results were more valid or correct.

Embracing farmer participation

From the mid-1980s, ARPT increasingly embraced the concepts of farmer participation in response to reflective learning from its own experiences, and also comments in external reviews. At the time of ARPT's national review workshop of farmer participation in early 1993, it was clear that the major constraints to the future of farmer participation in the organization – and the future of ARPT itself – were largely institutional in nature.

Limited capacity-building outside the core teams

Ten years on, the ARPTs had been relatively successful in convincing other senior researchers and a new cadre of emerging research managers of the value of farmer-oriented and participatory approaches. At the same time, there was a lack of support for a separate programme of farmer-oriented research within the Research Branch's newly established management team. The management team argued that all scientists and programmes should be engaged in farmer-oriented participatory research. However, expertise in conducting participatory research was still largely within the ARPT, and extending capacity to other research teams was hampered, not only by rivalry and jealousy over control of project resources, but also by the loss of experienced staff from the ARPT teams. Most of the skilled national field professionals that ARPT generated moved on to other projects or organizations, nationally and internationally, offering better remuneration and prospects and more exciting work challenges.

Internal debate about organizational structures

One factor that spurred staff to leave was a protracted debate about the future structure of research, particularly the value or otherwise of separate units for farming systems research. The debate and uncertainties resulted in a lowering of morale among the remaining researchers. The name of the ARPTs was changed to FSRTs (Farming Systems Research Teams), and under further restructuring there was a plan to reduce the number of these teams from nine to three so that they covered the three main agroecological regions rather than being provincially based, further weakening linkages with the extension service. The establishment of a full Department for Agricultural Research, with a separate division for socio-economics, was a further factor that potentially weakened the interdisciplinary focus of the area-based farming systems teams. While a certain amount of participatory agricultural research has continued, and the concepts, approaches and methods are accepted by many of the national researchers, implementation and further innovation have been hampered by limited human capacity and by limited incentives within the Research Branch for innovative participatory research.

Difficulty of influencing extension approaches

A key institutional issue was that, in most provinces, ARPT never really effectively influenced the mode of operation of public-sector extension to ensure the lateral spread of the technologies developed through the on-farm trials and farmer research groups. Although the farmer research groups were clearly effective and had longer-term potential, the benefits of the on-farm trials remained limited and localized. The Extension Branch, which not only had capacity problems of its own but was being pressured down the train-and-visit route by the World Bank extension advisor during visits to Zambia, in most provinces was not able to fully utilize the type of interactive group approach being tested with the farmer research groups. The exception was in Northern Province, birthplace of the village research groups, which developed village extension groups based on similar principles (Sikana, 1994). In other provinces, the fact that the farmer research groups were few in number, and thus the demonstration effect relatively limited, was undoubtedly a constraint. Within ARPT there had been considerable discussion of the need to provide training for extension staff in farming systems and participatory approaches, but very little of this was done; only those extension staff directly involved in implementation of research were trained. They tended to be regarded by their colleagues as out of the mainstream of extension, and themselves felt that by being involved with ARPT they were missing out on promotion opportunities. This factor further inhibited the uptake of ideas and approaches by extension.

Closed internal dialogue limited influence beyond the teams

ARPT was fairly effective at promoting internal dialogue within and across its teams. Its annual review meetings were often challenging events, leading to new initiatives and changes in terms of approach and methodology. However, because very few, if any, of the researchers outside the ARPT attended these review meetings, the benefits were not well shared across the research branch. As a result, a feeling of superiority developed within the ARPTs as they embraced new ideas and a vocabulary that pushed them further apart from many of their researcher colleagues.

Limited human capacity for dialogue with farmers

An emerging issue, even in a well staffed team, was the resource capacity required for intensive and sustained farmer participatory dialogue. One of the conclusions reached at the ARPTs' 1993 farmer participation workshop was that every farmer research group needed a trial assistant who could work closely with the group. Whereas most ARPT staff felt this should be a research or extension staff person, the farmers present felt it could be a trained person selected from their own number. The fact that from within the government structure it was difficult to develop a strongly empowering community process (partly due to logistical and resource constraints in teams without donor funding) ultimately limited the capacity and endurability of ARPT's farmer participatory research experiment.

Lessons

Institutionalization of farmer participatory research is part of a political process within organizations, and between organizations and their stakeholder constituencies. It cannot be seen merely as a matter of having supportive policies, strategies, organizational structures and capacity-building activities. The ARPT case illustrates that institutionalization is not simply a question of developing capacity within, and changing, a single organization. Many of the ARPT-trained staff have gone on to operate in NGOs, training organizations and donor programme offices in Zambia and in other countries, where they have had considerable influence in support of participatory approaches to agricultural research and development programmes.

Sources: Drinkwater (1997); Kean and Ndiyoi (1999); A.J. Sutherland, personal communication (2000).

The next case, DAREP, illustrates the opportunities that a relatively short-term research project provides for experimenting with and demonstrating new methodologies. It also highlights some of the limitations that such a project has for influencing the incentive and reward system of an existing organization.

CASE 16.2

DAREP: A MEANS FOR DEVELOPING, DISPLAYING AND DISSEMINATING PARTICIPATORY METHODOLOGIES AND APPROACHES

The Dryland Research and Extension Project was a joint venture between the Kenya Agriculture Research Institute (KARI), the Kenya Forestry Research Institute and the Natural Resources Institute (NRI). It was jointly funded by the Kenya Government and from the semi-arid systems component of the UK Department for International Development (DFID)'s Natural Resource Management Systems Programme of the Renewable Natural Resources Research Strategy. As a project within a strategic research programme, its objective related to the development of participatory methodologies in the context of technology development for poorer farmers in semi-arid areas.

Integration with KARI's existing research strategy

KARI's Regional Research Centre (RRC) at Embu hosted DAREP. The project began in 1993 and ended in early 1997, a few months after the DFID-funded component of NARP II had come on-stream in Embu. The project design process was lengthy and involved a dialogue over 2 years between KARI managers and NRI staff. As a result of this dialogue, the project's objectives, approach and mandate were broadly in line with KARI's strategy for regional research, which incorporated a strong farming systems and participatory orientation (Matata and Wandera, 1998). While the project had fairly clear technical objectives relating to dryland agriculture, it also had a mandate for innovative pathways to achieve these objectives. The additional project mandate of extension and technology supply, while extending beyond KARI's perceived mandate at the time, was thought to be necessary due to the remoteness of the area in which the project operated and the lack of agricultural services in the area. This mandate was facilitated by including government extension staff in research, monitoring and dissemination activities, and by employing young people from within the local communities to operate as frontline staff for the project.

Management support facilitates innovation

Throughout its implementation, the project enjoyed strong support from the Director of Embu RRC, who allocated experienced staff to the project, staff who were sympathetic to new approaches and ready to experiment with participatory research approaches. This attitude was also true of the expatriate staff, both the associate professional officers and the technical advisor employed on the project.

The project had inherited a well established infrastructure of research and demonstration sites, field staff and goodwill of local communities upon which to build.

A strong foundation for testing and disseminating new approaches

This starting point provided a very productive ground for developing and trying out a range of participatory approaches to implementing all parts of the research cycle. The project staff were encouraged to share and document their experiences throughout the course of the project, and a large number of papers were presented at national and regional fora which discussed the participatory methodologies used. The project organized a workshop aiming to encourage all the scientists at Embu RRC, and some researchers invited from other KARI research centres, to share their experiences of using participatory approaches, both at community level and in interactions with other researchers. A large number of the papers presented at the end-of-project conference focused on the participatory methodologies developed and applied by DAREP staff, rather than on the purely technical outputs of their research (Kang'ara *et al.*,1997c). Through this exposure, both to using participatory approaches and to documenting and sharing their value with others, the project contributed to building capacity of research scientists and technicians at Embu RRC, as well as that of the collaborating extensionists.

Participation through existing structures

The management structures and planning procedures within RRC Embu were largely conducive to the implementation of participatory approaches. DAREP was able to work effectively within the existing management structure, and to report results and plans through the annual research–extension advisory committee meeting. However, over time the process did start to challenge some of the laid-out procedures and assumptions about roles, particularly the view of researcher staff as the developers of technology and extension staff as the messengers. At a review and planning meeting held 2.5 years into the project, the extension representatives present expressed some discomfort at the fact that, as a result of the research activities, some farmers were ahead of them in terms of technical knowledge and access to new technologies developed through the project. In some quarters of KARI (mainly at the national headquarters) the view was expressed that DAREP was too much involved with extension and input supply, and should not be going beyond an adaptive research mandate.

After the project

After the end of the project, many ex-DAREP staff continued to use participatory approaches in research funded by other projects and programmes, and had the opportunity to further apply these skills and grow in confidence. In a few cases, researchers' work programmes were drawn back into more conventional types of research. This was both due to the nature of the research funding situation, which to a great extent depended on donor projects, and also because the incentive structure operating within KARI in practice rewarded researchers engaging in more publishable and strategic types of research. Hence while DAREP became well known and well regarded within certain circles of KARI, it exerted minimal influence on the dominant culture of awarding promotion and other scientific awards on the basis of more conventional academic and scientific criteria.

Source: A.J. Sutherland, personal communication (2000).

The case above shows that projects operating at the field level can be very effective vehicles for developing participatory approaches and demonstrating their value to researchers, both those directly involved and onlookers. Use of innovative and less conventional approaches may also arouse scepticism and defensive responses among more conventional researchers who have not ventured beyond controlled experimentation. Very often these are also the senior managers, who regulate and influence the allocation of resources and the system of rewards and incentives within an organization. In order to influence senior management, a somewhat different type of project may be required, such as the DFID support to KARI NARP II.

CASE 16.3

NARP II: DFID INSTITUTIONAL SUPPORT TO KARI

The Kenya Agricultural Research Institute is a parastatal body, formed in 1989 in order to spearhead agricultural technology development for a nation with significant agricultural potential and across a wide range of agroecological and socio-economic circumstances. In the first phase of KARI's development DFID, along with other donors, had through various research projects invested significant resources in training KARI scientists and supporting strategic on-station research. Together with KARI's senior management the donor was keen to see the fruits of this investment in the form of technology adapted to on-farm conditions in the various farming systems of Kenya. The organization of KARI, with both national strategic research programmes and regionally focused ones, provided a suitable framework within which to move the research agenda towards an on-farm and adaptive mode. The second phase of KARI's National Agricultural Research Programme was supported by DFID along with a number of other donors. The focus was on "participatory approaches to on-farm research, with an adaptive focus, and a concern to effectively transfer technologies to smallholder farmers and delivery systems". More resources were given to support participatory adaptive research through the regional research programmes. Support was also given for taking forward strategic research in technical areas previously funded by DFID into an on-farm mode. The project also supported KARI headquarters on socio-economics and on institutional issues such as gender, planning and prioritization, in recognition of the need to "consult with stakeholders and incorporate their views at an early stage of planning".

Supportive policy and strategies

The project's objectives relating to participatory research, being fully integrated with KARI's strategy, had the full support of the most senior management in KARI.

Some senior researchers still needed convincing

Many of the technical research managers and senior scientists in KARI had limited direct experience in using participatory approaches when the project started. They were not all fully convinced as to what these approaches could add to the conventional approaches used to date, although they sometimes gave them lip-service as part of the new strategy for achieving uptake. This is reflected in the view, often expressed in research meetings, that participatory on-farm trials are useful for disseminating 'proven on-the-shelf' technology' rather than seeing the role of on-farm trials as part of the technology development and screening process.

This viewpoint was effectively challenged in a number of ways, including initiatives of this DFID project supporting three of KARI's regional research programmes, and support to the socio-economics component and perspective within KARI.

Enhancing participation in regional research programmes

Through its the support to the regional research programme in three KARI research centres, NARP II stipulated that researchers should undertake participatory rural appraisal (PRA) exercises in the areas selected for research, and also consult with farmers about the content and design of trials before implementing them (Case 5.4). The PRA exercises involved a significant number of scientists who previously had limited experience of participatory approaches. This experience did influence their attitudes in many cases, increasing their respect for farmers' knowledge. The exercise of discussing research trials with farmers before planting was equally, if not more, effective than the PRA experience in terms of sensitizing researchers to the value of farmer participation. In several cases farmers refused trials proposed by researchers, forcing them to go back and think again.

Learning through study tours

The project also encouraged study tours to other projects using participatory approaches, and attendance at workshops on participatory methodologies. For example, in 1994 it sponsored a study tour of participatory projects in East Africa, in order to inform the development of the on-farm component of its support to crop protection research. In 1996, as part of inter-project collaboration, researchers from two of the centres in the west of Kenya organized a study tour to projects at Embu to learn more about alternative participatory approaches. Researchers from these centres also participated in a workshop held at Embu to share experiences of farmer participation in experimentation (Sutherland, 1996b).

Enhancing social science skills and capacity through training

NARP II provided support to the strengthening of KARI's social science capacity, posting technical assistance at the headquarters. Emphasis was placed in developing the skills level of the existing cadre of over 20 socio-economists, most of whom had an agricultural economics background, by providing basic training in sociological theory and qualitative research methods. This basic training was followed up with advisory and support visits by the technical co-operation social anthropologist to socio-economists at selected research centres. In addition, some socio-economists were supported in higher degree programmes in sociology and social anthropology. The project also focused on building the capacity of technical researchers to undertake qualitative research. Training in qualitative research methods and stakeholders analysis was provided to a group of 70 agricultural researchers.

Sources: Rees et al. *(1997a); Curry and Sutherland (1999); Sutherland, J.A. (1999b).*

The next case clearly illustrates the role that projects can play in a context where the senior management of national research and extension organizations is looking for new approaches. Shortly after the achievement of National Independence, a shift of focus towards smallholders in the communal areas took place within the public-sector research and extension systems. The KFSRE project, along with other similar projects in Namibia, was able to pilot new approaches within the Namibian research and extension system.

CASE 16.4

KFSRE: PILOTING NEW IDEAS THROUGH PROJECTS IN NAMIBIA

At the start of the Kavango Farming Systems Research and Extension Project Namibia was a newly independent nation which had inherited an agricultural research and extension structure designed to service a small but influential population of mainly white commercial farmers located in the centre of the country. Most of the country's black population engaged in agriculture lived in some newly created regions in the far north of the country, practising subsistence-based mixed-crop and livestock production, and with a dependence on (mainly male) labour migration. Politicians and senior civil servants were aware of the need to re-orient the national agricultural research and extension services to meet the needs of these neglected farmers in the north of the country, and were looking for appropriate strategies.

Searching for new extension approaches

When KFSRE started, the Ministry of Agriculture, Water and Rural Development (MAWRD) had begun to use the train-and-visit extension system. There was a steadily growing perception amongst MAWRD staff and donors alike that the train-and-visit system was not working. Few people working in MAWRD knew about participatory rural appraisal and its practical application. However, other European donors had started participatory projects, before the KFSRE project, and this had raised awareness among MAWRD staff about participatory approaches.

Training in participatory approaches

The KFSRE project started in 1995. Its initial tasks included understanding and documenting the farming systems in Kavango, and providing training in participatory methodologies to Namibian counterpart staff. Practical, one-to-one field training was given to the assigned MAWRD staff. To formalize the training and to give senior management a better grasp of the methodologies being used, the KFSRE team hosted two workshops, one for senior management and a second for middle managers. The Permanent Secretary of MAWRD, accompanied by senior managers from research and extension, attended the senior management workshop. This workshop included both the theory behind participation and also practical visits to farmers. This approach enhanced understanding among senior managers of what was meant by participatory methodologies. Other projects adopted a similar strategy of hosting workshops, publishing working documents, and attending key meetings within MAWRD at which to present the findings from participatory research activities.

The role of these training workshops should not be underestimated. A consultant, when drafting the follow-on project to KFSRE, noted that the March 1996 workshop for senior management was very influential for two reasons:

- the practical sessions with farmers in their field or homesteads allowed a direct one-on-one dialogue to take place
- project staff assiduously followed up information gained during training by reporting subsequent activities to management at regional and national level.

Regular visits to national managers

The KFSRE project built on these workshops through regular visits to the offices of managers and discussion with senior management. This helped to raise awareness about what the participatory methods were, and some of the implications of adopting them in terms of technical messages, policy effects and institutional problems. Many key officials received copies of working documents that the KFSRE Project and other participatory projects produced. Senior managers found some of these reports were useful in discussing policy issues.

Donor reviews endorse new policy

By 1997, four donor-funded projects were due for review. The reviews all emphasized that the projects should focus more on farming systems methodologies, and on developing the participatory skills of Namibian staff. Several of the reviews suggested that MAWRD must seriously consider adopting the farming systems approach as extension policy. The Permanent Secretary was clearly aware of this, as in June 1997 a meeting of senior staff was convened to consider and discuss the options for a national extension approach. A working group was formed to take these discussions further, and to examine how this approach could be adopted by MAWRD and operationalized. The findings were reported to the Permanent Secretary. The idea was tabled at the National Extension Strategy Meeting in September 1997, which was chaired by the Deputy Permanent Secretary. This meeting formally recommended that the farming systems approach be adopted as extension policy. The Permanent Secretary endorsed this.

Farming systems units established in regions

With the endorsement of the farming systems approach, North Central Division, supported by the French-sponsored Northern Namibia Rural Development Project, were at the forefront of establishing a farming systems unit. Workshops were held to discuss with field extension workers the changes that would follow as a consequence of this change of policy. For KFSRE a similar step was taken when the project moved into the regional MAWRD headquarters in July 1999. This profound institutional change is happening throughout Namibia, but in a gradual way, the pace being dictated by the individual regions.

What were the forces at work that fostered and promoted this change?

Concomitant with field-based activities, donor representatives at the policy and decision-maker levels were discussing the farming systems approach. Thus the policy environment in Namibia was predisposed for change. This desire for change was supported by the activities of farming systems projects working throughout Namibia at community level.

Within MAWRD management there was dissatisfaction with the train-and-visit system. Problems with the system related to a lack of appropriate messages, and limited dialogue with farmers. The need to reach a wider audience with appropriate technologies was widely discussed and alternatives were sought. Within MAWRD there was a significant body of opinion which saw the need for change.

The farming systems approach was, for the most part, unknown to MAWRD extension and research management prior to national independence. The donor projects, including KFSRE, fulfilled the roles of sensitizing and educating management and field staff to an alternative approach that offered more promise than the train-and-visit system.

Talking with farmers and listening to colleagues

The farming systems approach appeared to offer a solution to the weaknesses of the train-and-visit system, because it involved actually talking with farmers rather than instructing them. This, in the eyes of policy-makers and senior staff, increased the probability of the extension service being able to deliver on technical problems. Overlaying the above factors was the good personal relations between project staff and junior, middle and senior managers in MAWRD. Good relations were enhanced by the ability to listen, along with the ability to think creatively around the constraints that managers were operating under. This required delicacy. New initiatives were not (and should not be) pushed too heavily.

Testing and demonstrating new ideas through projects

The project is the best vehicle to test whether or not new ideas work. If they do work, senior managers can be told about it, and invited to come and see for themselves; projects can be used to demonstrate successful ideas.
Source: H. Bagnall-Oakeley, personal communication (2000).

16.4 CHANGING INSTITUTIONS WITHIN AND THROUGH NGOs

The second set of cases documents the efforts towards change of participatory agricultural research projects implemented by NGOs. They include efforts to influence both the host NGO and the collaborating public-sector research and extension organizations. The cases discussed in this section are ActionAid Uganda's Farmer Participatory Research Project (FPRP), FARM Africa's Farmer Research Project (FRP) and the Intermediate Technology Development Group (ITDG)'s Chivi Food Security Project.

