

**Partners in Technology Generation
and Transfer**

*Linkages between Research and
Farmers' Organizations in
Three Selected African Countries*

Thomas Eponou

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About the Authors

Thomas Eponou, Senior Fellow, Policy and Systems Design Program, ISNAR.

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CONTENTS

ACKNOWLEDGMENTS	vii
FOREWORD.....	viii
ABSTRACT	ix
ACRONYMS.....	xi
EXECUTIVE SUMMARY	xii
1. Introduction.....	1
2. Key Concepts and Propositions	5
Definitions of Key Concepts	5
Key Considerations	6
3. Overview of the Case Study Countries.....	11
Burkina Faso.....	11
Generalities	11
Research and Extension Services	12
Farmers' Organizations.....	12
Ghana	14
Generalities	14
Research and Extension.....	15
Farmers' Organizations.....	15
Kenya	17
Generalities	17
Research and Extension.....	17
Farmers' Organizations.....	18
4. Farmers' Organizations.....	19
Typology of Farmers' Organizations.....	19
Traditional Associations/Groups.....	19
Multipurpose Local Organizations/Groups	19
Agricultural Cooperatives	19
The National Associations.....	21
Strengths and Weaknesses of the Organizations	22
Linkage Policies of Farmers' Organizations	25
State of the Art.....	25
Why Some Organizations Are Not Aware of the Possibility of Linking with Research	27
Why Some Informed Organizations Do Not Have a Linkage Policy	29
Why There Are Differences in the Degree of Implementation of Policies	30

5. Non-Governmental Organizations (NGOs)	31
Types, Functions, and Problems	31
Linkage Policies	32
6. Linkage Policies and Practices of Research and Extension	35
Linkage Policies and Practices of Research	35
Linkage Policies and Practices of Extension	36
Factors Explaining the Absence of Explicit Linkage Policies	37
The Role of Farmers' Organizations in the Development Process	37
The Agricultural Research Policy	38
The Strong Adherence to the Linear Model	38
The Ambivalence of FSR	39
Expected Gains from Linkages	40
7. Analysis of the Existing Linkages	43
Attributes of Linkages and Linkage Mechanisms	43
The Nature of the Mechanisms	43
The Actors	49
The Use of Linkage Mechanisms	52
Effectiveness of Linkages	56
The Views of the Actors	56
The Assessment of the Situation by the Teams	57
Positive Examples of Linkages	58
8. Key Lessons, Recommendations and Conclusions	61
Key Lessons	61
Recommendations	62
Balancing the Decision-Making Power with Regard to Setting and Implementing the Research Agenda	63
Establishing More Effective Linkage Mechanisms	65
Conclusion	68
REFERENCECS	69

BOXES

Box 1. Case Study. The Kenya National Farmers' Union	22
Box 2. African Farmers	24
Box 3. Involvement of Farmers' Organizations in FSR	57
Box 4. Linkages between FUGN and INERA	60
Box 5. Planning Workshop in the Ashanti Region of Ghana	60

FIGURE

Figure 1. Map of Africa showing the three countries of the study	8
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TABLES

Table 1. Types of Farmers' Organizations	20
Table 2. Distribution of NGOs by Major Domain of Activity in Burkina Faso	32
Table 3. A Descriptive Typology of the Linkage Mechanisms Encountered.	44
Table 4. Representation of the Various Actors for Each of the Linkage Mechanisms Identified.	50
Table 5. The Use of Linkage Mechanisms	53

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Thomas Eponou

FOREWORD

To overcome the food and environmental crisis in Africa is one of the most serious challenges we face at the end of this century. Dealing effectively with this crisis involves making relevant technologies available to resource-poor farmers. Generating and transferring such technologies require strong national agricultural research systems (NARS), and also good linkages between research and the users of these technologies.

The International Service for National Agricultural Research (ISNAR), as the lead center of the Consultative Group on International Agricultural Research (CGIAR) established to advise NARS managers on the organization and management of research to meet development needs, receives many requests to help strengthen effectively such linkages. To improve its technical response to these requests, in 1987 ISNAR initiated the on-farm client-oriented research (OFCOR) project to address issues related to the institutionalization of on-farm research. A year later, a study on linkages between research and technology transfer was undertaken with the aim of developing guidelines for research managers on the design and management of these linkages. The results and lessons derived from both studies have been widely disseminated.

One of the critical findings of these studies, however, was that the performance of the agricultural knowledge and information systems (AKIS) will not change significantly, unless better linkages are established between research and farmers. Such linkages should not only be to transfer technology but also to ensure that research focuses on the real needs/problems of the users. Linkages are required which ensure an intensive dialogue between research and its targets. For various reasons, such linkages have a better chance of being effective if they are established between research institutions and farmers' organizations.

With financial support from the Dutch Ministry of Foreign Affairs, Directorate -General for International Cooperation (DGIS), ISNAR extended its own research work to look at the linkages between research institutions and farmers' organizations.

This research report summarizes the main findings of the case studies. Guidelines for managing linkages and the analytical tools for addressing these linkages are in preparation. However, even before these are available, ISNAR believes that the findings and lessons included in this report will be valuable. Research managers and leaders of farmers' organizations may apply them in efforts to strengthen the linkages in their agricultural knowledge and information systems. Donors and development institutions may also obtain useful insights.