The first case, the FPRP of ActionAid Uganda, documents aspects of efforts to influence the host national research organization, and illustrates a number of key points. One is that realigning incentive structures is a challenge that is not restricted to public-sector organizations.

CASE 16.5

FPRP: CHALLENGES OF INTEGRATING FARMER PARTICIPATORY RESEARCH, COMMUNITY DEVELOPMENT AND NATIONAL RESEARCH DURING ORGANIZATIONAL TRANSITION

The Farmer Participatory Research Unit (FPRU) was established by ActionAid Uganda (AAU) in collaboration with NRI in the Farmer Participatory Research Project in 1992, with joint funding from DFID and AAU. A central aim of the project was developing AAU's capacity to undertake participatory research with resource-poor farmers. To achieve this aim the FPRU was intended to be integrated into AAU's ongoing community development activities, and to link with national research institutions. Both these objectives proved to be challenges for the project.
Among the issues were:

- the fit of the FPRP objectives within AAU's evolving policy and strategy
- the changes in AAU organizational structures over the period of the project and associated values, institutional structures, staffing and incentives
- the demands of the approach on management and communication skills
- building capacity for sustainable participatory research
- establishing contact, official operating relationships and mechanisms for joint planning with external research agencies.

The national context for this project was a nation emerging from a protracted period of civil war and bad governance, in which the national extension services had ground to a halt and lost their staff, and in which national research services were being rebuilt. Hence AAU, in common with many other NGOs working in Uganda, had built up its own capacity for agricultural extension, but did not have an agricultural research capacity.

Navigating AAU's transition period

The FPRP spanned the transition from a sector-based approach to a more community-based approach within AAU. At the start of the project, ActionAid was operating sector-based integrated rural development projects covering primary healthcare, education, small business and agriculture. In agriculture, activities were largely undertaken by AAU's own extension staff providing technical support and inputs, and functioning in place of the inactive government extension services. However, AAU had begun to question the effectiveness and sustainability of its agricultural extension work and the rationale for providing subsidized inputs to farmers. AAU management was committed to participatory and innovative approaches in principle, and was prepared to take a degree of risk in developing these. Research as such was new to AAU, but they were interested in the possibility of integrating participatory research, initially into the work of the agricultural support programme, and potentially in the longer term into all the programmes. After a feasibility study a collaborative project between AAU and NRI was agreed, to develop participatory research methods to help farmers participate in finding solutions to their existing agricultural problems.

Different developmental goals

There was an important difference between the developmental goals of AAU development projects, which were measured by concrete results such as uptake of technologies, improvement in health indicators, school attendance, etc., and the less tangible, process-oriented methodological objectives of the participatory research project.

Organizational and management structures

The organizational and management structures within AAU were critical in influencing the success of the FPRU. Although the unit was distinct in identity, funding and operation, the emphasis was on its integration within AAU structures for reasons of sustainability, synergy, etc. It was intended to work as an integral part of the agricultural support programmes of two AAU projects. Although physically based in one project office, the unit had responsibility to work across two project areas. The team leader reported to the head of agricultural support programme, then to the co-ordinator of one of the projects rather than to higher-level management. Even though the differences in approach and understanding between a complex participatory research project and extension-oriented sector programmes were highlighted in the original project document, it still proved difficult for management to develop a strategy to deal with them. The reflective learning, which was later to become an important part of AAU operational philosophy, was missing in the critical early stages of the project.

Staff turnover

With the end of the sector approach of AAU in late 1994, integration of the FPRU was improved by the Unit's direct representation on the management team, but by this time the operational field structure, upon which integration had first been proposed, had disappeared. These changes, brought about by a change in AAU's development approach, had important consequences for staff turnover. The programmes restructured, retaining development generalists to work with community and government structures rather than technical specialists associated with the former 'hands-on' extension approach.

Challenges in realigning incentives and organizational culture

The participatory research initiative was consistent with AAU's value system. However, the challenge remained of realigning incentives and organizational culture to support a listening and learning approach rather than extension message delivery, and to recognize the less visible achievements such as farmer empowerment, knowledge building and linkages. AAU's reward system was oriented around extension performance and quantitative targets. The FPRP's emphasis on collection of qualitative and investigative data, which aimed to explore and understand a process as well as harness indigenous knowledge, was not very compatible with the household visit monitoring and reporting methods employed by AAU for the first half of the project. Within the old value system there were expectations on FPRP to produce outputs for use by extension field staff. The time lag between research and promotion of results was not well understood, nor was the unit's emphasis on methodological issues appreciated by field staff. This led to a conflict in expectations, and some pressure felt by the FPRP to provide evidence of impact in the form of concrete results from the fieldwork. This encouraged the rapid establishment of on-farm trials of technical alternatives, rather than a more reflective analysis of the process of development of participatory methods and the enhancement of their understanding within AAU.

There was limited flexibility in redefining reward systems, as incentives for a minority of staff involved with participatory research could not be provided without disturbing other staff on similar scales. During recruitment there was reluctance to recruit more experienced personnel as this would disturb the structure of seniority among the field workers.

Communication lessons

An important lesson learned was the need for a strategy for communicating lessons during the early stages of the project, which could have generated a common understanding and ownership of participatory research throughout the organization. The FPRU tended to be seen as a sector initiative, and AAU staff had only limited awareness and understanding of its objectives during the early operational phases. A start-up workshop would have been particularly useful at project inauguration to give staff the opportunity to renew or initiate their understanding of participatory research, and to discuss the organizational and management aspects as well as the overall strategy and relationship of AAU and FPRP.

A related point was the need for a means of communication which did not depend solely on reading reports. Where written materials were produced, these needed to be better tailored to their intended audience. The unit had to deal with a possible trade-off between progress in the field and their participation in meetings and seminars to represent and explain their work in the context of AAU. Because of its structural position, the FPRU had limited influence on other AA projects through lack of contact. In retrospect, it would have been better for the FPRP to have been structurally independent from the development projects at the outset, rather than being managed within one of them which tended to stifle communication and reporting channels and made strategic and prompt decision-making difficult.

Impediments to recruiting experienced staff

AAU had a strong interest in participatory approaches and some experience in PRA, but little capacity in the participatory identification of researchable problems, and no experience in participatory research. The challenge to the FPRU was to build this capacity within the organization. A team leader and interdisciplinary team were appointed, but team members had limited experience. Budgetary constraints and AAU appointments policy had an influence on this. FPRU members were recruited at field worker grade in order to fit into the AAU organizational structure. A higher grade would have fallen into management grades, and as the FPRU team members did not have management responsibilities this was not considered appropriate. More experienced researchers were not attracted by the packages offered at field worker grade.

The unit experienced quite a high degree of staff turnover which had an impact on the cohesion and continuity of the team and the achievements of the project. The combination of management skills and social and technical expertise needed for such posts is difficult to find. The lesson is that investment is needed, either to recruit the skills needed to run such initiative, or in the skills needed to backstop and support team personnel on the job. Experience of the project suggests the importance of recruiting a team leader with management skills over and above technical research expertise, and with leadership, networking and advocacy capabilities.

Linkages with national research and extension

The project was intended to build linkages with local extension and national agricultural research organizations, to encourage their involvement in farmer participatory research, and to provide information and training in order to influence the approach to research in these institutions. On the other hand, the FPRU team needed to draw on the technical expertise of national research programmes related to their focus research areas. However, there were no existing mechanisms to link AAU with government research and extension and, apart from the FPRU members, no-one to facilitate this after the death of the AAU staff member who could have played this role. The capacity of AAU to promote the institutionalization of participatory approaches within the formal system was thus very limited. Some difficulties, such as the physical distance from research organizations and inadequate telecommunications, were beyond the project's control.

This project's experience indicates a need for clear responsibility within the organization to pursue linkages, and for a formal institutional relationship, such as a memorandum of understanding, to underpin individual contacts. Specific mechanisms and integrated timetabling are necessary if researchers are to participate in the joint planning of participatory research.

Sources: Salmon and Martin (1997); A. Martin, personal communication (2000).

The next case summarizes the work, over a period of 7 years, of the Farmer Research Project (FRP) in promoting farmer participatory research in the Southern Region of Ethiopia. Unlike the previous case, where considerable effort was placed on influencing the wider programme of a large NGO, this illustrates the efforts of a much smaller NGO, FARM Africa, to facilitate change in the relevant government organizations involved in agriculture in southern Ethiopia. The case highlights the practical experiences of the project, changes brought about by it, lessons learnt, and some of the challenges remaining. In terms of the wider political context there are some similarities with the previous case, in that Ethiopia was involved in a long civil war when the project started, and experienced a change of national regime shortly after its inception.

CASE 16.6

FRP: EXPERIENCES, LESSONS AND CHALLENGES IN INSTITUTIONALIZING FARMER PARTICIPATORY RESEARCH

The Farmer Research Project, funded by DFID for its first two phases during 1991–98, started its operation in North Omo Zone and Derashe and Konso Special Districts (*weredas*) of the Southern Region of Ethiopia. It has recently entered a third phase. When the project started in 1991, its overall goal was a developmental one: to increase the incomes of resource-poor families in the project area. It aimed to achieve this through the promotion of farmer participatory research (FPR), leading to the use of appropriate technologies and thereby to increased production and productivity of resource-poor farmers.

Working through existing structures

From the outset, the project did not aim to implement research directly, but to work through the existing structures, both governmental and non-governmental. In its first phase the project worked more closely with NGOs. Following a mid-term review of its first phase more emphasis was placed on working with government organizations in the Southern Region with a mandate for agricultural extension, agricultural research and agricultural training, specifically the Bureau of Agriculture, Awassa Agricultural Research Centre and the Awassa Agricultural College. This shift was made within the context of an agriculturally dependent nation emerging out of a protracted civil war in which the new regime embarked upon rebuilding and expanding its public-sector agricultural research, extension and training capacity. This included reorganization of the political structure, with the formation of a federation of regional states. The project is currently in its third phase, working to implement the institutionalization of FPR at a more expanded scale across the Southern Nations, Nationalities and Peoples' Regional State, and through a more direct involvement of the three key governmental organizations. This requires more emphasis on linking approaches and activities to existing policy initiatives and bringing senior management into the process.

Project activities

The project activities in the first two phases focused on building human capacity, awareness raising and information sharing. This was done through training in participatory research approaches, conducting participatory on-farm trials, various workshops on participatory research approaches, diagnostic studies, topic-specific and special studies, and dissemination of findings through a wide range of technical pamphlets and reports. The project has demonstrated a framework within which FPR can be successfully carried out by either government organizations or NGOs in Ethiopia. The key components of this framework are: (i) diagnostic/PRA studies supported by other research studies; (ii) a wide mix of training activities; and (iii) a programme of participatory on-farm trials. The participatory on-farm trials have been implemented by the various agency staff trained in participatory approaches, and funded jointly by the project and the host agencies. Meetings have been held on an annual basis, facilitated by the project, to enable those implementing the on-farm trials to share their results and experiences and learn from each other (FARM Africa, 1999a, b).

Project impact

A stakeholder impact assessment completed in 1997 found that all the project activities were instrumental in promoting participatory approaches through enhancing the knowledge and skills of a wide range of staff from governmental organizations and NGOs. Then FRP has had considerable success in raising the awareness, changing attitudes and improving the technical capacity of the staff of collaborating governmental organizations to undertake participatory research, and has facilitated the spread of practical experience in the use of FPR methodologies. Research and extension staff have become much better informed about local agricultural systems, their rationale and constraints. The approaches and tools used have also found their way outside the project area, to many other areas of Ethiopia.

The FRP's experiences underscore the need to equip professionals in the relevant organizations with knowledge and skills relating to farmer participatory research. Training professionals in participatory approaches significantly contributed to them undertaking various research studies using participatory methods and principles. The participatory on-farm trials have also greatly helped to demonstrate how participatory research can be practically carried out with farmers and bring about successful results which can complement formal research and extension.

Summary of lessons

In summary, the lessons learnt from the FRP include the following.

- The need to work closely with local government organizations and NGOs if a project approach is to become institutionalized within local structures.
- The importance of adopting a multi-faceted approach to FPR.
- The importance of combining theoretical training with practical hands-on sessions.
- The need to involve senior-level staff in training events, in order to affect the management of local organizations and their policy towards participatory approaches; participatory research should not be left to younger scientists but should be firmly supported by management.
- Participatory on-farm trials can be effectively used to stimulate the adoption and adaptation of technologies by farmers and to strengthen farmers' experimental capabilities; it is important to monitor how these technologies spread to other farmers.
- The importance of creating links with the wider community of farmers to encourage dissemination of information.

Challenges to continuity and sustainability

The continuity and sustainability of FPR efforts are constrained by a number of factors. The practical application of the knowledge acquired during training has largely been limited to the individuals who were trained, rather than being taken up at institutional level. The people trained were nominated by their organizations and came from the middle strata of professionals. The senior officials, lacking proper awareness of participatory research, failed to provide support to facilitate the spread of knowledge and skills acquired to other members of staff. The project experienced considerable difficulty in influencing the College of Agriculture, largely due to its academically oriented culture and system of rewards. Moreover, while the extension staff in the Bureau of Agriculture were often keen to undertake participatory research, and were effective in what they did, their efforts received little recognition from their managers who were mainly interested in achieving national targets for large-scale demonstration of new, high-input technology.

By the end of its second phase the project's continuation was under question due to a lack of full and meaningful institutionalization. The following challenges, linked to the institutionalization of FPR, were outstanding at the end of phase two.

- A realization that FPR and farmers' priorities cannot adequately be addressed only by surveys, short visits or short participatory exercises. It is a process that requires time, effort, appropriate communication methods, a change in attitude and behaviour, and visible improvements for the farmers.
- Existing procedures for priority-setting, research planning and implementation, as well as the reward systems and the initiative to undertake FPR, were limited to projects and individuals rather than to institutions. This has implications for the commitment by management to allocate resources and give support.
- Participatory research requires the joint effort of all actors involved in technology generation and transfer. In the current institutional set-up there is a pronounced tendency to work in isolation because of the physical and functional separation of the institutions. Efforts towards working closer are affected by the attitudes of individuals and by institutional mandates; effective efforts depend on the goodwill of individuals.
- Given the current lack of developed farmer institutions, their representation at higher levels (above the district) is a problem. This has implications for farmers' influence on, and roles in, the review of research. At present, professionals carry out research reviews and make decisions in the absence of farmers. Can we really talk of farmer participatory research?
- With regard to technical and developmental outcomes, the project's experience indicates the need to improve the uptake environment in order to facilitate the wider use of technologies developed. This requires a detailed analysis of the key actors and their roles in both formal and informal research and extension systems.

Looking ahead

Based on the experiences and lessons of the first two phases, the current phase places much stronger emphasis on institutionalizing FPR within the institutions involved in the generation and transfer of technology in the Southern Nations, Nationalities and Peoples Region of Ethiopia. Emphasis is being given to creating awareness among the senior government officials whose support is vital. Additional key elements are facilitating networking and sharing of experiences in participatory research, and supporting practical FPR on the ground. To facilitate ownership, the project is being implemented at regional level as a joint venture of the stakeholder institutions. To facilitate this there is project steering group with active representation from the major stakeholder organizations.

Source: Jonfa (2000).

In Zimbabwe which, in contrast to Uganda, had a relatively developed public-sector extension service for smallholders, an NGO community development project formed a partnership with research and development projects to initiate institutional change in both communities and government organizations. In a similar way to the Farmer Research Project in Ethiopia, this started with work on a modest scale, successfully piloting a model of participatory research and extension. This resulted in further initiatives to scale-up the model through participatory extension conducted over a much larger area of Zimbabwe. Case 16.7 draws largely from a published account documenting the experience of a positive partnership that emerged between a conservation tillage research project (CONTILL) and the ITDG Food Security Project in Chivi, Zimbabwe (Hagmann *et al.*, 1998).

CASE 16.7

ITDG-CHIVI: A PARTNERSHIP APPROACH TO INSTITUTIONAL CHANGE

Early in its life the Intermediate Technology Development Group's Chivi Food Security Project formed an informal partnership with the Conservation Tillage Programme (CONTILL). This partnership enabled a linking of technology development capacity with a focus on poverty alleviation through facilitating community participation, local institutional strengthening, and building on existing local skills and knowledge. The emerging strategy of participatory technology development sought to facilitate the Chivi community's choice of technical solutions from a range of options. The project sought to link farmers in Chivi with sources of information which, after ITDG's involvement finished, they could continue to tap without having to rely on ITDG. These included government research stations, other NGOs and training institutions, and farmers in other districts.

The CONTILL project aimed to develop new technologies and extension messages in order to reduce soil erosion in smallholder farming. CONTILL's earlier work on research stations shifted its focus towards working with farmers in their fields when conventional concepts of mandated research and extension proved to be incompatible with farmers' reality. In the Masvingo branch of the project, which included operations in Chivi, the acknowledgement of this reality as the determining factor for land management through a learning process caused a drastic redirection of the project focus towards farmer-led research and extension. This clashed with the old institutional set-up and culture within AGRITEX, and necessitated active effort to institutionalize the participatory approach within the organization.

The Chivi Food Security Project had been successfully practising a similar approach but it too faced problems of institutional scaling-up. The German Development Agency (GTZ)-supported Co-ordinated Agricultural and Rural Development (CARD) programme, later renamed the Integrated Rural Development Programme (IRDEP), became another ally. CARD had begun pilot activities on community-level planning and development, and faced conceptual and institutional challenges relating to the multi-faceted foci of community projects. The common interest shared by all three projects was to shift the perspectives of rural extension towards farmer participation and to scale-up activities through government institutions such as extension, research, health, veterinary services, water development, etc.

Early learning experiences

In late 1990–92, adaptive on-farm trials were implemented to complement the CONTILL on-station research component. Intensive interaction between project staff and smallholder farmers provided an insight into the livelihood strategies of communal farmers, with all their problems and constraints. It showed that, because of the multitude and complexity of farmers' problems, conservation tillage as a single technique has very little potential to assist them. It also revealed that the type of farmer participation which was desired would develop only very slowly. Despite continuous encouragement, farmers were hesitant to make their own decisions on the trials and tended to wait for the researchers to tell them what to do. This was the 'culture' farmers were used to from previous experience with research and extension. The CONTILL project concluded that other means were required to achieve active farmer participation in the experimentation and adaptation process, and that it would be necessary to move beyond the concepts of adaptive trials.

At field level, focus was redirected towards catalysing active farmer participation. This phase commenced with workshops that brought together farmers, extension workers and researchers. Elements of Paolo Freire's 'pedagogy of the oppressed' (1972) in the form of training for transformation (Hope and Timmel, 1984) were utilized to raise farmers' awareness of the importance of, and scope for, self-reliant development. An assessment of farmers' visions for the future and their problems was taken as the basis for further activities. Workshops were also used to motivate farmers to experiment to find their own solutions to problems (the methodology is described by Hagmann, 1993). After the workshops a promising dynamic was established, including active participation and decision-making by farmers. Farmers became increasingly involved in dialogue, experimentation and mutual sharing of knowledge. However, collaboration with the extension services became more and more difficult as field extension workers felt threatened by the new confidence farmers displayed and the roles that they claimed.