Christian Bonte-Friedheim
Director General
ISNAR

September 1996

ABSTRACT

Three countries in sub-Saharan Africa were studied: Burkina Faso, Ghana and Kenya. There are differences among the three countries of the study, but the five major types of farmers' organizations/groups were found in each of them. Only a few of these organizations have explicit policies to link with research and among these, only one organization is fully implementing its policies. The others, for various reasons, use informal mechanisms to gain access to agricultural technologies that they disseminate through publications and seminars. Most of the organizations/groups do not have explicit policies because they are not aware that they can link with research, or they think that the transaction costs are too high for the potential benefits.

The research institutions also lack explicit linkage policies, because of their research strategies, a lack of awareness, and/or perceived transaction costs. In practice, however, they do have linkages with farmers' organizations/groups, but these linkages are not effective because of the attributes of the mechanisms used, the context in which they are used, and the way these linkages are managed.

Enhancing the power of farmers' organizations through institutional changes, clearly defining explicit linkage policies, and putting in place sounder linkage strategies are all necessary to improve these linkages. This will, however, require the managers of the agricultural knowledge and information systems to become more sensitive to the importance of linkages between research and farmers' organizations.

ABREGE

La présente étude concerne la liaison qui existe entre la recherche et les organisations paysannes dans trois pays d'Afrique, à savoir le Burkina-Faso, le Ghana et le Kenya. Dans chacun de ces pays, l'on trouve les cinq principaux types d'organisations paysannes/groupements, mais il existe des différences d'un pays à l'autre. Parmi les quelques organisations qui ont défini une politique explicite relative aux liens avec la recherche, une seule seulement exécute cette politique: les autres entretiennent plutôt des mécanismes informels avec la recherche, qui leur permettent de se procurer des technologies qu'elles diffusent ensuite à travers leurs propres publications et séminaires. La majorité des organisations n'ont pas de politique- soit parce qu'elles n'ont pas été informées de la possibilité d'en instaurer, soit parce qu'à leurs yeux les bénéfices potentiels ne justifient pas une telle démarche.

Pour ce qui est des institutions de recherche, aucune d'entre elles n'a établi ou adopté une politique explicite en la matière, que ce soit à cause des politiques et stratégies de recherche en vigueur, par manque d'information sur l'importance de tels liens, ou encore parce que les coûts impliqués leur semblent relativement élevés. Mais cela ne les empêche pas d'entretenir des liens avec les organisations paysannes. Or ces liens informels manquent d'efficacité, à cause des types de mécanismes adoptés, de la façon dont ceux-ci sont utilisés, du contexte du système de connaissance et d'information agricoles, et de la mauvaise gestion de ces liens.

Pour réaliser une meilleure liaison, il faut renforcer le pouvoir des organisations paysannes en introduisant des changements institutionnels, définir des politiques explicites de liaison et mettre en place des stratégies de liaison plus appropriées. Il faudrait en outre aiguïser la sensibilité des gestionnaires des institutions appartenant au système de connaissance et

d'informations agricoles concernant l'importance de liaison entre la recherche et les organisations paysannes.

RESUMEN

Hemos conducido tres estudios en países del Africa Subsahariana: Burquina Faso, Ghana y Kenia. Observamos diferencias entre los tres países en estudio, pero encontramos los cinco tipos principales de organizaciones/grupos de agricultores en cada uno de ellos. Sólo algunas de las organizaciones tienen políticas explícitas para vincular su investigación científica. Las otras organizaciones, por varias razones, usan mecanismos informales para lograr acceso a tecnologías agrícolas que ellos diseminan a través de publicaciones y seminarios. La mayoría de las organizaciones/grupos no tienen políticas explícitas porque no están conscientes de la posibilidad de crear vínculos con la investigación o porque piensan que los costos de transacción son muy altos comparados con los posibles beneficios.

Los institutos de investigación tampoco tienen políticas explícitas sobre vínculos, debido a sus estrategias de investigación, a la falta de información, y/o a los costos de transacción que perciben. En la práctica, sin embargo, tienen vínculos con las organizaciones/grupos de agricultores. Pero estos vínculos no son efectivos debido a las características de los mecanismos usados, el contexto en el cual son usados y a la manera en que estos vínculos son manejados.

Para mejorar estos vínculos es necesario fortalecer el poder de las organizaciones de los agricultores a través de una transformación institucional, definiendo claramente políticas sobre vínculos explícitas, y poniendo en marcha estrategias para crear vínculos más coherentes. Sin embargo, esto requerirá que tanto los gerentes del tecnología agrícola así como los gerentes de los sistemas de información sean más sensibles a la importancia de los vínculos entre la investigación y las organizaciones de agricultores.

ACRONYMS

AKIS	agricultural knowledge and information system
CGIAR	consultative group on international agricultural research
CNRST	National Center for Scientific and Technological Research
DGIS	Dutch Ministry of Foreign Affairs, Directorate-General for International Cooperation
FSR	farming systems research
FUGN	Federation des Unions des Groupements (“Naam”)
GNAFF	Ghana National Association of Farmers and Fishermen
INERA	Institut d’Etudes et de Recherches Agricoles
ISNAR	International Service for National Agricultural Research
KARI	Kenya Agricultural Research Institute
KCC	Kenya Cooperative Creameries
KEFRI	Kenya Forestry Research Institute
KENGO	Kenya Energy and Environmental Non-Governmental Organizations
KFA	Kenya Farmers’ Association
KGGCU	Kenya Grain Growers’ Cooperative Union
KNFC	Kenya National Federation of Cooperatives
KNFU	Kenya National Farmers’ Union
KPCU	Kenya Planters’ Cooperative Union
LDC	less developed country
NARS	national agricultural research systems
NGO	non-governmental organization
OFCOR	on-farm client-oriented research
UCOBAM	National Federation of Agricultural and Horticultural Cooperatives
T&V	training and visit

EXECUTIVE SUMMARY

Because of poor linkages between research and technology users, institutionalized agricultural research and extension have not made the expected impact on resource-poor farmers in Africa. Consequently, food production per capita is declining under the combined effect of an increasing population and deteriorating material resource base.

Linkages between research and farmers' organizations, which form part of the agricultural knowledge and information system (AKIS), need to be strong for effective technology generation and transfer to occur. The study was undertaken to identify and assess these linkages in three African countries — Burkina Faso, Ghana and Kenya — with the aim of developing guidelines for strengthening and properly managing them.

Five major types of farmers' organizations/groups were found:

- traditional associations/groups
- informal contact groups
- multipurpose associations/groups
- cooperatives
- national farmers' organizations

Even though the five types are found in all three countries, there are differences among the countries. The cooperatives, for example, are larger and better organized in Kenya. Until recently farmers' organizations/groups have either not been independent from the government, which uses them as a vehicle for its development programs, or have not been fully free to implement their programs. However, the situation is evolving positively and rapidly. Most of the organizations also suffer managerial problems and many of them rely on external resources for the implementation of their programs.

Only a few farmers' organizations have explicit linkage policies with research, and only the "Naam" Federation in Burkina Faso is implementing them. Some have frozen the implementation of their policies because, either they find the transaction cost too high, or they are not convinced they will derive significant benefit from linkages. However, knowing the importance of agricultural technology to their members, they have relied on informal mechanisms to obtain research results which they have then disseminated among their members. This was the case with several organizations in Kenya, and a few in Ghana and Burkina Faso.

Among the reasons why the majority of farmers' organizations do not have linkage policies are:

- access to technology is not one of the objectives of the organizations;
- the organizations are not convinced that they can benefit from linkages, given the political context; and
- the organizations are unaware that they can establish linkages with research. However, many organizations/groups, especially the multipurpose associations, have established linkages with research through the on-farm activities.

None of the research institutions has explicit linkage policies with farmers' organizations, even though they recognize, in their official documents, the need to involve farmers in the technology development process. This lack of explicit linkage policies stems from: the role assigned to farmers' organizations in the development process; until recently they were not seen as active actors in decision-making;

- the research policies prevailing in the three countries;

- the strong adherence to the linear model of technology generation and transfer by research and extension;
- the ambivalence of farming systems research; and
- the limited expected gains from linkages.

However, in practice, there have been linkages between research and farmers' organizations/groups in all three countries. Most of these linkage mechanisms have been established by research or the extension service, they are not very formal, have no decision-making power, and are controlled by research alone. Almost all of them are related to adaptive research and the majority of them focus on transferring information from research to farmers. These linkages also suffer from the lack of representation of farmers, and are often not used in an effective manner. In many cases, their management is a problem and often they cannot be sustained because of a lack of resources.

Some of the problems above arise because:

many researchers and managers are not fully convinced of the usefulness of linkages;

- linkages are somehow perceived as "extra" activities by researchers;
- the linkages have been established by donor pressure and have almost entirely been financed by donors;
- research is not truly accountable;
- research policies, especially those dealing with promotion and rewards, are not compatible with having strong linkages with farmers; and
- the research institutions have internal management problems, while most of the farmers' organizations are weak.

Consequently, linkages are not effective since their basic objectives are not met. Farmers, for example, have no influence on the research agenda and do not have access to relevant information when necessary. Both research managers and leaders of farmers' organizations are aware of the lack of effectiveness of linkages.

However, in each of the countries studied, examples of good linkages between research and farmers' organizations were encountered. The best example is the "Naam" Federation in Burkina Faso.

One can argue that even though most of the existing farmers' organizations/groups are not strong enough to establish full partnership with research, it is still possible to establish effective linkages between these two actors of the AKIS. The present situation is due to both contextual factors and management problems in the research institutions and the farmers' organizations/groups.

Even though each country is a specific case and must be dealt with accordingly, the study recommends:

- balancing the decision-making power between research and farmers' organizations with regard to setting and implementing the research agenda. This includes strengthening the capacity of farmers' organizations to link with public institutions;
- establishing more effective linkage mechanisms, some of them being initiated by farmers' organizations; and
- jointly defining sound linkage policies and strategies.

Although the study covered three countries, some of the findings may be valid for other African countries, who should also be able to initiate the necessary changes after investigating their own AKIS.

1. Introduction

Institutionalized agricultural research and extension have not had the beneficial impact on the millions of small farmers in Africa that has been expected (Spencer, 1986). Yields of basic staples have stagnated and the natural resource base is progressively deteriorating under the increasing pressure of population growth (Leisinger and Schmitt, 1995). The majority of African small farmers rely on traditional technologies and cannot keep pace with the growing demand for food. Research has the capacity to make an impact on productivity, but technological recommendations frequently do not benefit small farmers to a significant degree.