Sharing experiences with extension

Observations on and analysis of the interface between farmers and extension workers were regularly shared with provincial extension officers. This, coupled with these people's own exposure to their clients, became an important tool for raising awareness of the need for change. Increasingly, confident farmers openly spoke for themselves and confronted the extension staff with their shortcomings. Towards the end of 1993 it became apparent that the CONTILL project's influence on the extension department would be insufficient to generate change at an institutional level. They searched for 'allies' and began networking with other players in the area, including the Chivi Food Security Project.

The period 1994–95 saw the testing of a new concept for extension. At field level the insights of the previous phases were utilized to build a new concept for community-based, participatory innovation development. Towards the end 1995, CONTILL field activities were scaled down, and the outcome of the project in term of approach and technologies was integrated into the broader organizational development programme within AGRITEX, which was supported by IRDEP.

Lessons

- Process-learning approaches are a precondition for success in institutional innovation projects. If clients' needs and development goals are to be taken seriously, it will not be possible to determine precisely in advance either the parameters of the support programme or the outcome. An open approach which is responsive to farmers' needs and takes into consideration the problems and limitations of support institutions is a precondition for effective action learning within a project and within institutions. This requires a very broad, professional orientation as well as commitment, flexibility and willingness on the part of project staff to enter unknown and unpredictable territory.
- Ways must be found to accommodate risk. Because outcomes are not predictable, adopting a process-learning approach necessarily entails a high level of risk. Bureaucracies do not reward their staff for risk-taking. This poses questions as to how the risks of institutional innovation processes might be buffered. This appears to be an important role for externally funded, partly independent projects such as CONTILL, IRDEP and ITDG.
- Provoking action is crucial for institutional innovation. Bawden (1994) sees the key to institutional reform to be a "judicious combination of a gently provoking practice with a comprehensive, multi-dimensional and systematic model of learning". External 'provokers' must be aware of the delicacy of their intervention. They have to have a good insight into the organization with which they are working, as well as an ability to deal with conflict. They must also persist in their provocation, demonstrating resilience until changes have been negotiated and operationalized; premature withdrawal can otherwise lead to a return to the *status quo.*
- There are advantages to working from within a project. Project personnel benefit from the freedom to interact with all levels of the hierarchy. Being 'outsiders' they are often in a good position to obtain

information on the problems, needs and attitudes of different levels of staff. For example, AGRITEX management was poorly informed about shortcomings in the field, as the intermediate hierarchy levels tended to filter information going upwards. Project personnel played a delicate 'informant' role, bypassing these mid-levels of the hierarchy. Inevitably the mid-levels found this threatening. It was, therefore, important to remain highly aware of the degree of support accorded to the project by higher levels. Many projects withdraw once pilots have been established, assuming that new ideas will be rapidly adopted. In this case rapid withdrawal may have resulted in collapse, for it would have seriously underestimated the time required for individuals and AGRITEX as a whole to internalize the new ideas and approaches.

- Participatory extension can be implemented in a cost-neutral way. Except for the costs of additional stationery, participatory approaches can usually be implemented within existing budgets (according to an assessment by extension workers in Masvingo). Budgets may need to be reworked to accommodate the costs of training and materials. In Masvingo the addition of resources was not found to be precondition for adopting the new approaches.
- The process of institutionalizing participatory approaches is complex and demanding. With each phase the process of developing, institutionalizing and operationalizing participatory approaches in Masvingo became increasing complex and demanding, comparable to increasing the number of balls when juggling. This has implications for the replicability of such an effort in other areas and institutions, particularly those that are less well resourced.
- Networking and lobbying are crucial but require favourable conditions. The successes reported here were possible because of collaboration and networking between the three projects (IRDEP, CONTILL and ITDG). Good personal relationships and trust between the staff of the different projects and certain actors playing the 'networker' role were essential.
- Process can depend on one personality. The success of the organizational development process was heavily dependent on a single individual, the head of AGRITEX in the Province.
- The broader political framework has an impact. Since the devastating drought of 1992, a change of thinking and an opening-up of rigid post-colonial structures has been apparent in Zimbabwe. Decentralization has been adopted as a policy in most government departments, and participation is seen as one way to cope with reduced government services and expenditure.
- The biggest challenge is to change attitudes. The processes described have required behavioural and attitudinal changes on the part of all the actors involved, from farmers to bureaucrats. The changes must take place at personal level.
- Case studies and pilot activities are the centres for spreading/scaling-up of participatory extension approaches.

A new understanding of project-sponsored pilot activities is suggested: they should act as learning cases for client-oriented institutional innovations. They do not themselves have to be sustainable; indeed, in most cases this will be unlikely. It should be accepted that an approach can only be considered to have been truly operationalized once the institution itself, without external support, has established its own showcases and has demonstrated a commitment to spread them. Until internal showcases are established, externally established pilot activities must be sustained for training purposes, for further observation, and to demonstrate that new approaches work.

Sources: Croxton and Murwira (1997); Hagmann et al. *(1998).*

16.5 DISCUSSION OF PROJECT EXPERIENCES

Some lessons from these cases are discussed below in relation to the main areas of institutionalization outlined at the start of this chapter:

- influencing organizational policy and strategy
- building human capacity
- modifying organizational structures and procedures
- realigning incentives and organizational culture, and changing attitudes.

Policy and strategy support

An important early step in institutional change management, as illustrated in nearly all the cases above, is ensuring the proposed direction of change has support at policy level within the organization. There are two common scenarios. One is where existing policies and strategies support participatory approaches but there is little happening on the ground, and projects are required to help with the implementation of these strategies. The other is where existing policies do not explicitly embrace or prevent participatory approaches, and projects provide an opportunity to demonstrate the value of such approaches and develop them in a locally relevant way as a platform for lobbying for more participation and organizational change. The first scenario would apply to both DAREP and NARP II, which were implemented as part of a research strategy in place within KARI, supporting the participatory adaptive research through its regional research programmes (Cases 16.2 and 16.3). ARPTs were also a key part of the new strategy for agricultural research in Zambia during the 1980s (Case 16.1), and were able to pick up and adapt participatory approaches as they came on stream, incorporating them within a farming systems approach. Moving to the other scenario, the KFSRE project helped the Namibian government to make a decision to adopt farming systems approaches as part of a new strategy for extending research and extension services from the commercial farming sector into the small-scale subsistence farming sector (Case 16.4). The FPRP (Case 16.5) was hampered at first by being grafted on to a less participatory organizational environment, but larger changes in AAU in the direction of a more empowering and process-orientated approach to development provided it with an opportunity to support these changes in the direction of increased participation, although it had limited time and resources with which to undertake this task. In a similar way, the Farmer Research Project (Case 16.6) helped the research and extension managers in the Southern Region of Ethiopia to move in the direction of a clearer strategy for a more participatory research and extension system, even though the national extension approach was largely supply-driven from the national capital during the project. This case, and particularly the case of ITDG-Chivi in Zimbabwe, illustrate situations in which more active networking and even lobbying may be required to garner support for institutional change (Case 16.7; Hagmann *et al.*, 1998).

Human capacity-building

Capacity-building relates to developing the existing human resources of an organization. Capacity may be built through providing formal training in participatory approaches, as illustrated by the Farmer Research Project of Ethiopia in which building capacity in other organizations was the primary focus. The Farmer Research Project stands out as one that made a significant contribution through a more structured approach to capacity-building. This was also true for the ITDG-Chivi project, to a lesser degree in its earlier stages, but as the project moved into scaling-up a more formal approach to training became important (Case 16.7). The other projects largely focused on building capacity within their host organizations, and illustrate situations where human capacity was built through using a learning approach during the joint implementation of project activities, including one-to-one training provided 'on the job'. At the organizational level, change starts to become visible when the researchers trained start to apply new attitudes, approaches and methods in their work. Some examples of this have been documented in the previous chapters on team-building. The cases show that projects are an effective means for capacity-building through the experience and learning achieved during implementation of activities. As the ARPTs in Zambia illustrate, not all the organizations that benefited from capacity-building were able to retain this capacity after donor funding levels declined and more capable and experienced staff began to leave (Case 16.1). Nevertheless, even when this happens, those leaving usually continue to use the capacity and skills acquired, sometimes in more senior advisory and management positions, sometimes in teaching and training situations, and sometimes in different types of organizations and projects.

Modifying organizational structures

Participatory agricultural research may involve changes to an organization's structure. The cases above suggest that this type of change will not usually be included as an explicit part of a donor project, but will be perceived as an issue internal to the organization and its governing authorities. However, when a particular project is part of a plan to reorganize the research system, as was the case with the ARPTs, NARP II and KFRSE, it may significantly influence the way organizational structures evolve during a time of change. The structural changes within an organization needed to promote participatory approaches may differ according to the type of organization, whether it is government research, extension or NGO. They may also vary from one country to another. Different options for introducing more participatory and more farmer-centred approaches into national agricultural research organizations in Africa tried out over the past two decades have included: setting up separate specialist teams or units; mainstreaming participatory approaches into area-based applied and adaptive research programmes; and incorporating participatory and systems approaches into existing commodity and specialist research programmes (Anandajayasekeram and Stilwell, 1998). The ARPTs in Zambia and KFRSE in Namibia are examples of the first two options, where participatory farmer-oriented approaches were introduced as part of the reorganization of research services, with greater emphasis on downstream adaptive research targeting smallholders as part of the overall reorientation of public-sector national research (Cases 16.1 and 16.4). The second option is illustrated by NARP II, supporting adaptive research programmes in Kenya as part of a strategy to increase the impact of previous investments in technology development and human capacity-building (Case 16.3). In ActionAid Uganda, a new operational unit was added to the existing programme structure of this international NGO in an experimental piloting of farmer participatory research as an activity to strengthen and reorient its agricultural programme (Case 16.5). Its low position, initially, within AAU's management hierarchy made this a difficult task, although its operational approach, emphasizing participation and facilitation, fitted much better with AAU's emerging structure after reorganization during the life of the project. Changes to existing organizational structure and procedures may not be essential for participatory approaches to be mainstreamed within organizations. The existing structures and procedures may facilitate cross-disciplinary working and collaboration between different sections. The case of scaling-up the ITDG-Chivi experience illustrates that participatory approaches can be effectively introduced into organizations without overtly changing hierarchical management structures, although they do imply major changes in planning, implementation and monitoring procedures (Case 16.7; Hagmann *et al.*, 1998).

The FRP in Ethiopia has operated through the existing structures and procedures of the participating organizations, and with its third phase has established a steering group along with improved networking in order to facilitate learning across organizations which may, in time, influence their structures and procedures in the direction of greater participation (Case 16.6). This draws attention to the prospect that participatory research projects can influence relations between the lead organization and other organizations and stakeholders involved. As discussed in Chapters 14 and 15, new structures for improved linkages and partnerships may be developed through projects, or may be an important part of new projects, building on informal linkages established during project implementation.

Incentive systems, organizational culture and attitudes

An organization's system of incentives is typically a strong part of its culture, built around its traditional priorities and core values. Its incentive or reward system is likely to require changing as its values and priorities change. The case-study projects document minimal evidence of influence on the incentive systems operating in the host organizations. Most of the public-sector research and extension organizations hosting projects had rather 'flat' professional structures, with a limited number of grades and senior scientist positions, and more emphasis on promotion according to years of service or management responsibilities than on research performance. KARI, a large organization, was something of an exception, organizing its own scientific conferences, scrutinizing papers submitted, and giving awards on the basis of scientific rigour and excellence. This system did not, however, favour the KARI scientists engaged in on-farm research. KARI also had developed a performance-based staff appraisal system during the early 1990s, including criteria relating to uptake by farmers, but this was not practically effected during the life of DAREP and NARP II. The experience of the FRP project in Ethiopia, when working with extension and training organizations, was that influencing the organizational culture and incentive systems of these organizations was much more challenging than changing the attitudes and building the capacity of individual members.

What the case studies do show is the long-term nature of changing organizational culture. Particularly where projects had a strong capacity-building component and were situated within public-sector research organizations such as the ARPTs, KFSRE and NARP II, they could induce a 'subculture' of participatory research within a dominant culture of more conventional controlled research. If supported by donors, this subculture can become very strong and permeate the language of most of an organization's researchers. This becomes clear, for example, in the formulation of research proposals phrased to meet donors' criteria. As time passes, and researchers from a more conventional background begin to use participatory approaches in implementing their research, with positive results, they incorporate the associated values into their work culture. Moreover, because of donor emphasis on participation, and because donors and national governments alike are concerned with impact, this does provide an incentive for national researchers to embrace concepts and activities that are part of participatory agricultural research. While this process is happening, at varying paces, in most of Africa's national research organizations, the formal incentive systems of these organizations may not be changing very much. Moreover, these national researchers may be constrained by their peers and by older scientists in national academic institutions who remain sceptical, and retain influence on the reward system and scientific culture less directly through postgraduate supervision responsibilities and through control of scientific conferences and journals.

Managing incentives under a situation of declining core funding

This raises an important question. To what extent are the managers of national organizations involved in research able to manage incentives and rewards within their own organizations? This is likely to vary according to the manner in which research is funded, and the skill with which research managers are able to operate within a situation of increasingly diverse sources of funding.

In many organizations undertaking agricultural research, with limited core funding and diverse sources of funding for projects, managers have less and less control of the budgets of individual research projects and, therefore, of the management of incentives with their organizations. If competitive bidding for research funds becomes the norm and low salaries continue, then the room for providing incentives through adjustments in salary scales and promotion procedures may dwindle further. Instead, other benefits associated with winning research projects will increase in importance, such as training opportunities, attendance at workshops and conferences, allowances, and improved equipment and facilities. A skilful research manager, who has earned researchers' respect through an even-handed approach, may be able to manage these projects in such a way that responsibilities and rewards are allocated according to the known capacity and previous performance of individual researchers. A manager who is not skilful or even-handed is likely to lose control over the allocation of rewards and incentives when core funding is limited. This will happen as talented individual researchers gain more independence, start to bring in their own projects, negotiate financial control of project budgets, and choose who else they would like to assist them with implementation.

In organizations in which core public funding is stable, researchers' salaries are comparatively favourable and operational funding is not constrained, the management of incentives for the institutionalization of participatory approaches will be easier. Moreover, it will vary according to the type of organization undertaking research, whether primarily geared towards research, extension or training.

Public-sector research organizations will need incentives that encourage researchers to spend more time interacting with farmers and other stakeholders, and that promote collaborative research processes oriented to results that can be easily taken up by farmers and uptake agencies. Such incentives may include positive encouragement from management and associated resources allocated for on-farm research, and for research conducted in partnership with uptake agencies (as distinct from an emphasis on preserving the organizations' research mandate and associated resources).

Public-sector extension organizations may need incentives for staff to operate a listening, problem-solving, experimental approach rather than working within a more top-down teaching and demonstration approach. This would include rewards for innovative approaches to technology development and dissemination to solve problems identified with farmers. Similarly, NGOs involved in agricultural extension would need to reward staff less for achieving measurable and visible targets, such as the number of soil conservation structures built or demonstration plots planted, and more for initiating activities that empower local farmers to undertake research and that foster links with new sources of knowledge and technology.

In a similar way, training organizations will usually need seriously to review their curriculum, so that there are more opportunities for students to undertake practical assignments in farming communities that involve solving problems in partnership with farmers, uptake agencies and students from other disciplines.

16.6 SUMMARY

The project experiences documented in this book illustrate that projects can provide a mini-environment in which somewhat different reward and incentive systems operate. This environment may effectively challenge some of the attitudes and core values of the host organization. In the process of project implementation, attitudes of researchers on the project team can often change significantly, leading them to embrace many of the core ideas and approaches associated with participatory agricultural research. This process of changing attitudes and values can give rise to a subculture of participation within such organizations. It can also stimulate genuine commitment by managers to participatory processes, which may start as lip service. In the worst-case scenario, participatory approaches may be openly rejected. While projects do often help to change attitudes at various levels within an organization, they have so far had a rather limited influence on the formal incentive systems of public-sector agricultural research and extension.

NOTES

1. This situation has caused donors to be concerned with issues of sustainability and to insist on a promise of matching funds by government before approving a project. This becomes a game in which the host government makes a pledge in order to obtain project funding, and the donor releases funding even though it knows the likelihood of the host government's pledge actually being fulfilled is slim.

2. This emphasis on technical recommendations changed later, with more focus on direct dissemination following disappointing experiences with co-operatives and parastatal organizations in input supply, and their virtual collapse under economic liberalization (see Case 7.1).

Institutionalizing participation – practical challenges, lessons and the way forward

17

17.1 INTRODUCTION

The views of field practitioners on various aspects of participation in agricultural research as it has been implemented in sub-Saharan Africa have been presented in the previous chapters. The experiences of practitioners have, in most cases, been context-specific, and the case studies have presented individual views and also views from particular project teams. The lessons from the case studies have been highlighted in the chapters, and many of the chapters have included suggestions for better practice, during both implementation in the field and project design.

We conclude this book with a summary of the main challenges, lessons and issues, and the way forward. This chapter starts with an overview of some practical challenges projects face when introducing and institutionalizing participatory approaches into the agricultural research process. Some of these challenges can be termed 'institutional' in nature, while others relate to methodology and approach. Where projects have tried to address these, some summary lessons are noted. The chapter then highlights some overarching issues in relation to a discussion of the way forward. This addresses the future development of programmes and projects that facilitate more effective participation in agricultural research. Finally, some strategies for institutionalization that cut across the issues and challenges are identified.

17.2 REMAINING CHALLENGES AND LESSONS

The case studies presented in this book, and particularly those in Chapters 9–16, have illustrated many of the practical challenges to the complete and effective institutionalization of participatory approaches. By practical challenges we mean challenges that commonly hinder change in the direction of more effective and increased participation. We have noted in the previous chapter that if institutionalization of participatory approaches is to be effective, it cannot be addressed purely through changes to policy, management structures and the provision of training and appropriate incentives. The organization involved must also embrace the principle of continuous learning and reflection on past performance and future opportunities.

While the policies of both donors and national organizations may support participatory approaches, at the start of a project all other conditions favourable to the institutionalization of more participatory approaches are not likely to be in place. Moreover, there is no simple blueprint for success, and project implementers will face challenges and pitfalls as they learn what may or may not work in a particular situation (Neilsen *et al.*, 1997; Pijnenburg, 1998). The nature and extent of challenges may vary from one project and country to another. However, there are commonly faced challenges, most of which fit into one of the three following categories:

- challenges relating to organizational policies, management structures and procedures (Figure 17.1)
- challenges relating to human capacity and other resource constraints (Figure 17.2)
- challenges relating to attitudes and perceptions (Figure 17.3).