Part of the problem is due to the lack of effectiveness of agricultural research. This has been underlined by some authors since the late 1980s (Eicher, 1988; Jain, 1992). Many research managers and policy-makers have attributed the problem to a lack of resources and the inefficiency of extension. Yet, in terms of resources invested in research, Africa compares well with other developing regions of the world where better results have been achieved (Pardey and Roseboom, 1990). This study argues that the problem of the limited effectiveness of research has its roots in the lack of relevance and poor quality of the technologies produced by the national research systems. Lack of relevance is partly due to the poor linkages between research and its clients, namely farmers and extension. It is well established that improving linkages between research and its clients is a prerequisite to the effectiveness of research (Kamowitz, 1990; Röling, 1990; Merrill-Sands and Kamowitz, 1990; Eponou, 1993).

The need to improve linkages is even more urgent, and also more challenging, with respect to resource-poor farmers because they face both technological and institutional constraints. For example, sometimes the agricultural institutions that should assist farmers are weak or non-existent. Farmers' limited resource base narrows the range of technologies that are feasible for them to adopt; it also constrains their ability to experiment and adapt technologies themselves. In many cases, the natural resource base of their farming systems is deteriorating rapidly. In these cases, not only must production be increased to keep pace with a rapidly growing population, but technologies often alien to farmers' practices must be developed and transferred to maintain the resource base which is increasingly under pressure.

Resource-poor farmers are rarely sufficiently powerful or well enough organized to exert pressure on research to make it more responsive to their needs. They also do not have the power to influence the government to establish pricing policies more favorable to their interests. At the same time, research, and even extension agencies, often have limited knowledge of the diverse and complex farming systems these farmers operate. To produce relevant technologies for this client group, research must capitalize on farmers' knowledge and obtain systematic feedback from farmers and technology transfer agents concerning the priority problems and the relevance of the proposed solutions (Merrill-Sands and Kamowitz, 1990).

Linkages between research and farmers' organizations is one way of bridging the gap between research priorities and farmers' needs. On the one hand, through farmers' organizations and other agrarian interest groups, farmers can influence research to become more responsive to their problems. On the other hand, research organizations can effectively reach more farmers and institutionalize their capacity to solve technological problems through close collaboration with these farmers' organizations. However, these linkage activities are not free of costs. Farmers' organizations and research have different strategies, procedures and interests and each enjoys its own relative autonomy. To participate in link-

age activities with research, farmers' organizations must feel that these activities benefit their members.

Farmers' organizations have always existed in Africa. However, new forms of groups, ranging from national farmers' associations to informal village-level groups are emerging, often in spite of a hostile environment. The functions performed by these groups are being diversified. Owing to the democratization process and the social consequences of structural adjustment programs, these organizations are themselves calling for a more active role. At the same time their potential for economic development is becoming more explicit. They can no longer be ignored and they must be strengthened or at least be provided with relevant information, whenever necessary, in order to make them effective.

Other agrarian interest groups, especially NGOs are increasing in number and are playing a more active role in improving agricultural production by assisting farmers in various ways, including enhancing their access to agricultural technologies. The impotence and decay of many public institutions, the stringent financial constraints facing these institutions, the confidence placed by donors in the capacity of these NGOs to play a role, have made their contribution so important that it can no longer be ignored (Farrington *et al.*, 1993). In the area of agricultural technology, NGO activities range from technology generation and transfer to facilitating access to and adoption of technologies by farmers. This is achieved by the NGOs mediating between farmers and public institutions or by providing inputs and agricultural credit to farmers. Moreover, they reach the farmers directly, or through their organizations, and in most cases they initiate or strengthen these organizations. Consequently, enhancing the linkages of NGOs with research should be considered an integral part of strengthening the linkages between research and farmers' organizations.

This study of the linkages between research and farmers' organizations/agrarian interest groups and extension provides lessons and recommendations for research managers and leaders of farmers' organizations on how to establish and manage linkages to their mutual advantage.

The objectives of the study are the following:

- to identify and assess the linkage policies of the actors of the technology system;
- to analyze the key factors that influence the effectiveness of linkages; and
- to develop recommendations for leaders and members of the institutions involved in the linkage process.

Three countries — Burkina Faso, Ghana and Kenya — were selected for the study because of their history of farmers' organizations. In each country, the study was conducted in partnership with the major research organization. The research team comprised scientists from the research organization and ISNAR.

Interviewing the leaders of farmers' organizations, non-governmental organizations, managers of research and extension, and key actors involved in linkages was the primary approach used for data collection. However, since part of the data needed was already available in study and review reports, these documents were exploited as much as possible. The teams were also encouraged to use other instruments such as direct observation and participation whenever possible to complement the interviews, e.g. attending linkage meetings.

This research report is a synthesis of the findings, lessons, and recommendations from the study. In the following section the key concepts are defined and the major propositions stated. The third section presents a brief overview of the countries where the study took place, while sections 4, 5 and 6 deal respectively with the linkage policies of farmers' organizations, NGOs, and research and technology transfer institutions. The effectiveness of the

existing linkages is discussed in section 7. The last section is a summary of the key lessons and the recommendations from the study.

2. Key Concepts and Propositions

The objective of this section is to clarify some key concepts and to briefly state some of the major propositions concerning linkages. Additional propositions are discussed in the relevant sections.

Definitions of Key Concepts

The study is based on three main premises. The first premise is that there exists an agricultural knowledge and information system (AKIS) with the mission of improving agricultural production by generating, transferring, and using effective agricultural technologies.

Agricultural knowledge and information system (AKIS). An AKIS is defined as a set of agricultural organizations and/or persons, and the links and interactions between them, that are engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information with the purpose of working synergically to support decision-making, problem solving and innovation in a given country's agriculture or a domain thereof (Röling, 1990).

The elements and actors of the AKIS are:

Research. This covers the whole spectrum of scientific inquiry and technology development, from basic to adaptive research. It includes the work performed by the public and private institutes and organizations that carry out scientific inquiries in the broadly defined area of agriculture. These institutes and organizations include among others, research departments and units of ministries of agriculture, semiautonomous agricultural research institutes, commodity boards and other agricultural organizations with research mandates, and university faculties of agriculture.

Technology transfer. "Technology transfer" refers to the process of: (a) bringing research results, in the form of new agricultural technologies and new information, to farmers; and (b) supplying research with information on farmers' needs, production constraints and feedback on technologies. This includes the activities of the agricultural extension services, commodity boards, government and semiprivate seed-production units, and commercial firms. "Technology transfer" has a broader coverage than "extension" in terms of the organizations involved but it refers only to the dissemination aspects of generating and transferring improved technologies.

Farmers' organizations. "Farmers' organizations" are defined here as those agrarian interest groups formed by farmers to help them meet their professional and/or social objectives. They vary from traditional or new grassroots organizations to more formally institutionalized (national) farmers' associations.

Non-governmental organizations. These "are international and national non-profit-making philanthropic and voluntary bodies who operate through programs and projects in LDCs" (Esman and Uphoff, 1984).

Policy-makers. These are in charge of defining technology policies, approving research strategies and managing the other development instruments such as pricing, public investments and market regulation.

The agricultural knowledge and information system, in addition to its actors, has many other stakeholders, such as processors, merchants, consumers, and donors, who also have vested interests in it and can indirectly influence it. It is therefore important to stress the fact that the system does not belong to its members alone.

The second premise is that, for effectiveness, synergy is the mode of functioning of the system and linkages are crucial for synergy. *Linkages* are defined in this study as channels for the two-way flow of knowledge, information, and resources between research and its partners. These linkages may be used for different aims ranging from providing information to controlling the system. Structural or managerial devices or procedures, referred to as *linkage mechanisms*, are used to sustain the linkages. The key set of actors, i.e., research and technology transfer institutions and farmers' organizations, may have an implicit or explicit *linkage policy*, that is a stated commitment and framework to link with each other.

The third premise is that both research and farmers' organizations have explicit objectives in linking with each other. The objectives of research are: (i) to obtain information on the technological needs and production conditions of farmers and other technology users, (ii) to disseminate its results, and (iii) to gain access to more resources (physical, human and financial). The objectives of farmers' organizations are to influence/control the research agenda and to have access to technological information and knowledge when needed. Both parties have the following as goals:

- a more effective AKIS because of an increase in the flow of relevant technologies to users;
- a more efficient AKIS because of a better utilization of resources;
- a more dynamic AKIS because of its ability to adapt to new requirements and challenges.

Key Considerations

In this study we address several important considerations and highlight several important propositions about the conditions for successful linkages and the efficiency of the process. The propositions emerged from our study of the linkages between research and technology transfer, and the preliminary studies of linkages with farmers' organizations indicate their importance.

Incentives for interaction. Linkages as a social process have both benefits and costs for the actors involved. Therefore, before entering this process, leaders of farmers' organizations and agrarian interest groups, and research managers are likely to assess the net gain they may derive from it. Different types of agrarian groups will have different attitudes towards linkages with research. Groups that provide farmers with services directly related to technologies, such as credit and marketing facilities, may not have sufficient incentive to link with research because their private net gain may not be attractive enough. However, commodity associations, which often must improve the productivity of their members in order to maintain their competitive edge, may be eager to invest in linkages with research. They value linkages with research because the cost of not having them can be high.

Accountability to farmers. In the context where research is not accountable to farmers and farmers do not directly finance research, there may be no pressure for research to link with farmers' organizations or other agrarian interest groups. This may be so because there is no incentive to link with them and no sanctions if they do not. Linkage policy statements may not correspond with actual implementation. The existence of such divergence can be deliberate or be induced by factors out of the control of managers, such as the availability of resources or the willingness to cooperate from the other partner. There must be guidelines and some pressure from the policy level for research to interact with farmers' organizations.

Awareness of gains from linkages. The willingness of an organization to invest in linkages with research may also be a function of the degree of its awareness of the potential gains to be derived from such investment (Wuyts-Fivawo, 1992). Some farmers' organizations and agrarian interest groups may not be fully informed of these gains. In some cases, they may not know that they have the right to link with research.

Locus of control. The locus of the control of linkages may affect the distribution of the benefits and costs of linking. It can, therefore, be a source of conflict between research and the agrarian interest groups. Research managers may attempt to link with farmers' organizations and agrarian interest groups only when they are sure that the locus of control will remain within research. Consequently, if there is no pressure from the policy level, some managers would tend to link with individual farmers and informal groups, or link with farmers through extension.

Level and content of linkages. Linkages may be required both at the policy and the operational levels. It is important that the right structures, procedures, and participants are involved at each level. For example, the cost to research may be high if linkages that take place at the policy level cause research to lose control over the operational parts of the research process. Left alone, research may attempt to link with farm groups only at the operational level, where researchers may believe farmers can really contribute to ensure relevance. Agrarian interest groups will prefer to link at the levels where they can achieve their objectives, some of which may not be best addressed by technical research. These levels may vary from one type of group to another and there is a need for bargaining between research and farmers' organizations/groups.