In reflecting on these types of challenges, the four main stakeholders involved are farmers, research organizations, extension organizations and NGOs. As Figures 17.1–17.3 indicate, the challenges affect these stakeholders differently. These challenges are discussed below; some references are made to the previous case studies

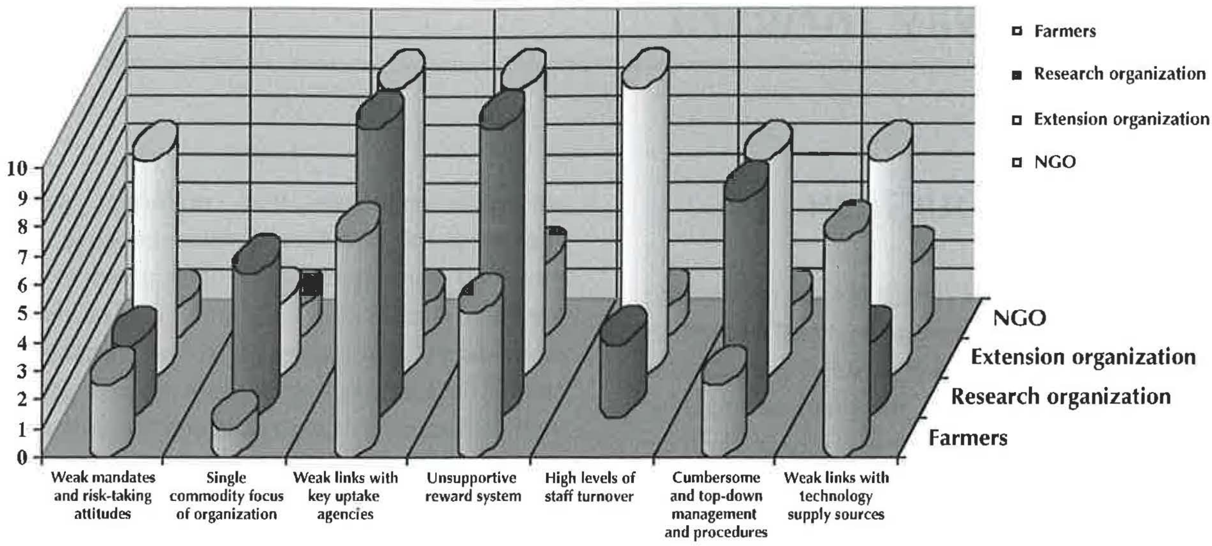


Figure 17.1 Challenges relating to organizational policies, management structures and procedures

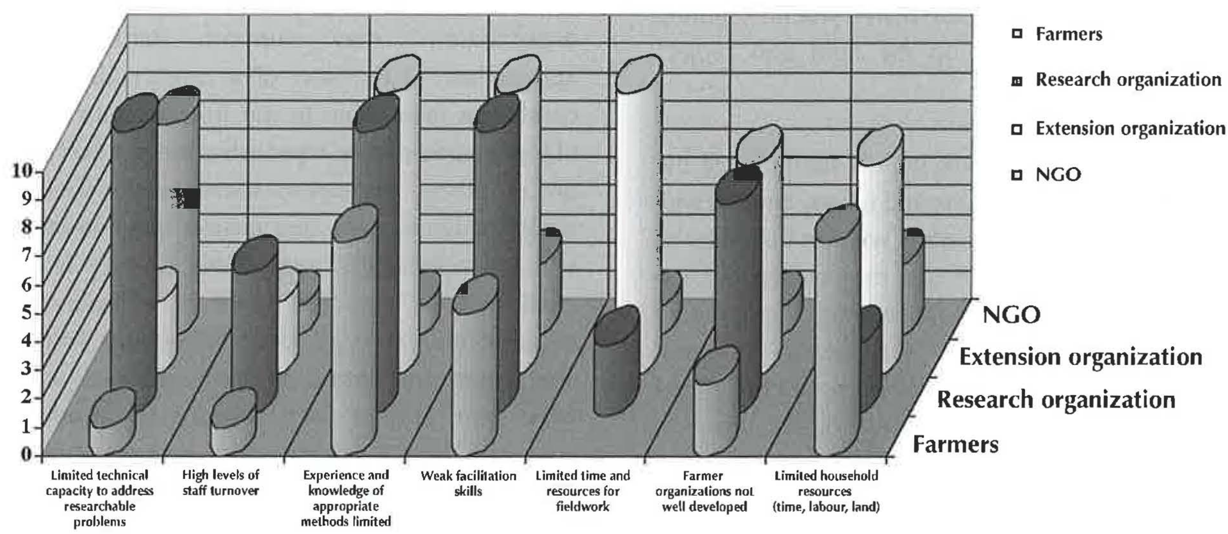


Figure 17.2 Challenges relating to human capacity and other resources constraints

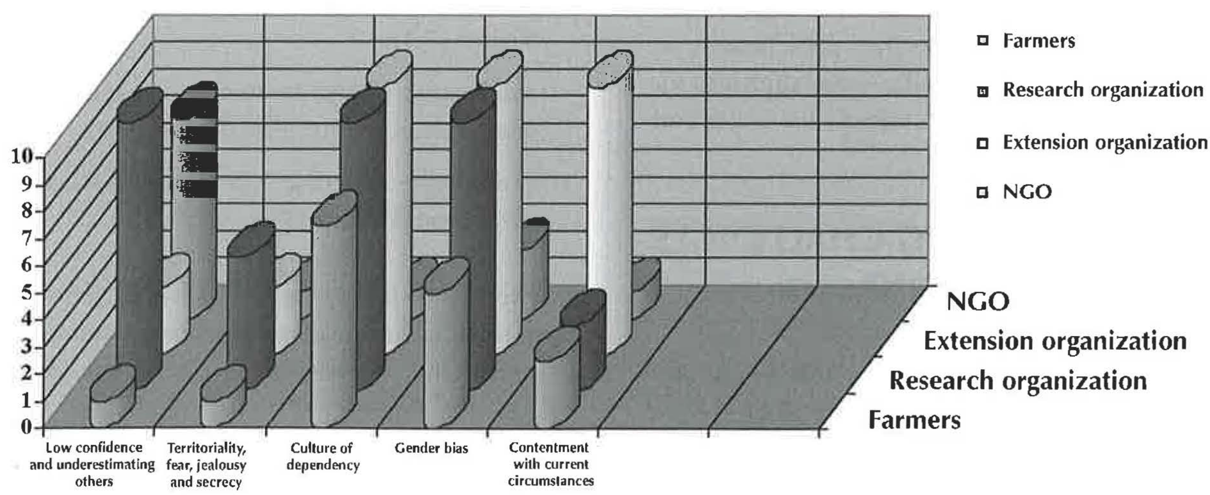


Figure 17.3 Challenges relating to attitudes

to support points made, and lessons emerging are also summarized under each of the headings.

Weak mandates and risk-taking attitudes

Organizational mandates and a functional separation of tasks in public-sector research and extension systems challenge the institutionalization of participatory research. Participatory and adaptive research activities sit somewhere between conventional research and extension. Neither organization may have a clear mandate, or both may think that either only themselves, or only the other, should undertake a particular activity. NGOs often do not include this type of activity within their core mandate, but may have flexibility to conduct farmer participatory research as a discrete sideline activity, or as one of a suite of projects. A mandate for research also implies a mandate to take risks, and as Hagmann *et al.* (1998) note, "bureaucracies do not reward their staff for risk-taking". Risk-taking may be equally difficult for an extension organization driven by targets as for an NGO that is very oriented towards quick visible impact. For farmers whose livelihoods depend on reliable production there are also risks involved. Yet farmers under pressure to survive in difficult environments are also experts at calculating and managing risks, and for them experimentation can be a coping strategy to reduce risk under harsh conditions.

Lessons

Projects such as those discussed in this book can be an effective means of encouraging organizations, their leaders and other staff to think critically about their existing mandates, and about their attitudes to risk-taking activities for the cause of development.

Such projects can provide an environment in which the participating farmers can assume a more explicit role and legitimacy within their communities as researcher–innovators. Projects also include farmers in risk-taking during the research process, but cushion them from more extreme risks by introducing technology and knowledge that has worked in similar circumstances.

Single commodity focus of organization

Participatory research, being demand-driven and practised in small-scale, mixed farming systems, tends not to focus on a single commodity. Two cases in this book, the Cashew Research Project (CRP) and the Larger Grain Borer (LGB) Control Project, provide exceptions. In the case of the CRP, more participatory approaches coincided with an expanding research agenda as the project evolved, with increased attention to other crops in the local farming system. The LGB project ended as soon as the focal problem had been addressed.

Lesson

Participatory approaches are not inherently incompatible with a commodity or factor research focus, but may lead to pressure to expand the scope of activities beyond the original project focus.

Unsupportive reward systems

As many of the cases and earlier discussions illustrate, inappropriate reward and incentive systems present a major challenge in public-sector research and extension organizations. NGOs may have more flexibility in defining their reward systems, but they too have their own internal hierarchies and procedures, and not all have the inclination and capacity to adjust these to encourage more participatory research. For example, due to donor stipulations NGOs may feel pressured, like national extension organizations, to show quick results in terms of productivity, poverty alleviation and gender inclusion. Farming communities in Africa rarely have explicit systems for rewarding participatory innovation. Farmers often innovate out of desperation as part of their coping strategies, in secret and in isolation from each other.

Lessons

The issue of organizational incentive structures should be given a high profile during project design. Perhaps projects can be used as a leverage point for the revision of existing incentive structures and promotion criteria in research and extension organizations.

Projects have an opportunity to reward farmers for participatory research and innovation, for example, by initiating local competitions and cross-visits of the type used in the Dryland Research and Extension Project (DAREP) and the Intermediate Technology Development Group's (ITDG) Chivi Food Security Project.

High levels of staff turnover

Because participatory agricultural research is a relatively long-term process, requiring good relations and effective dialogue between a range of actors, a high turnover of staff can have an adverse effect on the process. The cases suggest that this problem is most common in public-sector extension agencies due to the frequent transfer of staff and the somewhat novel nature of farmer participatory research to many extension programmes. In the Zambian Adaptive Research Planning Teams (ARPTs), the system of seconded extension staff provided some continuity, but these staff expressed reservations about being seconded due to the risk of being sidelined when it came to promotion and training opportunities.

Lesson

When agricultural extension organizations take on a research role, they need to review their career structures and procedures for transferring staff.

Cumbersome and top-down management and procedures

The speed with which participatory research programmes can respond to farmers' problems can be slowed by lengthy procedures for approving work programmes and disbursing funds and other resources. By the time resources are made available, farmers may have become tired of waiting, and researchers may also have shifted their interests to other areas. The projects documented in this book did not report such difficulties, mainly because project managers had the freedom to allocate resources to address issues as they arose, rather than waiting for approval and funds from above. This type of challenge is likely to have been faced by the staff who remained after the closure of these projects. Having been used to developing and implementing research programmes to address problems raised by farmers, they are likely to become frustrated when resources are not easily available for them to continue. On the positive side, when projects promoting participatory approaches have empowered farmers and frontline staff to be more proactive in undertaking agricultural research, this may have increased their capacity and confidence to address local technical problems without the need for external help.

Lessons

Projects provide a form of decentralization of budgets and decision-making in public-sector research and extension organization which by-passes some cumbersome procedures and facilitates a more timely response in trying out technical options to address priority problems.

After projects have ended, further frustrations may arise and researchers may revert to previous research and extension approaches for which resources are available.

Weak links with key uptake agencies

As discussed in Chapters 14 and 15, establishing effective linkages with uptake agencies is a major challenge for projects located in public-sector research organizations. National research organizations often do not have a clear mandate or capacity to become directly involved in dissemination and uptake activities. Some researchers regard their input as complete when statistical research results indicate a successful technology and the participating farmers have agreed that the technology is acceptable.

Lessons

The importance for achieving impact of strong linkages between research and uptake functions may in future imply more frequent use of a market-driven approach to some types of participatory research (Jones *et al.*, 1999).

Weak links with technology supply sources

Links to new knowledge and product streams to feed into the research process will also be a challenge. Once researchable problems and opportunities have been identified, a major challenge is to find sources of technologies to address these. Adoption of an interdisciplinary team approach should foster a diversity of new knowledge sources, including the internet and world wide web, to prime the research process. This will be further supported by mechanisms to make it easier for any researcher or development agency, anywhere, to access new knowledge and new products. Supplies of technology with which to experiment, as well as obtaining supplies on a larger scale once promising technologies have been identified, remain major challenges. The ARPT in Zambia was constrained in this respect, as was the ActionAid Farmer Participatory Research Project (FPRP) and the Kavango Farming Systems Research and Extension (KFRSE) Project. DAREP clearly benefited greatly from having multiple links with agencies willing and able to supply new products and ideas for testing in the field.

Lessons

Provision of access to sources of new technology and knowledge should be very carefully considered in project design.

The international agricultural research centres have a major role to play in this endeavour, particularly through more cross-cutting programmes that are oriented to systems as well as commodity issues.

Limited technical capacity to address researchable problems

Participatory approaches, if taken up on a widespread scale, have the potential to generate far more researchable problems than can be tackled by the formal research system. DAREP found this, and used farming systems research prioritization methods to develop a researchable agenda, as did the National Agricultural Research Project, Phase II (NARP II) and KFSRE in selecting on-farm research sites. When farmers are empowered to develop research agendas through local committees and farmer research groups, they have the potential to exert more pressure on the formal research system to address their problems. When implemented by NGOs with very limited technical expertise to respond to farmers problems, technical expertise will have to be drawn in, usually from the national research and extension organizations. If mechanisms for priority-setting are not well developed at national and regional levels, research problems generated through empowerment approaches may not be typical of a larger constituency of small-scale farmers. Particularly in countries with diverse agroecological conditions, public-sector extension has a substantially more technical capacity than research organizations, through its subject matter specialists able to address a diversity of problems at local level. The farmers themselves usually have most experience with operating under specific local conditions, but may not always be prepared to share all their knowledge freely with other farmers.

Lessons

Any organization taking up participatory agricultural research should be encouraged to think carefully about how it will respond to demands from farmers and other stakeholders.

Such organizations may need help with developing mechanisms for priority-setting, linking with other service providers, and empowering farmers and other stakeholders to develop their own technical problem-solving capacity.

Experience and knowledge of appropriate methods not developed

The projects documented here all put considerable resources into developing human capacity to implement participatory research approaches in the field, thereby developing capacity within the host organization. However, some field approaches still being used by research and extension organizations are not well suited to participatory research. For example, some public-sector research organizations have a basic knowledge of participatory rural appraisal (PRA) tools and approaches, but still have a limited capacity for applying these in the most creative and cost-effective way at field level. Similarly, most public-sector extension organizations and many NGOs have limited experience of how to diagnose researchable problems (as distinct from general problem analysis) and of participatory experimental design and implementation.

Moreover, effective scaling-up of the beneficial aspects of farmer participation will require skills and perspectives that are not usually included in the academic training of agricultural research scientists. Few researchers have training in communication, community development, qualitative research, investigating indigenous knowledge, farming/livelihood systems analysis, gender analysis, design and management of on-farm trials, and participatory monitoring and evaluation. Short courses may provide skills capacity and new perspectives, but the new approaches (such as PRA) may be applied mechanistically and often there is little follow-up to evaluate the impact of training. The challenge ahead is to equip mature research scientists with these skills so that they can have confidence in them and begin to apply them in a more creative way.

Lessons

Future initiatives should avoid a mechanistic approach to applying participatory methods, and foster an open spirit of learning and sharing experiences in piloting and developing cost-effective field approaches.

Weak facilitation capacity

The facilitation capacity tends to be weak among most of the key stakeholders. Research organizations often have fairly top-down management structures with regard to resource allocation and planning, and at the same time an 'individualistic' culture among the implementing researchers. Similarly, farm households often have hierarchical relations within them, between husband and wife and parents and children, but are individualistic when it comes to undertaking particular farming operations. Extension organizations often have top-down approaches and expectations, but offer less room for individualism, even though frontline staff are often left unsupervised for long periods of time. In the case-study projects, the culture of facilitation was emphasized at different levels. The NGOs, such at ITDG, ActionAid and FARM Africa, particularly emphasized facilitation in their relations with local communities. In the case of DAREP, training staff in facilitation and participatory approaches started with more senior staff. In KFSRE and ITDG-Chivi this type of training began at the field level.

Lesson

Developing facilitation capacity may (and probably should) begin at all administrative levels, not just at the top, the bottom, or in the middle.

Limited time and resources for field research

While the projects described in this book were largely effective in mobilizing human resources, some public-sector researchers may also be so busy with laboratory, on-station and multi-locational trials that they have very little time to engage in participatory research. Extension staff can at times also be very busy with general extension duties, and lack a mandate for using existing resources for participatory research activities. Can a change of approach in research or extension, towards increased participation, be justified in terms of using existing resources more effectively and efficiently?

Lessons

There is not a clear lesson from the cases in this book to answer the question 'are participatory research approaches more or less sustainable than conventional on-station research and supply-driven extension approaches?'

Farmer organizations not well developed

In Africa, participatory agricultural research remains an activity that is rarely initiated by farmers, but is orchestrated by practitioners (Sikana, 1995). In the absence of strong farmers' organizations in most sub-Saharan countries, empowering farmers to influence decision-making in the formal research process presents a major challenge. It is difficult for research and extension decision-makers to obtain a consensus from farmers about their major concerns and constraints. In the absence of strong farmer organizations, projects can set up temporary structures for empowering farmers to influence the research agenda, but these rarely sustain such a function long beyond the life of the project. Once farmer organizations exist, there is much to be learned from the experiences of building farmer capacity through the local agricultural research committees that have been piloted in Latin America (Ashby *et al.*, 2000).

Lessons

Setting up a large organization to represent the interests of smallholder farmers is beyond the scope of a participatory agricultural research project. In the few cases where such organizations exist in Africa, there are opportunities for setting up projects to develop their research capacity based on experience elsewhere.

In the absence of farmer organizations, by setting up local research groups and committees a project may help small numbers of smallholder farmers to mobilize around agricultural issues.

Limited household resources (time, labour, land)

Because agricultural experimentation requires resources such as land, labour and time, it is a challenging enterprise for households to become involved where these resources are in short supply.

Lessons

First, specific strategies may be needed to target activities and ensure inclusion of marginal groups and resource-poor households.

Second, the ability of the resource-poor to effectively participate in and benefit from participatory agricultural research should not be an assumption, but something that is carefully considered and factored into project design.

Low potential for increased income or food production

A project may face a situation where there is limited potential for increasing food production or income through the introduction of new agricultural technology. In such a case, farmers may be desperate for help, but technical research may have little to offer them. None of the projects documented in this book reported such a situation. Often both project staff and farmers have an optimistic view of what new technology can contribute. It make take some time before both parties accept the limitations of what they may achieve. Projects such as the KFSRE and DAREP were operating in quite challenging environments for crop production, but still experienced relatively high levels of farmer participation. Farmers' continued interest under these harsh conditions may reflect the fact that, as populations increase and livestock population per head of human population declines, crop production becomes relatively more important as a source of livelihood for more people – even though growing conditions are far from ideal.

Lessons

Careful thought in where to site farmer participatory research projects in relation to agricultural potential. Assessment of potential should not rely only upon 'experts' views which are likely to be more influenced by opinion and date land use classifications than by empirical knowledge. Efforts should be made to take stock of processes of indigenous agricultural intensification and livelihood diversification.

Low confidence and underestimating others

Agricultural graduates have usually been recruited straight into public-sector research and extension systems. In many countries, those selected to join research are customarily regarded as more intelligent and capable than those joining extension. Researchers as a group tend to look down on their extension colleagues. This can lead to a lack of confidence on the part of extension staff when it comes to technical issues relating to research. This set of attitudes has to be changed if extension staff are to become more directly involved with participatory agricultural research. In a similar way, farmers often underestimate their own capacity, and defer to visiting government experts on technical issues. The ITDG and FARM Africa cases illustrate that early involvement of extension staff and farmers in the participatory research approach, providing them with training and resources to undertake research, is an effective means of overcoming this challenge. Collaborative agricultural research of the type discussed in earlier chapters of this book provides farmers with the experience and confidence to express and defend their own viewpoints.[1]

Lessons

Empowerment of farmers and extension staff through training and early involvement in the participatory research process will help address existing lack of confidence and attitudes of inferiority and superiority.