Authority of linkage mechanisms. Friction can also occur over the decision-making power accorded to the linkage mechanisms, because it affects the sharing of benefits and costs between research and the agrarian interest groups. The latter may prefer linkage mechanisms with strong decision-making power while research will favor advisory types of mechanisms because they are less binding. The friction may stem from a lack of agreement regarding the purpose of the linkages. Research may see linkages as a means of obtaining information on the needs and conditions of production from farmers; while farmers' groups may attempt to use them for control of the research agenda.

Pressure from extension and donors. The final outcome, in terms of locus of control and level and content of linkages, depends on the relative political power of research and agrarian groups and the influence of many other forces. Government policies and attitudes towards farmers' organizations and agrarian groups are likely to influence the balance. The perception of farmer-research linkages by the extension service must also be taken into account. This service can enhance or hinder farmer group-research linkages through its own

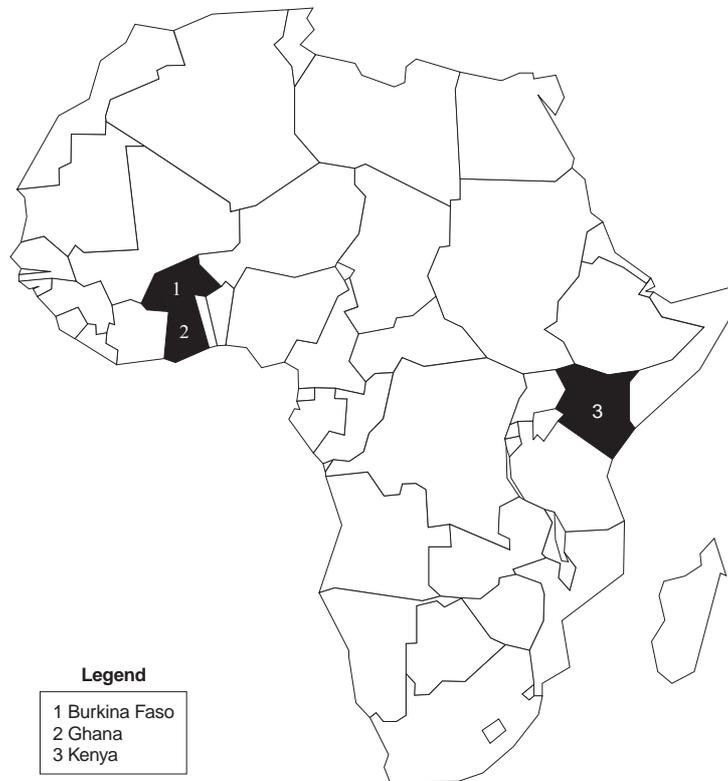


Figure 1. Map of Africa showing the three countries of the study

linkage policy. In the present context of many African countries, the extension service could have a negative policy towards direct linkages between research and farmers' organizations because there seems to be some misunderstanding over its role and that of the farmers' organizations. The extension service sees these linkages as a threat to its own existence. Lastly, donors play an important role in defining the nature of these linkages. They may enforce linkages through "conditionality" in their funding.

Distribution of gains from linkages. Linkages can have both positive and negative effects in terms of costs and benefits for different groups of farmers. One such cost may be that the least-organized farmers, who often happen to be resource-poor or women farmers, are discriminated against by the agricultural knowledge and information system. This may occur where commercial farmers, seeing the social change taking place and recognizing the need for new knowledge more strongly than the other farmers, organize themselves, and use the knowledge and information system for their own ends.

A farmers' organization may not necessarily serve the interests of all its members equally. Some members, usually the least affluent ones, may be discriminated against because the organization is hijacked by a few members, the leaders, for their own benefit or non-stated objectives. Also, some agrarian interest groups may not necessarily operate for

the benefit of farmers if it is not their primary objective. Such groups can, in fact, be a constraint to the well-being of farmers.

In conclusion, an appropriate strategy to improve linkages must increase the net gains as perceived by the individual actors who must consciously decide to interact. This involves reducing the danger of individual losses, raising potential benefits, and reducing the general transaction cost of linking. The danger of loss may be reduced by policies and structures which ensure that the right people and the right information are brought together at each level of decision-making.

Gains may be increased through having more relevant research agendas, relevant participation in the execution of the research agenda, higher rates of adoption, and maximizing positive spillover. This would ensure that individuals and society will benefit from the increasing practical support for research and technology transfer.

Reduction in the overall costs of linking may come about through clear policy provision for linkage, good communication, the right choice of mechanisms, appropriate internal processes, and effective linkages with the extension services.

3. Overview of the Case Study Countries

This section highlights the major features of the agricultural sector and of the research and extension systems of each of the countries studied. The objective is to put the analysis which follows in the other sections into perspective. Some elements of this section will also aid an understanding of why some types of farmers' organizations are more prevalent in one country than another, or why the same type of organization, the cooperatives for example, are more developed in Kenya than in the two other countries. The nature of the constraints faced by farmers, the economic opportunities, and the political economy of the countries shape, in one way or another, the incentives for farmers to form organizations.

Burkina Faso

Generalities

With a population of about 9.3 million, Burkina Faso is a Sahelian and landlocked country. Average annual rainfall ranges from 400 millimeters in the northern Sahelian region to 1,100 millimeters in the Sudanese western part. Not only is rainfall irregular, but one never knows when the rainy season starts or ends. The country has suffered several severe droughts over the last twenty years.