More serious consideration should be given to situating participatory research projects within agricultural extension organizations, with researchers playing a facilitation role.

Territoriality, fear, jealousy and secrecy

Challenges arising from territorial behaviour, fear, jealousy and secrecy affect all the potential stakeholders. While NGOs may have good internal relations, they can be defensive of what they regard as 'our territory', 'our farmers' and 'our information'. While many of the case-study writers did not talk about these challenges, the ARPT case clearly shows how serious they can become. Extension organizations may be the least affected by such challenges due their priority of communicating information, and because they often need to respond quickly and pragmatically to directives and requests for help.

Lessons

Organizations that are driven more by the forces of hierarchy, seniority and historical roles than by research outcomes and a search for new opportunities are likely to have difficulty in fully embracing and capitalizing on the benefits from more participatory research approaches.

There is a need for any project or programme to have an open door and an inclusive approach during implementation.

Culture of dependency

Many of the projects operated in situations where communities had been used to receiving free hand-outs of food and other aid, and a culture of depending on external assistance to solve problems had developed. This did slow down project efforts to initiate greater self-reliance in development, particularly where the projects combined research with technology supply issues, such as the DAREP efforts to develop alternative seed supply systems for dryland crops.

Lessons

Participatory agricultural research initiated in food-deficit areas should prepare for a lengthy period of engagement with local communities, local leaders and relief agencies.

Gender bias

Related to the above, lack of gender awareness and capacity to handle gender issues, gender bias on the part of implementing research and extension staff, and gender bias implicit in the methods and approaches used, are likely to result in the marginalization of female farmers and also female professionals in the research process.

Lessons

Specific strategies may be needed to target activities and promote the inclusion of specific gender and age categories of farmers.

Project team design and recruitment should consider how the gender composition of the team will influence its operational effectiveness, particularly with regard to effective dialogue with women farmers and addressing researchable issues in a gender-sensitive manner.

Contentment with current circumstances

Contentment with the current situation can be a major challenge for involving all the main stakeholders in more participatory agricultural research. Contentment with their existing ways of doing things, whether amongst farmers, extension agents, researchers or NGO employees, offers limited prospects for a project to introduce greater participation and new ways of doing things. Contented people have few incentives to become engaged, and may see participatory approaches as unnecessary and too demanding in terms of their time and other resources. The case studies provide some examples of this type of reaction among researchers on the edges of projects. In nearly every case there was a critical mass of interested people (researchers, extension, farmers) that helped to launch the process, while others joined in later.

Lessons

A general state of contentment among researchers, extensionists and farmers is not a good sign at the start of a participatory research project. Projects are more effective when a critical mass of stakeholders desiring change is present.

The scaling-up challenge

One final challenge, which tends to cut across the above, is that of scaling-up the successes of relatively small participatory projects (Farrington, 1998; Uvin and Miller, 2001). These projects have often been well endowed with human and financial resources, and limited in geographical scope. In the longer term, one would hope that an overall increase in prosperity within a farming community would enable farmers to commit more of their own resources to learning from and teaching other farmers, and paying for agricultural services in a more liberalized economic environment. However, such a hope is a long way off for many communities in many

African countries, particularly those in remoter areas with difficult access to markets. Scaling-up successes in these areas is likely to require continued and targeted support from all the main development agencies (public, private and charitable) operating in these areas.

17.3 THREE OVERARCHING ISSUES

We have discussed many of the challenges and related lessons in institutionalizing participatory research approaches in Africa's national agricultural research and extension systems. What are the broader issues emerging? We raise and briefly discussing three inter-related issues:

- projects versus programmes
- pluralism of organizations
- functional boundaries between organizations.

An outline of some strategies that can be used to address these issues, along with some of the challenges highlighted earlier, concludes this chapter.

Issue 1: Projects versus programmes

Donor-funded projects, rather than programmes supporting a particular sector, are the main vehicle through which participatory approaches to agricultural research and extension have been introduced to Africa and other parts of the developing world (Farrington and Martin, 1988; Okali *et al.*, 1994). Given the current state of public-sector support for agricultural research in most sub-Saharan countries, dependence on donor funding is likely to continue into the foreseeable future. For donors, projects with defined objectives, outputs and time spans have provided a convenient and manageable framework for technical co-operation support to agricultural research and extension, including support to change management and capacity-building. In this context, projects provide windows of opportunity to:

- influence the direction of change
- challenge entrenched approaches
- demonstrate the value of new approaches
- build capacity at individual level
- provide modified incentive structures on a temporary basis
- engage in dialogue with decision-makers about the value of participatory approaches
- fund training, planning and strategy development activities in support of institutionalizing participatory research approaches.

As an alternative to projects, some donors may be inclined to fund participatory approaches as part of larger programmes supporting sectoral reform. The tendency over the past two decades for the programmes of many research organizations in Africa to be driven by the multiple agendas of various donor projects has given rise to efforts by some national policy-makers and donors to improve donor co-ordination, and in some cases to move from a project to a programme approach.[2] From the donor perspective, programmes have distinct advantages over projects when managing development assistance, both in terms of handing over decision-making responsibility to national programme leaders, and in terms of the lesser technical co-operation and administrative inputs involved. Programmes may also be relatively more compatible with the notion of partnership between Northern donors and Southern recipients.

In the context of donor funding, both projects and programmes provide opportunities for elements of external facilitation to make modest contributions to positive change management in national agricultural research systems (Thompson, 1995). Projects may create memorable experiences and reference points to guide future thinking and action – and start up helpful routines for reflective thinking and interdisciplinary working practices. Programmes provide a more comprehensive framework for institutionalizing participatory approaches, notwithstanding the risks that efforts and quality may diluted. The prospects for using either projects or programmes, or a combination of both, will vary depending on the context. Research that is technically driven, but includes participatory approaches to achieve specific technical objectives, may not include a fully fledged learning and training cycle of the type described by Thompson (1995), but rather may aim for smaller incremental changes, initially targeting parts of a larger organization. Such research is still likely to be most easily supported through a project framework.

The pendulum of opinion may swing between favouring projects on the one hand and programmes on the other. However, the choice may not have to be either/or in every case. For example, the UK Department for International Development (DFID)'s support to KARI was in the form of a project supporting programmes within a large research organization. Particularly in the later stages of DFID support to NARP II, the project regrouped a number of formerly separate strategic and applied research projects under a single project focusing on adaptive research. The same project gave specific support to strengthening the existing socio-economic and downstream regional research programmes of KARI (Sutherland, J.A., 1999b).

Do projects or programmes provide more opportunities for effective collaboration across agencies involved in agricultural research and development? Projects may provide more flexible structures than programmes within which to manage collaboration at field level, and even at higher levels. This is because they are less likely to be tied to decision-making hierarchies within organizations and, therefore, provide more room for innovation on the part of individuals within organizations. On the other hand, programmes may provide a framework within which projects can collaborate and learn from each other.

Issue 2: Organizational pluralism

A challenge that future programmes and projects face in sub-Saharan countries is managing the growing plurality of organizations involved in agricultural research and development. This can take two inter-related forms: more organizations involved in a particular type of activity; or a wider range of activities undertaken by a single organization. With the removal of monopolistic mandates in the drive to develop national agricultural research systems, there will be increased involvement from the NGOs, innovative private-sector companies, producer organizations, some academic institutions, and strong regional research networks. Each organizational context will have its own distinctive challenges, but a common one will be how to develop workable partnerships with other players. The pressure to demonstrate impact is likely to lead public-sector research and extension organizations into greater involvement in training, input supply and marketing activities. As organizations focus energy on developing their own profiles and forging research partnerships, a possible risk is that farmer participation will again become marginal to the research process. Farmers, especially those in development project 'hot spots', may have to face both more opportunities and also potentially more confusion. Farmers accustomed to dealing with only one agency (such as the government extension services or a locally based NGO) are likely to have to deal with more external agencies, each trying to capture their attention and foster their participation. This could create difficulties if different organizations offer different incentive systems, and do not collaborate in terms of research methods, timing of events, and sharing of information.

A plurality of organizations may also result in a greater plurality of participatory methodologies or approaches. The search for better participatory methodologies reflects to a large extent a more widespread acceptance of the idea that participation is a good thing. As Thompson (1995) notes, "today the question many public sector institutions are asking is not why to adopt and apply participatory research and development approaches, but how to go about it". The current need is less of persuading government organizations or donors to support greater use of participatory research and extension approaches, and more to provide guidance for the effective introduction, demonstration and uptake of these approaches and associated methods (Martin and Sherington, 1997). The challenge here will be to avoid imposing methodologies upon organizations, and instead to devote quality time and resources to 'growing' methodologies to suit organizational capacity and project objectives. Alongside this, there is a need to avoid excessive use of jargon and new terminology and to try and keep approaches as simple as possible, so that they are easily learned and transferable within and across organizations.

Issue 3: Rethinking functional boundaries

A functional approach to agricultural research and development is mirrored in the structures established under public-sector government and parastatal organizations in post-independence African states. A conventional functional model of research and development assigns distinct functions to the main actors. For example, agricultural universities and colleges are given a teaching, training and basic research role; public-sector research organizations an applied research and technology development role; public-sector extension organizations an information and technology transfer role; and agribusiness organizations an input supply and marketing role. Farmers are usually assigned a production role – they are primarily perceived as producers of national food and raw materials (even though they often perform the functions assigned to the other organizations as well). This perspective is represented in Figure 17.4.

In assessing the performance of organizations, the failure of a particular organization to fulfil its key function becomes a focal point of concern within this functional model. As discussed in Chapters 14 and 15, it is not uncommon for members of organizations with different functions to point fingers at each other. Researchers may argue that extensionists do not use the technical information they generate, and that the technology they have successfully developed has not been taken up because of inadequate input supply, credit and marketing services. Extension and agribusiness organizations may maintain that research information is not effectively communicated to them. Moreover, each organization may become defensive about its particular area of functional specialization, perceived as a 'national mandate'. The ownership of new information and new technologies may become an issue within and between organizations. This may result in a reluctance of individuals to collaborate and share information with other agencies.

To address this problem of poor functional interdependence between organizations, improved linkage mechanisms have been emphasized. Various African countries have implemented linkage mechanisms over the past 15 or so years, including research–extension liaison officers, research–extension liaison committees, and agricultural development committees (Ewell, 1988; Merrill-Sands and Kaimowitz, 1989; Anandajayasekeram and Stillwell, 1998). In most cases these mechanisms have enjoyed only partial and often short-lived effectiveness. The most effective mechanism of linkage has been when agencies have undertaken planning and implementation of field-based activities in a collaborative mode (Merrill-Sands and Kaimowitz, 1989).

One lesson to be drawn from the experience to date is that a functional model of agricultural research and development, which assigns distinct functions and mandates exclusively to particular organizations, is not very conducive to the institutionalization of participatory approaches. There is a need for organizations to specialize up to a point. However, an openness and eagerness to cross over traditional boundaries and take on new functions and roles is a precondition for the

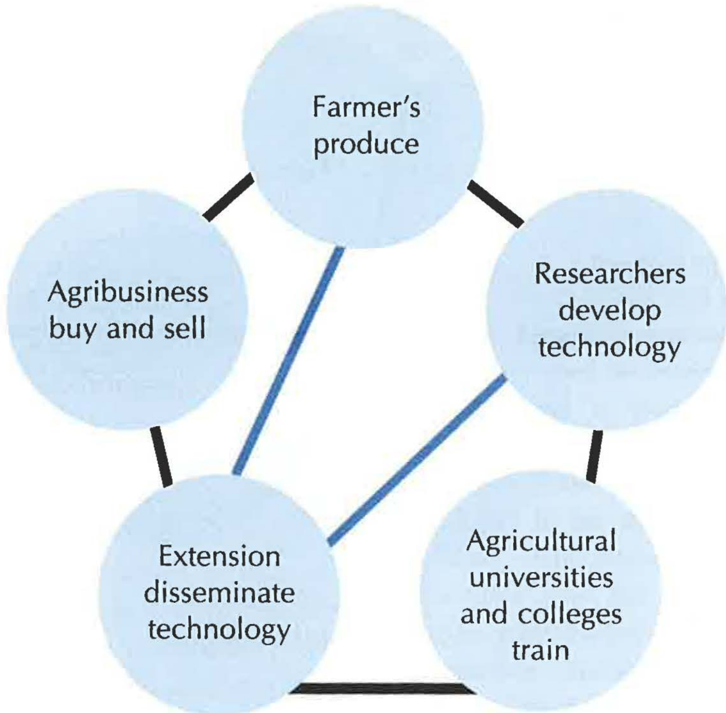


Figure 17.4 A functional perspective on agricultural research and development

effective institutionalization of participatory approaches in which farmers play a significant role. A more integrated model for the organization of participatory research and development activities is presented in Figure 17.5. This model emphasizes an overlapping of functions and roles, implying that at least some individuals in each organization will be likely to have dual roles.

For example, farmers are seen not simply in a production role, but also as undertaking research, extension, training, technology supply and marketing. For example, in the case of crop varieties, with support from research and extension, they may screen and adapt the varieties, report the results to other farmers, multiply the seed and sell it to other farmers, and train other farmers in this set of operations. In undertaking these other roles they have a comparative advantage: knowing more about local growing conditions, local variety preferences, low costs for producing, storing, packaging and distributing the seed, and training *in situ* using the local language.

Extension organizations, whether public sector, private or NGO, do not simply have a communication role. They also become involved with other functions where they have a comparative advantage, such as certain types of adaptive research and training, and even facilitating input supply and marketing support in areas where the private-sector and farmer co-operatives are poorly developed. Extension may also play a facilitation role in the formation of farmer groups for input purchase and crop marketing, or in encouraging private traders to supply inputs and markets.

While much on-farm research may be implemented by extension, public-sector researchers will need to continue research on-farm, particularly research of the type that requires specialist knowledge and skills, and is of strategic importance in improving the effectiveness of the technology-generation process. In the process of working on-farm, some members of research organizations may take on an extension role for a time. In addition, and where necessary, they may take on technology supply and pilot product marketing roles, in

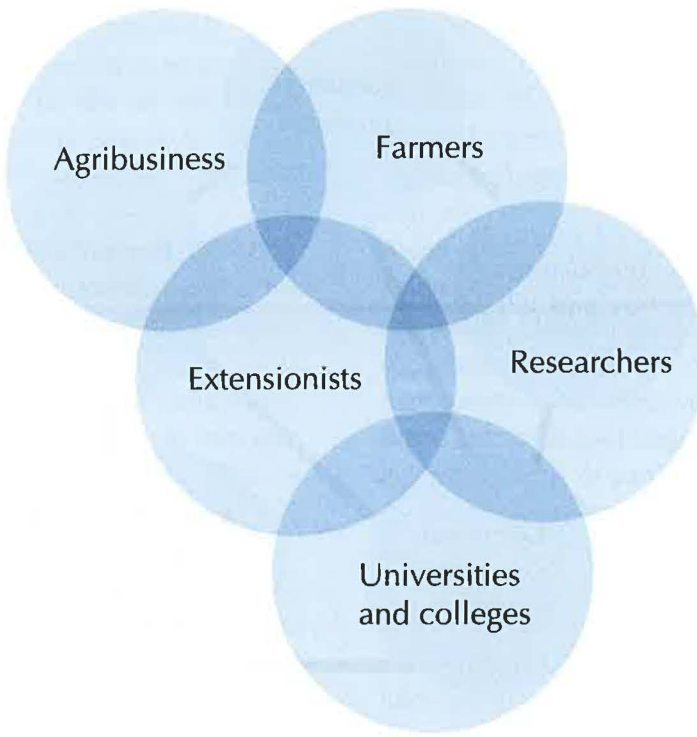


Figure 17.5 A more integrated perspective on agricultural research and development actors and their functions

order to demonstrate the potential for a new technology and stimulate demand for its product. This may also require effective lobbying of private- and public-sector input suppliers and marketing agencies.

Researchers with significant experience of farmer participatory approaches also have an important role in training interested extension staff. This training may be in issues relating to participatory experimentation or a particular area of technical specialization, to empower extension to do more effective research with farmers. There should also be scope for such researchers to make inputs into training provided in the universities and colleges, to share experiences and to increase the practical relevance of this training.

While location-specific solutions to address the challenges listed above will be developed in the process of implementation, there is a considerable body of experience with a range of methods and tools that have assisted institutionalization of farmer participatory research and similar approaches. Drawing on this experience, a number of cross-cutting strategies for addressing institutionalization challenges are described briefly below.

17.4 SOME CROSS-CUTTING STRATEGIES

Specific strategies to address the challenges discussed above will be developed locally, as part of the learning and experimentation process within a particular organization and country. There may be no simple solutions to address some of these challenges. In some cases, rather small adjustments to practice may make participatory processes more effective. In other cases, where the need for change is widely accepted and the resources are available, significant changes in the way organizations and their individual members operate may be possible. Aside from the strategy proposed above to rethink organizational functions and boundaries, some other strategies of a fairly generic type may be used across a range of stakeholders involved in the participatory research process.

Forming *ad hoc* joint action groups

Building capacity and changing attitudes through formal training only, and addressing linkage issues through meetings to strengthen linkages, is likely to make rather limited inroads into institutionalizing participatory and collaborative approaches. *Ad hoc* groups can be used to bring together members of various organizations or social groups to collaborate on a specific task or number of tasks. An action group is often a much more effective mechanism than a committee or a linkage office, both for capacity-building and for building relationships between members of different organizations. Action groups can include teams formed to undertake PRAs and diagnostic surveys, planning teams to discuss research proposals, and peer review teams to evaluate farmer participatory research programmes. As described in Chapter 8, at the community level farmer research groups or research committees (with specific functions) can be formed to plan and implement farmer participatory research programmes, bringing together members of the community who do not usually work together, and thereby stimulating local learning processes.

Partnerships

Effective joint action groups provide a building block for more sustained and formal partnerships between organizations. There are likely to be continued opportunities for, and pay-offs from, partnerships in the implementation of various aspects of farmer participatory research, particularly for problem identification, experimental design, and technical reporting of the results. The involvement of agribusiness (from local traders to large companies) provides an opportunity to bring in their resources to support the farmer participatory research process. This may be through the contribution of information, agro-inputs, training, or financial assistance for research and dissemination activities.

Empowerment training

Empowerment training is relevant to all the main actors or stakeholders, and is typically included as part of participatory learning and action approaches used in institutional change. The main purpose is build the confidence of individuals in their own capabilities and strengths to solve problems and address issues. The focus is on attitudes, but methods are involved. Empowerment training provides individuals with the skills for forging more effective partnerships, including the capacity for constructive dialogue with others, as an alternative to evasive, deceptive or combative behaviour.

Making space and opportunities for dialogue, listening and learning

In the rush of implementing farmer participatory research, it is important to create quality time for dialogue with farmers and others at various levels, to encourage actors to listen to each other, and to provide space for learning by doing. Participatory rural appraisals are often quite rushed activities, but they do provide useful opportunities for dialogue, listening and learning in the early stages of a project. The challenge is how to sustain the dialogue after the PRA activities are over. Some of the activities discussed in Chapter 8, including farmer research groups, field visits and field-based events, are very useful means of doing this.

Keeping the door open

One danger to watch out for is the formation of an exclusive 'participatory research club' or clique. This risk is present at all levels of operation and in any organization. It can happen in agricultural universities and colleges, in national and regional research centres, in extension offices, and in local communities with farmer research groups. Cliques tend to provoke feelings of jealousy and insecurity among other members of the organization, and can work against the spirit of participation. Such clubs and cliques will tend to form naturally, and so a regular review of who is participating at various levels is useful, with specific efforts made to include others along the way.

Exchanging roles

One mechanism for avoiding the growth of unhealthy cliques of professionals, who may become complacent and smug over time, and also for strengthening linkages and partnership, is for individuals to exchange roles. Mechanisms for doing this include staff-exchange programmes between organizations (such as research and extension), staff attachment, staff secondment, rotating certain roles within teams, and removing barriers to entry, exit and recruitment (such as rigid rules on basic qualifications, more flexible employment conditions, granting leave without pay, etc.).

Identify win–win opportunities

Partnerships between individuals and organizations are likely to be effective when there are benefits for both parties. Participatory research activities that clearly benefit all the parties involved are more likely to succeed than those leaning heavily towards the interests of a particular party. Collective identification of benefits should minimize ritual forms of collaboration lacking clear benefits (such as fulfilling an organizational directive, a project document output, or a memorandum of understanding). Identifying mutual benefits may involve initial stakeholder analysis, stakeholder workshops, or frank informal talk between potential partners.

Rewards for productive partnerships, risk-taking and innovation

In organizations and communities where there is not a strong ethic of partnerships, and where individuals are risk-averse and not innovative, it can help to reward exceptional behaviour. Those who do make efforts to form productive partnerships, take risks and innovate can be rewarded simply, by words of praise and encouragement from colleagues and managers, and also through more formal competitions and modest prizes.

Lobbying and demonstrating results

Acceptance of a new approach usually involves a demonstration of its effectiveness or potential, and some degree of lobbying or sensitizing of key decision-makers whose support is needed. Farmers who have been involved in participatory research are often the best spokespersons when it comes to convincing key decision-makers that participatory approaches are effective.

17.5 FINAL CONCLUSIONS

Participatory agricultural research is not a formula for instant success in technology development and dissemination. It is an approach that challenges more conventional ways of thinking and acting, and offers a way forward to address some shortcomings of conventional research approaches. Participatory agricultural research does not require that the organizations involved change their core functions, but it does require that they reflect upon how effectively they fulfil current roles, and be prepared to take on new roles. The cases in this book reflect generally positive experiences from practitioners working with participatory approaches across a range of organizations in a number of different countries. Not all practitioners working in agricultural research and development will agree with every opinion expressed in this book. They may not need to use the full range of approaches and methods documented in their work. They are, however, encouraged to be more adventurous in the way they undertake agricultural research, and not to be confined by their disciplines and past experience. It is our expectation that they will find participatory approaches make their work both more productive and more enjoyable.

NOTES

1. This exposure may not, however, prevent participating farmers from stereotyping their poorer neighbours, attributing their poverty to laziness and ignorance.

2. his would probably include the World Bank, the German Development Agency (GTZ), and more recently DFID and DGIS (Directoraat Generaal Internationale Samenwerking, formerly Netherlands Development Agency).

REFERENCES

ACQUAYE, K. (1995) Maize storage practices in Volta Region. pp. 45–47. In: *Report of the Workshop on Control of the Larger Grain Borer, 21–23 February 1995.* Boxall, R. (ed.). Accra/London: Ghana Ministry of Food and Agriculture/UK Overseas Development Administration Larger Grain Borer Control Project.

ADAIR, J. (1986) *Effective Teambuilding.* New York: Pan Books.

ADDO, S., COMPTON, J., GBEDEVI, S. and OFOSU, A. (1995) Involving farmers in biological control of a storage pest: the experience of *Teretriosoma nigrescens* release for *Prostephanus truncatus* control in Ghana. Paper presented at the *International Conference on Post-Harvest Technology and Commodity Marketing, Accra, Ghana, November 1995.*

ANANDAJAYASEKERAM, P. and STILLWELL, T. (eds) (1998) *Institutionalization of Farming Systems Approach in Eastern and Southern Africa.* Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

ANON. (1996) Tharaka-Nithi Districts. In: *Focus on Agricultural Research for Sustainable Development in a Changing Economic Environment. Proceedings of the 5th KARI Scientific Conference.* Fungoh and Mbadi (eds). Nairobi: Kenya Agricultural Research Institute.

ARESAWUM MENGESHA and BULL, M. (1997) Starting with local knowledge in participatory research. pp. 115–126. In: *Farmers' Research in Practice: Lessons from the Field.* Van Veldhuizen, L., Waters-Bayer, A., Ramirez, R., Johnson, D.A. and Thompson, J. (eds). London: Intermediate Technology Publications.

ARPT (1989) *Proceedings of a Workshop on the Design and Analysis of On-farm Experiments, 2–6 November 1989.* Mount Makulu Central Research Station, Chilanga, Zambia: Adaptive Research Planning Team.

ARPT (1993) *Workshop Commentary and Papers of the ARPT National Workshop on Farmer Participation and Farmer Research Groups, 1–6 February.* Mount Makulu Central Research Station, Chilanga, Zambia: Adaptive Research Planning Team.

ARPT-CP (1991) Central Province Performance Review 1981–91. Presented to the Review Seminar: *ARPT in the 1990s and Beyond, 19–21 February.* Mount Makulu Central Research Station, Chilanga, Zambia: Adaptive Research Planning Team.

ARPT Northern Province (1989) *Annual Report, 1988/89 Season.* Kasama, Zambia: Misamfu Research Station.

ASHBY, J. and SPERLING, L. (1994) *Institutionalizing Participatory Client-driven Research and Technology Development in Agriculture.* AgREN Network Paper, No. 49. London: Overseas Development Institute.

ASHBY, J.A., BRAUN, A.R., GRACIA, T., DEL PILAR GUERRERO, M., HERNANDEZ, L.A., QUIROS, C.A. and RAO, J.I. (2000) *Investing in Farmers as Researchers: Experience with Local Agricultural Research Committees in Latin America.* Cali: Centro Internacional de Agricultura Tropical.

BASS, S., DALAL-CLAYTON, B. and PRETTY, J. (1995) *Participation in Strategies for Sustainable Development. Environmental Planning Issues,* No. 7. London: International Institute for Environment and Development.

BAWDEN, R.J. (1994) Creating learning systems: a metaphor for institutional reform for development. pp. 258–263. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

BIGGS, S. (1989) *Resource-poor Farmer Participation in Research: A Synthesis of Experiences from Nine Agricultural Research Systems. OFCOR Comparative Study Paper,* No. 3. The Hague: International Service for National Agricultural Research.

BIGGS, S. and CLAY, E.J. (1981) Sources of innovations in agricultural technology. *World Development,* **9**: 321–336.

BINGEN, J.R. and POATS, S.V. (1990) *Staff Management Issues in On–farm Client Oriented Research. OFCOR Comparative Study,* No. 5. The Hague: International Service for National Agricultural Research.

BOXALL, R.A. and COMPTON, J.A.F. (eds) (1996) Ghana Larger Grain Borer Control Project, Final Technical Report. Chatham, UK: Natural Resources Institute.

BUNCH, R. (1982) *Two Ears of Corn: A Guide to People-centered Agricultural Improvement.* Oklahoma City, USA: World Neighbours.

CARE Zambia (1996) *Livingstone Food Security Project: Phase Two.* Lusaka: CARE.

CASTILLO, G.T. (1997) *Research Partnerships: Issues, Lessons, Results and Dreams for Sustainable Development. AgREN Network Paper,* No. 71. London: Overseas Development Institute.

CHAMBERS, R. (1989) Reversals, institutions and change. pp. 181–195. In: *Farmer First: Farmer Innovation and Agricultural Research.* Chambers, R., Pacey, A. and Thrupp, L.A. (eds). London: Intermedate Technology Publications.

CHAMBERS, R. (1997) *Whose Reality Counts? Putting the Last First.* London: Intermediate Technology Publications.

CHAMBERS, R. and GUIJT, I. (1995) PRA – Five years later. Where are we now? *Forests, Trees and People Newsletter,* **26/27**: 4–14.

CIMMYT (1988) *From Agronomic Data to Farmer Recommendations: An Economics Training Manual* (revised edn). El Batan, Mexico: International Maize and Wheat Improvement Center.

COLLINSON, M.P. (1979) *Deriving Recommendation Domains for Central Province, Zambia. Report,* No. 4. Nairobi: International Maize and Wheat Improvement Center.

COMPTON, J. (1997a) *Managing Applied Research: Experiences from the Post-Harvest Pest Control Project in Ghana. AgREN Network Paper,* No. 74. London: Overseas Development Institute.

COMPTON, J. (1997b) How to make post-harvest research serve the needs of the farmer: the example of maize storage in Ghana. Paper presented at the *GASGA Executive Seminar, Canberra, Australia, September 1997.* Canberra: Group for Action on Systems of Grain After Harvest/Groupement de Action de Systemes de Grain Apres-Recolte.

COMPTON, J. and MOTTE, F. (1997) Case study: Ghana/UK Larger Grain Borer Control Project (1993–1996). Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

COMPTON, J.A.F. (1995) The maize storage game: a new training tool for agricultural extension staff in Ghana. Paper presented at the *International Conference on Post-Harvest Technology and Commodity Marketing, Accra, Ghana, November 1995.*

COMPTON, J.A.F., MAGRATH, P.M., MOTTE, F.F., GBEDEVI, S.R., ADDO, S., OFOSU, A., BOXALL, R.A. and SEMAKOR, S.K. (1995a) Involving maize traders in developing and promoting new maize storage technology in Eastern Ghana. Paper presented at *African Association of Insect Scientists, 11th Meeting, 6–11 August 1995, Yamoussoukro, Cote d'Ivoire.*

COMPTON, J.A.F., OFOSU, A., MAGRATH, P.M., MOTTE, F.F., ACQUAYE, K., ADDO, S. and BOXALL, R.A. (1995b) Rapid methods for small farm storage surveys. Paper presented at the *International Conference on Post-Harvest Technology and Commodity Marketing, Accra, Ghana, November 1995.*

COMPTON, J.A.F., MAGRATH, P.A., ADDO, S., GBEDEVI, S.R., AMEKUPE, S., AGBO, B., PENNI, H., KUMI, S., BOKOR, G., AWUKU, M., MOTEY, Z., FLOYD, S. and BOXALL, R. (1997a) The influence of insect damage on the market value of maize grain: a comparison of two research methods. Paper presented at the *Premier Colloque International: Lutte contre les depredateurs des denrees stockees par les agriculteurs en Afrique, Lome, Togo, 10–14 February 1997.*

COMPTON, J.A.F., MAGRATH, P.A. and OFOSU, A. (1997b) A new method for cost–benefit analysis of small scale tropical maize storage trials. In: *Insects in African Economy and Environment. Proceedings of the Joint Congress of the Entomological Society of Southern Africa and the African Association of Insect Scientists, Stellenbosch, 30 June–4 July 1996.*

CORNWALL, A., GUIJT, I. and WELBUORN, A. (1994) Acknowledging process: challenges for agricultural research and extension methodology. pp. 98–116. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

CROXTON, S. and MURWIRA, K. (1997) Participatory technology development and dissemination: a case study from Chivi, Zimbabwe. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

CURRY, J.J., MBABU, A.N. and SUTHERLAND, J.A. (1999) Processes of rural social and economic differentiation and their consequences for smallholder agricultural research. pp. 495–498. In: *Toward Increased Use of Demand Driven Technology*: Pre-conference and mini-papers prepared for the KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

CURRY, J.J. and SUTHERLAND, J.A. (1999) Incorporation of a social science perspective into biophysical research programmes: the project approach. pp. 511–514. In: *Toward Increased Use of Demand Driven Technology*: Pre-conference and mini-papers prepared for the KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

DANSOU, K.K., AFFOGNON, H. and BELL, A. (1997) Lutte integree contre le grand capucin du mais et autres insectes associes dans les greniers ruraux au Benin: developpement participatif de technologie post-recolte concept et procedure. Paper presented at the *Premier Colloque International: Lutte contre les depredateurs des denrees stockees par les agriculteurs en Afrique, Lome, Togo, 10–14 February 1997.*

DERBYSHIRE, H. and GONGWE, A. (1992) An Informal Study of the Socio-economic Impact of the Cashew Improvement Programme. Cashew Research Project. Mtwara, Tanzania: Department of Research and Training, Naliendele Agricultural Research Institute, Ministry of Agriculture (unpublished report).

DE VILLIERS, A. (1996) *Quantifying Indigenous Technical Knowledge (QUIK): A Rapid Method for Assessing Crop Performance without Field Trials. Examples of its use in Ginger and Mango Research.* London: Overseas Development Institute.

DE WAAL, D. (1997) Farmer Participatory Research in the ODA/DRT Cash Research Project. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

DRINKWATER, M.J. (1991) Central issues for farmer participation in adaptive research in Zambia. Revised paper originally prepared for the *ARPT Workshop on Farmer Participation, Kasama, Zambia, 18–20 September.*

DRINKWATER, M.J. (1992) Methodological evolution within ARPT: the use of farmer research groups and RRA informal surveys with Central and Copperbelt Provinces. Paper presented at *ARPT Biannual Review Meeting, Mongu, Zambia, 13–16 April.*

DRINKWATER, M.J. (1994) Knowledge, consciousness and prejudice: adaptive agricultural research in Zambia. pp. 16–31 In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

DRINKWATER, M.J. (1997) Participation within participatory technology development and dissemination: Zambian case study. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April.* Chatham, UK: Natural Resources Institute.

DRINKWATER, M.J. and SUTHERLAND, A.J. (1993) Developing a dialogue?: Farmer participation and empowerment in the work of ARPT. pp. 27–59. In: *Farmer Participation and Farmer Research Groups. ARPT National Workshop, Workshop Commentary and Papers.* Drinkwater, M. (ed.) Kabwe, Zambia: Adaptive Research Planning Team, Ministry of Agriculture.

ELLIS, F. (1992) *Agricultural Policies in Developing Countries.* Cambridge, UK: Cambridge University Press.

EWELL, P. (1988) *Organization and Management of Field Activities in On–farm Research: A Review of Experience in Nine Countries. OFCOR Comparative Study,* No. 2. The Hague: International Service for National Agricultural Research.

EWELL, P. (1989) *Linkages Between On-Farm Research and Extension in Nine Countries. OFCOR Comparative Study,* No. 4. The Hague: International Service for National Agricultural Research.

FAO (1989) *Farming Systems Development.* Rome,: Food and Agriculture Organization of the United Nations.

FARM AFRICA (1999a) *Incorporation of Farmer Participatory Research in the Southern Region of Ethiopia. Proceedings of a workshop held in Awassa, 18–19 March 1998.* Addis Ababa: FARM Africa/Institute for Sustainable Development.

FARM AFRICA (1999b) *Review of Participatory On-Farm Trials in the Southern Region of Ethiopia. Proceedings of a workshop held in Soddo, 17–22 May 1998.* Addis Ababa: Farmers' Research Project, FARM Africa/Institute for Sustainable Development.

FARRELLY, M. (1995) Whose Project is it Anyway? London: Intermediate Technology Development Group (unpublished report).

FARRINGTON, J. (1995) *Farmers' Participation in Agricultural Research and Extension: Lessons from the Last Decade.* London: Overseas Development Institute.

FARRINGTON, J. (1998) *Organizational Roles in Farmer Participatory Research and Extension: Lessons from the Last Decade. Natural Resource Perspectives,* No. 27. London: Overseas Development Institute.

FARRINGTON, J. and MARTIN, A. (1988) Farmer participatory research: a review of concepts and recent fieldwork. *Agricultural Administration and Extension,* **29** (4): 247–264.

FARRINGTON, J. and NELSON, J. (1997) *Using Logframes to Monitor and Review Farmer Participatory Research. AgREN Network Paper,* No. 73. London: Overseas Development Institute.

FEAKPI, R. (1995) Testing and Developing Tools to Help Front Line Staff Advise Farmers on Maize Storage Options. BSc thesis, University of Cape Coast, Ghana.

FEAKPI, R., COMPTON, J., MAGRATH, P. and OFOSU, A. (1994). Developing and testing tools and methods for extending LGB control recommendations. In: Ghana MoFA/UK ODA Larger Grain Borer Control Project Research Programme, 8th and 9th Quarterly Reports. Compton, J. (ed.). London: Overseas Development Administration.

FRESCO, L. (1984) *Comparing Anglophone and Francophone Approaches to Farming Systems Research and Extension. Networking Paper,* No. 1. Gainesville, USA: Farming Systems Support Project, University of Florida.

FREIRE, P. (1972) *Pedagogy of the Oppressed.* Hammondsworth, UK: Penguin.

GARFORTH, C. (1997) *Dissemination Pathways for RNR Research. Socio-economic Methodologies for Natural Resources Research, Best Practice Guidelines.* Chatham, UK: Natural Resources Institute.

GBEDEVI, S. (1995) Training of market traders in five major maize markets in Volta Region. pp 48–51. In: *Report of the Workshop on Control of the Larger Grain Borer, 21–23 February 1995.* Boxall, R. (ed.). Accra/London: Ghana Ministry of Food and Agriculture/UK Overseas Development Administration Larger Grain Borer Control Project.

GILBERT, E., NORMAN, D. and WINCH, F. (1980) *Farming Systems Research: A Critical Appraisal. Rural Development Paper,* No. 6. East Lansing, USA: Michigan State University.

GIBBERD, V. (1993) Final Report, EMI Dryland Farming and Dryland Applied Research Project 1988–1993. Chatham, UK: Natural Resources Institute.

GOLDEY, P., LE BRETON, S., MARTIN, A. and MARCUS, R. (1997) Approaches to address gender specific needs in relation to access to technological change. *Agricultural Systems,* **55**(2): 155–172.

GRIMBLE, R. (1998) *Stakeholder Methodologies in Natural Resource Management. Socio-Economic Methologies for Natural Resources Research, Best Practice Guidelines.* Chatham, UK: Natural Resources Institute.

GSS (1995) *Ghana Living Standards Survey: Report on the Third GLSS Round, 1991–1992.* Accra: Ghana Statistical Service.

GUBBELS, P. (1997) Strengthening community capacity for sustainable agriculture. pp. 217–244. In: *Farmers' Research in Practice: Lessons from the Field.* Van Veldhuizen, L., Waters-Bayer, A., Ramirez, R., Johnson, D.A. and Thompson, J. (eds). London: Intermediate Technology Publications.

HAGMANN, J. (1993) Farmer participatory research in conservation tillage: Approach, methods and experiences from an adaptive on-farm programme in Zimbabwe. pp. 319–330. In: *Proceedings of the Third Annual Scientific Conference, Gaborone, 5–7 October 1993.* Kronen, N. (ed.). Gaborone: SADC Land and Water Management Research Programme, SACCAR.

HAGMANN, J., CHUMA, E. and MURWIRA, K. (1997) *Kuturaya*: participatory research, innovation and extension. pp. 49–66. In: *Farmers' Research in Practice: Lessons from the Field.* Van Veldhuizen, L., Waters-Bayer, A., Ramirez, R., Johnson, D.A. and Thompson, J. (eds). London: Intermediate Technology Publications.

HAGMANN, J., CHUMA, E., CONNOLLY, M. and MURWIRA, K. (1998) *Client-Driven Change and Institutional Reform in Agricultural Extension: An Action Learning Experience from Zimbabwe. AgREN Network Paper,* No. 78. London: Overseas Development Institute.