One of the key characteristics of Burkina Faso is the poverty of most of its soils and the continuing degradation of these soils as a consequence of population pressure, drought and erosion. Because of the high population pressure, the poverty of the soil and the erratic rainfall, households in many parts of the country have to earn part of their living off the farm. Migration has been one of the solutions to these problems since the colonial era.

With per capita GNP at US \$290, Burkina Faso is classified as a low income country according to the World Bank taxonomy. It also has one of the highest illiteracy rates (82%). Total GDP grew at an annual rate of 4% between 1981 and 1990 but at a rate of 3.2% for the agricultural sector which translates into a cumulative 2.4% increase in per capita food production for the period (World Bank, 1993).

Because of the climatic conditions, the alternatives for agricultural production are limited to drought resistant and short-cycle crops. Millet, sorghum, cotton, groundnut and sesame are the major crops. Yam and other tuber crops are grown in the more humid western part of the country. Irrigated rice and cowpeas are also produced to a limited extent in other areas. Recently, the country has experienced an important increase in horticultural production for both domestic consumption and export. Sheanuts are harvested for both export and domestic use.

In spite of the droughts, livestock (cattle, sheep and poultry) production is still important. Export of cattle and poultry products contributes significantly to the generation of foreign exchange earnings.

The production system in Burkina Faso is characterized by small household holdings producing for home consumption and selling any surplus in years of abundance. Only cotton, groundnut, and livestock are primarily produced for the market. Farm labor is almost totally provided by the household and the use of chemicals as well as mechanical equipment is very limited.

Since the mid 1980s, government policies have put more emphasis on food production. In the past, priority, in terms of resource allocation, was given to the export sector. Un-

fortunately, efforts to encourage food production are being hampered by a structural adjustment program which has limited direct public investment and has led to the removal of input and marketing subsidies.

Research and Extension Services

The Institut d'Etudes et de Recherches Agricoles (INERA), the major agricultural research institute established in 1985, is part of an umbrella organization, The National Center for Scientific and Technological Research (CNRST) which is in charge of coordinating most of the research carried out in Burkina Faso. CNRST is an autonomous organization within the Ministry of Higher Education and Scientific Research. With 98 scientists, INERA operates through eight programs and six centers, five of which are regional.

Fifteen years ago, the research system was part of the French network established during the colonial era in Africa, and did not consider making technologies available to farmers its major objective. Only research on export crops was targeted at farmers. Now the focus of research has shifted to food crops, understanding the farming systems, and natural resource management. However, as with many research organizations in Africa, INERA is heavily dependent on external sources of funding; much of its funding comes from a World Bank project.

Agricultural extension services are provided by the Ministry of Agriculture and Animal Resources through various departments and special projects. During the revolutionary era, there was a special ministry in charge of promoting farmers' organizations and providing extension services. The activities of that ministry are now carried out by a department within the Ministry of Agriculture and Animal Resources. Owing to a World Bank project, the Department of Agricultural Extension Services carries out the bulk of its work using the T&V (training and visit) model.

Farmers' Organizations

As in most of the African countries, several types of farmers' organizations/groups exist in Burkina Faso. Whether induced by local or external initiatives, most of these groups are calling for a greater role in the development process. The major organizations/groups are:

Traditional associations/groups. The traditional groups or associations have their origin in the local traditions and value systems and are found everywhere in Burkina Faso under different names. They have often been used as a vehicle for education and training in the traditional value systems. In some cases, a boy cannot reach adulthood unless he joins one of these groups and the status gained during his involvement in the group will influence the rest of his life. This is the case, for example, for the Poro in the Senoufo region. Specific community responsibilities are often vested in these groups, but because of their occult nature they are seldom used by the public institutions and the NGOs for development purposes.

Multipurpose associations/groups. The multipurpose farmers' associations/groups are internally or externally initiated and are geared toward improving the well-being of farmers. This type of group is found in almost all the villages, and their origin can be traced back to the "Animation Rurale" era of the 1950s and early 1960s (Maïga, 1984). At that time they were mostly involved in community development activities. Since the 1970s, these groups have been formed by government initiative. The process was accelerated in the 1980s when

a special ministry was created to organize the farmers. This was a political move because the government intended to mobilize farmers to support the revolution which was not well perceived by the majority of the urban population. There are two major subcategories of farmers' groups and both have objectives which are different from those of their predecessors of the "Animation Rurale" era. The sub-categories are:

- village groups; these are open to all the farmers of the village and can be mixed, or have strictly male or female members. In December 1992, there were 9,350 such groups in Burkina Faso and 1,960 of them were women-only groups (tables provided by the Division of Farmers Cooperatives); and
- youth groups; these are formed from graduates of the youth agricultural training centers. According to the same source, 711 groups were operating in 1992.

Agricultural cooperatives. The cooperatives provide credit, production and marketing services to their members, and seem to be the most advanced form of farmers' organizations. Two major types of farmers' cooperatives are found in Burkina Faso. The first category is the agricultural and horticultural cooperatives which are aimed either at boosting fruit and vegetable production and export or at making more efficient use of the irrigated areas for rice cultivation. Although variable in size, most of the cooperatives are small and, contrary to what is found elsewhere, almost all the members are smallholders. Assistance is provided by the government. The fruit and vegetable cooperatives are grouped into seven unions which form a national cooperative (UCOBAM) which is one of the major fruit and vegetable exporters of Burkina Faso. The second category is the saving and loans cooperatives whose number is rapidly expanding.