HAKUTANGWI, M. and SCOONES, I. (1996) Evaluation of the Chivi Food Security Project. IT-Zimbabwe (unpublished report).

HALL, A. and NAHDY, S. (1999) *New Methods and Old Institutions: The Systems Context of Farmer Participatory Research in National Agricultural Research Systems. The Case of Uganda. AgREN Network Paper,* No. 93. London: Overseas Development Institute.

HARRINGTON, L.W. and TRIPP, R. (1985) *Recommendation Domains: A Framework for On-farm Research.* Working Paper 02/84. El Batan, Mexico: International Maize and Wheat Improvement Center.

HOLTI, R. (1996) Teamwork in manufacturing. In: *International Encyclopaedia of Business and Management.* London: International Thomson Business.

HOPE, A. and TIMMEL, S. (1984) *Training for Transformation: A Handbook for Community Workers.* Gweru, Zimbabwe: Mambo Press.

HOWELL, J. (ed.) (1988) *Training and Visit Extension in Practice. Agricultural Administration Unit Occasional Paper,* No. 8. London: Overseas Development Institute.

HUDGENS, R.E. (1988) A diagnostic survey of female headed households in the Central Province of Zambia. pp. 373–388 In: *Gender Issues in Farming Systems Research and Extension.* Boulder, USA: Westview Press.

IRUNGU, J.W. (1997) Soil fertility management practices in small-holder farms in semi-arid Mbeere in eastern Kenya: an analysis of the farming systems. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

ITDG (1994) Chivi Food Security Project Document, 1994–97. London: Intermediate Technology Development Group (unpublished report).

ITDG (1995a) 1995 Ward 21 Community Review. London: Intermediate Technology Development Group (unpublished report).

ITDG (1995b) Chivi Food Security Project, 1995 Review Report. London: Intermediate Technology Development Group (unpublished report).

ITDG (1995c) Chivi Food Security Project Document, 1995–98. London: Intermediate Technology Development Group (unpublished report).

ITDG (1996) *Strengthening Local Food Production, Masvingo Province.* London: Intermediate Technology Development Group.

ITDG (no date) *Zimbabwe: Second Annual Report to ODA, Joint Funding Scheme and Comic Relief.* London: Intermediate Technology Development Group.

JAETZOLD, R. and SCHMIDT, H. (1982) *Farm Management Handbook of Kenya.* Nairobi: Ministry of Agriculture, Livestock Development and Marketing.

JANSSEN, W. and GOLDSWORTHY, P. (1995) *Integrating and Managing Multidisciplinary Teams in Agriculture and NRM Research. ISNAR Briefing Paper,* No. 23. The Hague: International Service for National Agricultural Research.

JONES, R., LIKOSWE, A. and FREEMAN, A. (1999) Improving poor farmers' access to technologies and markets in pigeonpeas in Malawi. pp. 150–157 In: *Integrated Crop Management Research in Malawi: Developing Technologies with Farmers. Proceedings of the Final Project Workshop, Club Makakola, Mangochi, Malawi, 29 November– 3 December 1999.* Ritchie, J.M. (ed.). Chatham, UK: Natural Resources Institute.

JONFA, E. (2000) Farmer participatory research (FPR) in practice: experiences, lessons and challenges in FPR, the case of FARM Africa. Paper presented at *Farmer Participatory Research Forum, Awassa, Ethiopia, 28 June –1 July 2000.*

JONFA, E., MEKURIA, G., KASSA, H., ALEMU, K., SANDFORD, S. and DERIBE, T. (1998) Participatory on-farm trials with cotton in North Omo. pp. 143–189. In: Review *of Experiences with Participatory On-farm Trials in the Southern Region of Ethiopia. Proceedings of a workshop held in Soddo, 17–22 May 1998.* Sutherland, A. and Sandford, S. (eds). Addis Ababa: FARM Africa/Institute for Sustainable Development.

KANG'ARA, J.N., KAMAU, J., NJIRU, J.N., GATHAMBIRI, R.W. and KARANJA, J. (1997a) Use of indigenous knowledge for effective and sustainable mange control in goats. pp. 237–242. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

KANG'ARA, J.N., SUTHERLAND, A.J., and GACHOKI, I. (1997b) Participatory evaluation of dryland crop food recipes and vegetable preservation. pp. 196–203. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

KANG'ARA, J.N., SUTHERLAND, A.J., and GETHI, M. (eds) (1997c) *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kitale, Kenya: Kenya Agricultural Research Institute.

KANG'ARA, J.N. and OUMA, J.O. (1997) Site management committees: a local institution to support technology demonstration and dissemination in marginal areas. pp. 81–86. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

KANG'ARA, J.N. and SUTHERLAND, A.J. (1993) *Report of a Livestock Reconnaissance Survey in Lower Embu and Tharaka-Nithi Districts.* Embu, Kenya: Dryland Applied Research and Extension Project, KARI Regional Research Centre.

KEAN, S.A. and NDIYOI, C.M. (1999) Institutionalizing FSR in Zambia: a stakeholder perspective. In: *A History of Farming Systems Research.* Collinson, M. (ed.). Rome/Wallingford, UK: Food and Agriculture of the United Nations/CABI Publishing.

KEAN, S.A. and SINGOGO, L.P. (1988) *Zambia: A Case Study of Organization and Management of the Adaptive Research Planning Team, Research Branch, Ministry of Agriculture and Water Development.*

OFCOR Comparative Study Paper, No. 1. The Hague: International Service for National Agricultural Research.

KEAN, S.A., MULELE, M.R. and PATEL, B.K. (1985) A review of Zambia's systems based on-farm research programme – the Adaptive Research Planning Team. Paper presented to the *Networkshop of Senior Agricultural Research, Extension and Teaching Personnel of Eastern and Southern Africa,* Maseru, Lesotho, *25–28 November. CIMMYT Networkshop Report Series.* Nairobi: International Maize and Wheat Improvement Centre.

KFSRE (1996) *Annual Report 1995/1996.* Namibia: Kavango Farming Systems Research and Extension Team.

KFSRE (1997) Project Framework. Namibia: Kavango Farming Systems Research and Extension Team.

KHARBANDA, O.P. and STALLWORTHY, E.A. (1990) *Project Teams: The Human Factor.* Oxford: Blackwell.

KIDUNDO, M. (1997a) Key informant survey as a diagnostic tool for propagation of *Melia volkensii* – a potential agro-forestry tree in semi-arid Kenya. pp. 205–213. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

KIDUNDO, M. (1997b) Propagation of Fodder Trees in Semi-arid Mbeere. MPhil thesis, University of North Wales, Bangor.

KIDUNDO, M. and OCHIENG, D. (1997) On-farm planting as a diagnostic tool: experiences from semi-arid Kenya. pp. 250–256. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

LAMBOLL, R. (1993) *People and Cashew Nuts, Mtwara: ODA/Department of Research and Training Cashew Research Project.* London: Overseas Development Administration.

LEMA, N.M. and MEENA, S.B. (1998) Institutionalization of farming systems approach in Tanzania. pp. 161–198. In: *Institutionalization of Farming Systems Approach in Eastern and Southern Africa.* Anandajayasekeram, P. and Stillwell, T. (eds). Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

LIEBLER, C. (1994) *Making Interdisciplinary Teams Work: A Guide for Team Leaders and Technical Assistance Managers. WASH Technical Report,* No. 52. Washington DC: Water and Sanitation for Health Project, US Agency for International Development.

LONG, N. and LONG, A. (eds) (1992) *Battlefields of Knowledge: The Interlocking of Theory and Practice in Social Research and Development.* London: Routledge.

MAGRATH, P. (1993) Harvest study. In: Ghana MoFA/UK ODA Larger Grain Borer Control Project Research Programme, 3rd Quarterly Report. Compton, J. (ed.). London: Overseas Development Administration.

MAGRATH, P. and COMPTON, J. (1995) Notes on cost–benefit analysis of station trials. In: Ghana MoFA/UK ODA Larger Grain Borer Control Project Research Programme, 8th and 9th Quarterly Reports. Compton, J. (ed.). London: Overseas Development Administration.

MAGRATH, P.A., COMPTON, J.A.F., MOTTE, F.F. and AWUKU, M. (1996) *Coping with a New Storage Insect Pest: The Impact of the Larger Grain Borer in Eastern Ghana.* Chatham, UK: Natural Resources Institute.

MAGRATH, P., COMPTON, J., OFOSU, A. and MOTTE, F. (1997a) *Is Participation Cost-effective? Assessing the Costs and Benefits of Farmer and Trader Participation in an Agricultural Research Project in Ghana. AgREN Network Paper,* No. 74b. London: Overseas Development Institute.

MAGRATH, P., MOTTE, F., COMPTON, J., OFOSU, A. and ADDO, S. (1997b) *Participation of Farmers and Traders in Agricultural Research: Lessons from the Larger Grain Borer Control Project, Ghana.* Chatham, UK: Natural Resources Institute.

MAILU, S.K., NJUE, E.K., KIDULA, N.L., ACHUODHO, G.B., IMA, D.K. and REES, D.J. (1999) Some characteristics of the farming community in Kericho, Transmara, Rachuonyo, Kisii and Homa Bay Districts of SW Kenya. pp. 478–481. In: *Toward Increased Use of Demand Driven Technology*: Pre-conference and mini-papers prepared for the KARI/DFID NARP 11 Project, End of Project Conference, Nairobi, Kenya, 23–26 March 1999. London: Department for International Development.

MARSDEN, D. (1994) Indigenous management and the management of indigenous knowledge. pp. 52–56. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

MARTIN, A. (1990) Farmer participatory research: a feasibility study for a project with Action Aid in Uganda. Chatham, UK: Natural Resources Institute (unpublished report).

MARTIN, A. and SALMON, J. (1996) Final Technical Report, R5214 Farmer Participatory Research Methodologies. Chatham, UK: Natural Resources Institute.

MARTIN, A. and SHERINGTON, J. (1997) Participatory research methods – implementation, effectiveness and institutional linkages. *Agricultural Systems,* **55**(2):195–216.

MARTIN, A., JACKSON, D. and FFRENCH-BLAKE, C. (1996) Mid-term Review of the Kavango Farming Systems Research Extension and Training Project. Chatham, UK: Natural Resources Institute (unpublished report).

MATATA, J.B.W. and WANDERA, E.O. (1998) Institutionalization of farming systems approach in Kenya. pp. 77–98. In: *Institutionalization of Farming Systems Approach in Eastern and Southern Africa.* Anandajayasekeram, P. and Stillwell, T. (eds). Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

MATSAERT, H., SIMBOMBO, J., KASHILE, M., MUKUNDU, P., HATUTALE, K., HENGUA, A., VAN ROOYEN, B., MUTWAMEZI, E., KAKUKURU, E. and BAGNALL-OAKELEY, H. (1997) Documenting participation within participatory technology development and dissemination: Kavango farming systems research, extension and training project. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

MATURANA, H.R. (1991). Reality: the search for objectivity or the quest for a compelling argument. In: *Carl Winter "Die Gedankenwelt Sir Karl Poppers".* Leser, N., Seitfert, J. and Plitzner, K. (eds). Heidelberg: Universitätsverlag Heidelberg.

MAXWELL, S. (1986) Farming systems research: hitting a moving target. *World Development,* **14**: 65–77.

MELLIS, D. (1997) Focused farmer research groups: a method for more effective technology development and dissemination. pp. 40–63. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

MELLIS, D., MATSAERT, H., MWANIKI, B. (1997) Development and introduction of affordable planting and weeding tools for dryland areas. pp. 280–290. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

MERRILL-SANDS, D. (1986) Farming systems research: clarification of terms and concepts. *Experimental Agriculture,* **22**: 87–104.

MERRILL-SANDS, D. and KAIMOWITZ, D. (1989) *The Technology Triangle: Linking Farmers, Technology Transfer Agents, and Agricultural Researchers.* The Hague: International Service for National Agricultural Research.

MERRILL-SANDS, D. and McALLISTER, J. (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,* No. 1. The Hague: Netherlands International Service for National Agricultural Research.

MERRILL-SANDS, D., EWELL, P., BIGGS, S., BINGEN, R.J., McALLISTER, J. and POATS, S. (1991) Integrating on-farm research into national agricultural research systems: lessons for research policy, organization and management. Ch. 15. In: *Planned Change in Farming Systems: Progress on On-Farm Research.* Tripp, R. (ed.). Chichester/New York: John Wiley.

MITTI, G., DRINKWATER, M.J. and KALONGE, S. (1997) *Experimenting with Agricultural Extension in Zambia: CARE's Livingstone Food Security Project. AgREN Network Paper.* London: Overseas Development Institute.

MORIS, J. (1991) *Extension Alternatives in Tropical Africa.* London: Overseas Development Institute.

MOTTE, F. (1995) Trader–farmer Relationship: A Potential Supplementary Medium for Agricultural Extension Message Dissemination. MSc thesis, University of Reading, UK.

MOTTE, F., FEAKPI, R. and AWUKU, M. (1995) Farmer experimentation in small scale maize storage: experiences from Volta Region in Eastern Ghana. Paper presented at the *International Conference on Post-Harvest Technology and Commodity Marketing, Accra, Ghana, November 1995.*

MOTTE, F., COMPTON, J.A.F., MAGRATH, P.A. and OFOSU, A. (1996) A participatory approach to research and extension – the experience of the ODA (UK)/MoFA (Ghana) Larger Grain Borer Control Project. In: *Management of Farm Storage Pests in East and Central Africa: Proceedings of a Storage Pest Management Workshop, Naivasha, Kenya, 14–19 April 1996.* Farrell, G., Greathead, A.H., Hill, M.G. and Kibata, G. (eds). Ascot, UK: International Institute for Biological Control.

MULIRA, G.L., MASON, V., MUKASA, B., MBUGA, J.K. and APONGO, J. (1999) Training farmers in safe and efficient use of acaricides and anthelmintics. pp. 541–543. In: *Toward Increased Use of Demand Driven Technology*: Pre-conference and mini-papers prepared for the KARI/DFID NARP 11 Project, End of Project Conference, Nairobi, Kenya, 23–26 March 1999. London: Department for International Development.

MULUGETTA MEKURIA (1998) Institutionalization of farming systems research in Ethiopia. pp. 59–76. In: *Institutionalization of Farming Systems Approach in Eastern and Southern Africa.* Anandajayasekeram, P. and Stillwell, T. (eds). Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

MUNRO, M. and CARTER, M. (1993) Project Memorandum, Okavango Farming Systems Research and Training Project. Ministry of Agriculture and Livestock, Namibia and Overseas Development Administration, London.

MUTSAERS, H.J.W., WEBER, G.K., WALKER, P. and FISHER, N.M. (1997) *A Field Guide for On-Farm Experimentation.* Ibadan, Nigeria/Wageningen/The Hague: International Institute for Tropical Agriculture/CTA/International Service for National Agricultural Research.

MWABUMBA, M. (1998) Institutionalization of the farming systems research in Malawi. pp. 99–112. In: *Institutionalization of Farming Systems Approach in Eastern and Southern Africa.* Anandajayasekeram, P. and Stillwell, T. (eds). Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

NARO (2000) *A Strategy for 2000–2010: Facing the Research Challenges for the Modernization of Agriculture.* Uganda: National Agricultural Research Organization.

NDIYOI, M. and PHIRI, M. (1998) Institutionalization of the farming systems approach in Zambia. pp. 221–242. In: *Institutionalization of Farming Systems Approach in Eastern and Southern Africa,* Anandajayasekeram, P. and Stillwell, T. (eds). Harare/Mbabane, Swaziland: FARMESA/SAAFSRE.

NEILSEN, F., FARLEY, C. and WORTMAN, C. (1997) Opportunities and constraints for farmer participatory research for technology development and diffusion. pp. 2–15. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

NJIRU, E.N., SUTHERLAND, A.J., MUTHAMIA, J., OUMA, J., MUGO, C. and MUTWIRI, P. (1997) Experiences with farmer open days for technology evaluation and dissemination. pp. 136–140. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

NRI (1992) Project Proposal: The Dryland Applied Research and Extension Project. Chatham, UK: Natural Resources Institute (unpublished report).

NRI (1997) *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

OCHIENG, D., KIDUNDO, M. and SUTHERLAND, A. (1996) Participatory dryland agroforestry research: the DAREP experience. Paper for *DAREP/Regional Research Centre Embu Workshop on Experiences with Participatory Technology Development, East College, Embu, 22–23 October 1996.* Kenya: Dryland Research and Extension Project.

OFOSU, A. and MOTTE, F. (1994) On-farm trials: insecticides applied to maize stored in the husk. In: Ghana MoFA/UK ODA Larger Grain Borer Control Project Research Programme, 9th Quarterly Report. Compton, J. (ed.). London: Overseas Development Administration.

OKALI, C., SUMBERG, J. and FARRINGTON, J. (1994). *Farmer Participatory Research: Rhetoric and Reality.* London: Intermediate Technology Publications.

OOI, P. (1998) *Beyond the Farmer Field School: IPM and Empowerment in Indonesia. Gatekeeper Series,* No. 78. London: International Institute for Environment and Development.

ORR, A. (1997) *IPM for Resource Poor African Farmers: Is the Emperor Naked?* Discussion Paper. Bvumbwe Research Station, Malawi: Farming Systems Integrated Pest Management Project.

ORR, A., MWALE, B., RITCHIE, J.M., LAWSON-McDOWALL, J. and CHANIKA, C.S.M. (2000) *Learning and Livelihoods: The Experience of the FSIPM Project in Southern Malawi.* Chatham UK: Natural Resources Institute.

OSBORNE, N., HEDLEY, D. and KASONGE, L. (1996) *Community Participation in Urban and Rural Water Use and Management.* Lusaka: CARE.

OUMA, J., SUTHERLAND, A., MUTHAMIA, J., MUGO, C.R., IRUNGU, J.W. and KING, S. (1996) Accelerated technology development: the case of millet in dryland Embu and Tharak-Nithi Districts. pp. 168–179. In: *Focus on Agricultural Research for Sustainable Development in a Changing Economic Environment. Proceedings of the 5th KARI Scientific Conference.* Fungoh and Mbadi (eds). Nairobi: Kenya Agricultural Research Institute.

OUMA, J.O., SUTHERLAND, A.J., KANYENJI, B., MUKURU, S. and MUTWIRI, P. (1997) The use for farmer expert panels in technology screening: the experiences of the dryland research and extension project in Tharaka-Nithi and Mbeere Districts. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

OUTTARA, S. (1987) Togo's maize bugs are in for a big surprise. In: *IDRC Reports,* October: 10–11.

PIJNENBURG, B. (1998) Limits to farmer participation. *ODI Agricultural Research and Extension Newsletter,* No. 37. London: Overseas Development Institute.

POUND, B. (1996) Planning An Exit Strategy: The Case of the Dryland Applied Research and Extension Project, Kenya. Chatham, UK: Natural Resources Institute (unpublished report).

PRETTY, J. and CHAMBERS, R. (1993) Towards a learning paradigm: new professionalism and institutions for agriculture. *IDS Discussion Paper,* No. 334. Brighton, UK: Institute of Development Studies. [Also published as PRETTY, J. and CHAMBERS, R. (1994) pp. 182–202. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.]

REES, D.J., NKONGE, C., NJUE, E.K. and MAGENYA, O.E.V. (1997a) A review of participatory technology development in the Kenya Agricultural Research Institute/Overseas Development Administration National Agricultural Research Project, Phase II (KARI/ODA NARP II). Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

REES, D.J., NKONGE, C. and WANDERA, J. (eds) (1997b) *A Review of Smallholder Agricultural Practices and Constraints in the North of the Rift Valley Province of Kenya.* Kitale, Kenya: Kenya Agricultural Research Institute.

REES, D.J., NJUE, E.K., MAKINI, F.W. and MBUGUA, D.M. (eds) (1997c) *A Review of Smallholder Agricultural Practices and Constraints in South West Kenya.* Kitale, Kenya: Kenya Agricultural Research Institute.

REES, D.J., NKONGE, C., WANDERA, J.L., MASON, V.I. and MUYEKHO, F. (eds) (1998) *Participatory Rural Appraisals of the Farming Systems of the North of Rift Valley Province, Kenya, 1995–7.* Kitale, Kenya: Kenya Agricultural Research Institute.

REES, D.J., NKONGE, C., OGECHA, J.O., KARIUKI, I.W., LUSWETI, C.M., MUYEKHO, F. and CHERUIYOT, D.T. (1999) Advantages and disadvantages of working with farmer research groups and farmer expert panels. pp. 4–8. In: *Toward Increased Use of Demand Driven Technology,* Vol. 2. KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

REES, D. J., MOMANYI, M., WEKUNDAH, J., NDUNGU, F., ODONDI, J., OYURE, S., ANDIMA, D., KAMAU, M., NDUBI, J., MUSEMBI, F., MWAURA, L. and JOLDERSMA, R. (2000) *Agricultural Knowledge and Information Systems in Kenya – Implications for Technology Dissemination and Development. AGREN Network Paper*, No. 107. London: Overseas Development Institute.

RHOADES, R.E. and BOOTH, R. (1982) Farmer-back-to-farmer: a model for generating acceptable agricultural technology. *Agricultural Administration,* **11**: 127–137.

RICHARDS, P. (1989) Agriculture as performance. pp. 39–43. In: *Farmer First: Farmer Innovation and Agricultural Research.* Chambers, R., Pacey, A. and Thrupp, L.A. (eds). London: Intermedate Technology Publications.

RUSSELL, T.D. and DRINKWATER, M.J. (1994) The Development of Farmer Research Groups in Central and Copperbelt Provinces. Luansha, Zambia: Copperbelt Province ARPT (unpublished report).

SALAS, M. (1994) The technicians only believe in science and cannot read the sky: the cultural dimension of knowledge conflict in the Andes. pp. 57–68. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

SALMON, J. and MARTIN, A. (1997) Farmer Participatory Research Unit, Uganda. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997.* Chatham, UK: Natural Resources Institute.

SANDFORD, S. and REECE, A. (eds) (1992) *Proceedings of the Workshop on Farmer Participatory Research, Addis Ababa, 17–19 February 1992.* Addis Ababa: FARM Africa.

SCARBOROUGH, V., KILLOUGH, S., JOHNSON, D.A. and FARRINGTON, J. (eds) (1997) *Farmer-led Extension: Concepts and Practices.* London: Intermediate Technology Publications.

SCARR, M.J., REES, D.J., CHUI, J.N., JOLDERSMA, R. and HOARE, E.P. (1999) Packaging and dissemination of research messages. pp. 573–576. In: *Toward Increased Use of Demand Driven Technology*: Pre-conference and mini-papers prepared for the KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

SCHEUERMEIER, U. (1997) Let's try it out and see how it works. pp. 31–38. In: *Farmers' Research in Practice: Lessons from the Field.* Van Veldhuizen, L., Waters-Bayer, A., Ramirez, R., Johnson, D.A. and Thompson, J. (eds). London: Intermediate Technology Publications.

SCOONES, I. and THOMPSON, J. (eds) (1994) *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* London: Intermediate Technology Publications.

SEMAKOR, S.K. (1995) Training front-line staff, farmers and traders. pp 45–47. In: *Report of the Workshop on Control of the Larger Grain Borer, 21–23 February 1995.* Boxall, R. (ed.). Accra/London: Ghana Ministry of Food and Agriculture/UK Overseas Development Administration Larger Grain Borer Control Project.

SHANER, W.W., PHILIPP, P.F. and SCHMEHL, W.R. (1981) *Farming Systems Research and Development: Guidelines for Developing Countries.* Boulder, USA: Westview Press.

SIKANA, P. (1994a) Indigenous soil characterisation in Northern Zambia. pp. 80–82. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

SIKANA, P. (1994b) Alternatives to current agricultural research and extension systems: village research groups in Zambia. pp. 244–245. In: *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice.* Scoones, I. and Thompson, J. (eds). London: Intermediate Technology Publications.

SIKANA, P.M. (1995) The Participatory Training Consultancy on the Assessment and Identification of Formal and Customary Village Institutions, Mtwara: ODA/DRT Cashew Research Project. London: Overseas Development Administration.

SIKANA, P. and KERVEN, C. (1994) A community approach to identifying household variables influencing farming decisions. pp. 149–154. In: *Tools for the Field: Methodologies Handbook for Gender in Agriculture.* Sims Feldstein, H. and Jiggins, J. (eds). West Hartford, USA: Kumarian Press.

SIMMONDS, N.W. (1986) Farming systems research in the tropics. *Experimental Agriculture,* **22**: 1–13.

SIMS FELDSTEIN, H. and JIGGINS, J. (1994) *Tools for the Field, Methodologies Handbook for Gender Analysis in Agriculture.* West Hartford, USA: Kumarian Press.

SKINNER, H. and MWANIKI, B. (1994) Tools and Tillage On-farm Research, September 1993–August 1994 Technical Report. DAREP/Rural Technology Development Unit. Embu, Kenya: Kenya Agricultural Research Institute.

STOLZENBACH, A. (1997) The craft of farming and experimentation. pp. 39–48. In: *Farmers' Research in Practice: Lessons from the Field.* Van Veldhuizen, L., Waters-Bayer, A., Ramirez, R., Johnson, D. A. and Thompson, J. (eds). London: Intermediate Technology Publications.

STROUD, A. (1999) Participatory Agroecosystem Management (PAM) – an approach utilized by benchmark location research teams in the African Highlands Ecoregional Programme (AHI). Case study for Participatory Research and Gender Analysis Natural Resource Management Meeting, 1–3 September 1999. Chatham, UK: Natural Resources Institute.

SUTHERLAND, A.J. (1986) *Extension Workers, Small-Scale Farmers, and Agricultural Research: A Case Study in Kabwe Rural, Central Province, Zambia. Agricultural Administration Network Discussion Paper,* No. 15. London, UK: Overseas Development Institute.

SUTHERLAND, A.J. (1987) The benefits of a community approach to farmer selection for trials. pp. 53–64. In: *Report on a Networkshop on Household Issues and Farming Systems Research, Lusaka, Zambia, 27–30 April 1987.* Sutherland, A.J. (ed.). *Networking Workshops Report,* No. 10. Harare: International Maize and Wheat Improvement Center Regional Office.

SUTHERLAND, A.J. (1994a) Managing bias: farmer selection. pp. 15–21. In: *Tools for the Field: Methodologies Handbook for Gender in Agriculture.* Feldstein, H. and Jiggins, J. (eds). West Hartford, USA: Kumarian Press.

SUTHERLAND, A.J. (1994b) A community approach to selection for on-farm trials. pp. 106–111. In: *Tools for the Field: Methodologies Handbook for Gender in Agriculture.* Hartford, USA: Kumarian Press.

SUTHERLAND, A.J. (1996a) Some experiences with targeting in Zambia's farming systems research programme. Paper for *Interdisciplinary Forum on Identification of Target Groups for Farming Systems Research, National Dryland Farming Research Centre, Machakos, Kenya, 19–20 November 1996.*

SUTHERLAND, A.J. (1996b) Experiences with farmer research clusters and farmer to farmer evaluation tours. Background paper for *DAREP/RRC Embu Workshop on Experiences with Participatory Technology Development, East College, Embu, 22–23 October 1996.* Kenya: Dryland Research and Extension Project.

SUTHERLAND, A.J. (1996c) *Report on Evaluation of DAREP Farmer Research Clusters. Technical Document,* No. 31. Embu, Kenya: Dryland Applied Research and Extension Project, KARI Regional Research Centre.

SUTHERLAND, A.J. (1997) Involving other stakeholders through participatory research planning workshops. pp. 87–94. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J. (1998) *Participatory Research in Natural Resources. Socio-economic Methodologies for Natural Resources Research, Best Practice Guidelines.* Chatham, UK: Natural Resources Institute

SUTHERLAND, A.J. and KANG'ARA, J.N. (2000) Experiences in applying FSR to animal health problems and household food shortages in semi-arid Kenya. pp. 130–139. In: *A History of Farming Systems Research.* Collinson, M.P. (ed.). Rome/Wallingford, UK: Food and Agriculture Organization of the United Nations/CABI Publishing.

SUTHERLAND, A.J. and MELLIS, D. (1996) The participatory research process of the DAREP soil and water component. In: *Report on DAREP Soil and Water Harvesting/Conservation Tillage Workshop, 4–6 June 1996, EAST College, Embu.* Mellis, D. (ed.). Embu, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J. and OUMA, J. (1996) Experiences with using broad-based diagnosis (BBD) as an inter-disciplinary entry point. Background paper for *DAREP/RRC Embu Workshop on Experiences with Participatory Technology Development, East College, Embu, 22–23 October 1996.* Kenya: Dryland Research and Extension Project.

SUTHERLAND, A.J. and SANDFORD, S. (eds) (1998) *Report of a Workshop on the Incorporation of Farmer Participatory Research in Southern Region, Ethiopia, Awassa College of Agriculture, 18–19 March 1998. Farmers Research Project Workshop Report,* No. 6. Addis Ababa: FARM Africa/Institute for Sustainable Development.

SUTHERLAND, A.J., KANG'ARA, J., KIDUNDO, M. and IRUNGU, J.W. (1997a) Farming systems characterization and targeting: DAREP experiences. pp. 64–80. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J., MELLIS, D. and MUGO C.R. (1997b) Farmer clusters for improving farmer to farmer dialogue in on-farm research. pp. 123–135. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J., OUMA, J. and MUTWIRI, P. (1997c) Handing over the stick: experiences with research agenda review by researcher farmer panels in semi-arid eastern Kenya. pp. 109–122. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J., MUCHERO, P., MUGO, C.R. and IRUNGU, J.W. (1997d) A low cost approach to variety testing and dissemination: follow up of new cowpea variety seed sales from five DAREP sites. pp. 170–177. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997.* Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M.(eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J., KANG'ARA, J.N., IRUNGU, J.W. and KIDUNDO, M. (1997e) Dryland Applied Research and Extension Project: participation within participatory technology development. Paper prepared for *NRI/ODA Forum: Participatory Technology Development, Aberdare Country Club, Kenya, 14–17 April 1997*. Chatham, UK: Natural Resources Institute.

SUTHERLAND, A.J., IRUNGU, J.W. and MUGO, C.R. (1997f) On-farm performance of pearl millet varieties under high and low soil fertility conditions in semi-arid Eastern Kenya. pp. 230–236. In: *Proceedings of the Conference on Participatory Dryland Agricultural Research East of Mount Kenya, 21–24 January 1997*. Kang'ara, J.N.N., Sutherland, A.J. and Gethi, M. (eds). Kitale, Kenya: Kenya Agricultural Research Institute.

SUTHERLAND, A.J., MARTIN, A. and SALMON, J. (1998) *Recent Experiences with Participatory Technology Development: Practitioners' Review. Natural Resource Perspectives,* No. 25. London: Overseas Development Institute.

SUTHERLAND, J.A. (1999a) Innovative use of the logical framework – a quasi-sectoral approach to project management. pp. 201–202. In: *Toward Increased Use of Demand Driven Technology,* Vol. 1. KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

SUTHERLAND, J.A. (1999b) "Background of NARP and the Development of the KARI/DFID NARP II" pp. 1–4. In: *Toward Increased Use of Demand Driven Technology,* Vol. 2. KARI/DFID NARP 11 Project, End of Project Conference, 23–26 March 1999, Nairobi, Kenya. London: Department for International Development.

THOMPSON, J. (1995) Participatory approaches in government bureaucracies: facilitating the process of institutional change. *World Development,* **23**: 1521–1554.

TIDD, J., BESSANT, J. and PAVITT, K. (1997) *Managing Innovation: Integrating Technological, Market and Organizational Change*. Chichester, UK: John Wiley.

TRIPP, R. (1982) *Data Collection, Site Selection and Farmer Participation in On-Farm Experimentation. Working Paper* No. 82/1. El Batan, Mexico: International Maize and Wheat Improvement Center.

TRIPP, R. (1991) The farming systems research movement and on-farm research. pp. 3–16. In: *Planned Change in Farming Systems: Progress in On-Farm Research*. Tripp, R. (ed.) Chichester, UK: John Wiley.

TRIPP, R. and WOOLLEY, J. (1989) *The Planning Stage of On-Farm Research: Identifying Factors for Experimentation*. El Batan, Mexico: International Maize and Wheat Improvement Center/Centro Internacional de Agricultura Tropical.

UPRICHARD, T. and REID, P. (1989) Village saturation approach to on-farm research. Paper presented to *SADCC/CIAT Regional Bean Workshop, Mbabane, Swaziland, 4–7 October*.

UVIN, P. and MILLER, D. (2001) *Scaling Up: Thinking Through the Issues*. Discussion paper on Hungerweb, World Hunger Programme: www.brown.edu/departments/world_hunger_program/

VAN VELDHUIZEN, L., WATERS-BAYER, A. and DE ZEEUW, H. (1997) *Developing Technology with Farmers: A Trainer's Guide for Participatory Learning*. London/New York: Zed Books.

VIGNE, P. (ed.) (1994) *Extension Strategies in Namibia. Proceedings of the 1994 National Extension Conference.*

WARBURTON, H. and MARTIN, A. (1999) Local people's knowledge and its contribution to natural resource research and development. pp. 66–96. In: *Decision Tools for Sustainable Development.* Grant, I.F. and Sear, C. (eds). Chatham, UK: Natural Resources Institute.

WARREN, G.P., MUTHAMIA, J. and IRUNGU, J.W. (1996) Soil fertility improvements under manuring in semi-arid lower Embu and Tharaka-Nithi. pp. 151–163. In: *Focus on Agricultural Research for Sustainable Development in a Changing Economic Environment. Proceedings of the 5th KARI Scientific Conference.* Fungoh and Mbadi (eds). Nairobi: Kenya Agricultural Research Institute.

WEST, M.A. (1994) *Effective Teamwork.* Leicester: British Psychological Society.

WOODCOCK, M. and FRANCIS, D. (1994) *Teambuilding Strategy.* Aldershot, UK/Brookfield, USA: Gower.

WRIGHT, S. (1995) *Anthropology of Organizations.* London/New York: Routledge.

ACRONYMS

AAU	ActionAid Uganda
ACMD	African cassava mosaic disease
AKIS	agricultural knowledge and information systems
ARPT	Adaptive Research Planning Team
ATNESA	Animal Traction Network for Eastern and Southern Africa
CAEO	Chief Agricultural Extension Officer
CANAMCO	Canada, Namibia Co-operation, Oxfam
CARD	Co-ordinated Agricultural and Rural Development
CBA	cost–benefit analysis
CBO	community-based organization
CIMMYT	International Maize and Wheat Improvement Center (Centro Internacional de Mejoramiento de Maíz y Trigo)
CIP	International Potato Center (Centro Internacional de la Papa)
CONTILL	Conservation Tillage Programme, Zimbabwe
CRP	Cashew Research Project, Tanzania
DAREP	Dryland Research and Extension Project, Kenya
DFID	Department for International Development, UK
DGIS	Directoraat Generaal Internationale Samenwerking (formerly Netherlands Development Agency)
DRSS	Department of Research and Specialist Services, Zimbabwe
DRT	Directorate of Research and Training, Tanzania
ELCIN	Evangelical Lutheran Churches in Namibia
FAO	Food and Agriculture Organization of the United Nations
FED	farmer extension development (group)
FPR	farmer participatory research
FPRU	Farmer Participatory Research Unit
FPRP	Farmer Participatory Research Project, Uganda
FRG	farmer research group
FRP	Farmer Research Project, Ethiopia
FSR	farming systems research
FSRE	farming systems research and extension
FSRT	Farming Systems Research Team
FSU	Farming Systems Unit
GTZ	Gesellschaft für Technische Zusammenarbeit (German Development Agency)
ICARDA	International Center for Agricultural Research in Dry Areas
ICIPE	International Centre for Insect Physiology and Ecology
ICM	Integrated Cashew Management Programme, Tanzania
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IITA	International Institute for Tropical Agriculture
IPM	integrated pest management
IRDEP	Integrated Rural Development Programme
ISNAR	International Service for National Agricultural Research
ITDG	Intermediate Technology Development Group
ITDG-Chivi	Intermediate Technology Development Group-Chivi Food Security Group Project, Zimbabwe
ITK	indigenous technical knowledge
KARI	Kenya Agricultural Research Institute
KFRSE	Kavango Farming Systems Research and Extension Project, Namibia
KLIG	Kavango Livestock Interest Group
LFSP	Livingstone Food Security Project, Zambia
LGB	Larger Grain Borer Control Project, Ghana
MALDM	Ministry of Agriculture, Livestock Development and Marketing, Kenya
MAWRD	Ministry of Agriculture, Water and Rural Development, Namibia
MFMR	Ministry of Fishery and Marine Resources, Namibia
NAEO	National Agricultural Extension Organization

NARO	national agricultural research organization
NARP II	National Agricultural Research Project, Phase II, Kenya
NARS	national agricultural research system
NGO	non-governmental organization
NOLIDEP	Northern Livestock Development Project, Namibia
NRI	Natural Resources Institute, UK
NRP	national research programme
ODA	Overseas Development Administration, UK (now DFID)
OFFA	on-farm field assistant
PRA	participatory rural appraisal
PTD	participatory technology development
RDSP	Rural Development Support Project
RELO	Research Extension Liaison Officer
RRA	rapid rural appraisal
RRC	Regional Research Centre, Kenya
RREAC	Regional Research and Extension Advisory Committee
RRP	regional research programme
SADC	Southern African Development Community
TRD	traditional recommendation domain
UNIP	United National Independence Party, Zambia
USAID	United States Agency for International Development
VIDCO	village development committee
VMC	village management committee
WARDCO	ward development commitee
ZFU	Zimbabwe Farmers' Union

What are the key issues in farmer participation?

What makes a project research team effective?

How is wider stakeholder participation fostered and sustained?

What are the challenges to institutionalizing participatory research approaches?

Dimensions of Participation: Experiences, Lessons and Tips from Agricultural Research Practitioners in Sub-Saharan Africa explores dimensions of practical experiences with participation in agricultural research – farmer participation, teamwork and engaging with other stakeholders. Sixteen chapters include practitioners' candid accounts of their experience on agricultural research and extension projects in Africa, sharing the difficulties they faced along with the progress they made. These case studies cover many practical aspects of design and implementation that are not covered in currently available books and manuals addressing participatory agricultural research. Principles, lessons and tips to facilitate good practice are drawn from these experiences and highlighted throughout the book.

This book is for all those interested in the practical aspects of agricultural research and development, including practitioners, project managers, development specialists, advisors, donors, academics involved in development teaching and research and students of agricultural development.