FUGN (Federation des Unions des Groupements). The FUGN, or "Naam" Federation as it is known, has a national dimension. It was initiated by a former civil servant who was dissatisfied by the performance of the village groups program for which he was working. The whole undertaking became feasible because of an international ONG, SIX "S" set up to support the organization both financially and technically.

The "Naam" Federation grew from a traditional farmers' group of the Yatenga region. Because of its success it spread quickly to other regions building on similar local traditional organizations. The "Naam" groups differ from village groups in terms of development philosophy and strategy, organization, and scope of activities (Dabiré *et al.*, 1995). There are presently more than 300,000 farmers from 1,200 villages and 18 provinces (out of 30) who are members of the "Naam" organization; they form 4,563 groups and 63 unions. The Federation is the largest farmers' organization in Burkina Faso and could even be the largest organization in Francophone Africa totally independent of the government.

The other major agrarian interest groups are NGOs and there were about 200 NGOs operating in various domains in Burkina Faso in 1993. The majority of NGOs are in agricultural production and natural resource management. Since the revolution of 1983, the attitude of the government toward farmers' organizations and NGOs has been very positive and many policy decisions have been initiated to facilitate the activities of these groups.

Ghana

Generalities

Located in the Guinean Gulf, and with a population of about 15 million, Ghana enjoyed one of the highest standards of living in Africa before the economic crisis of the 1970s and 1980s.

Average annual rainfall is adequate throughout the country, ranging from 1,000 to 1,700 millimeters. Population density varies from one region to another but compares well with the African average. Land is relatively abundant since only 30% of the arable land is under cultivation.

The per capita GDP is US \$400 and makes Ghana one of the lower income countries, even though it has one of the highest literacy rates (60%) in West Africa. The overall economy grew at an annual rate of 3.2% between 1980 and 1991. The rate for the agricultural sector was 1.2% for the same period.

Economic development policies have evolved drastically in Ghana since independence. The first main strategy was the development of import substitution industries, large mechanized state farms and heavy direct involvement of the public sector in production. This was followed by a period of liberalization of the economy. In both cases, the expected results were not achieved and the errors made during both periods led to the economic crisis of the 1970s and 1980s. An economic rehabilitation program launched in the early 1980s, consisting of privatization, reduction of government spending, liberalization of imports, and producer price incentives, has led to an improvement in the economic indicators. However, the social costs of this structural adjustment program have been heavy, especially for the urban resource-poor sections of the population.

Agriculture is the mainstay of the economy with about 53% of GDP (World Bank, 1993) and 66% of the labor force (ISNAR, 1991).

Ghana has two major ecological zones:

- the forest zone, which covers the southern part of the country, is where cocoa, coffee, oil palm, Kola nut, jute, sugar cane, yam, cassava, plantain, cocoyam and banana are produced;
- the drier savanna zone where sorghum, millet, maize, rice and cowpeas are the major crops. There is also the potential for producing cotton, tobacco and groundnut (Tsini et al, 1995); it is also the major livestock production area.

In spite of the diversity of crops produced, Ghana has been heavily dependent on cocoa as its most important agricultural export product. This is complemented by timber and mining exports. Difficulties faced by the cocoa economy coupled with poor monetary and fiscal policies led to the severe economic crisis. Efforts are underway to diversify agricultural exports by increasing the production of palm oil and pineapple.

Even though smallholders account for 80% of agricultural production, the establishment of large estates, sometimes state-owned, has been encouraged by most of the recent governments. In recent years, however, more attention has been given to the smallholder sector.

Research and Extension

Agricultural research in Ghana is carried out within several research institutes and stations under the umbrella of the Council for Scientific and Industrial Research, a body reporting to

the Ministry of Industry and Technology. Most of the institutes specialize in specific commodities such as cocoa and oil palm. The Crop Research Institute is in charge of food crop research and has two major stations; one in the forest region (Kumasi) and the other one in the Savanna region (Nyankpala). The universities and some private agro-industrial companies are also active in agricultural research.

An important share of the financial resources is provided by external donors. Currently, the Canadian International Development Agency grain project and the national agricultural research project financed by the World Bank are the two major sources of research finance (cocoa sub-sector excluded).

Extension services are provided by the Department of Agricultural Extension Services of the Ministry of Agriculture and several public agencies specializing in specific commodities. In recent years, an independent foundation, Sasakawa Global 2000, has been very active in supplying extension services. The major project run by the Department of Agricultural Extension Services is also financed by the World Bank and uses the T&V approach to agricultural extension.

Farmers' Organizations

The same types of organizations/groups are found in Ghana as in Burkina Faso. In Ghana they also range from the informal village-level, ad hoc groups, to national-level associations.

Traditional associations/groups. The “nnoboa” groups, which are informal, ad hoc and traditional cooperatives, organized by farmers themselves usually temporarily for one season, are a typical example of such associations. The “nnoboa” groups had been in existence for generations and had been a source of relief to the very resource-poor farmers. These village-level, informal, traditional, ad hoc groups are formed during certain periods of the cropping season.

Multipurpose associations/groups. This category comprises a range of diverse community-based groups, usually organized because circumstances require people to seek each others' assistance. Even though they are similar to those found in Burkina Faso, they are less common in Ghana.

Agricultural cooperatives. Different forms of cooperatives exist:

- The two regional producers' associations: (a) the Regional Seed Growers' Association, and (b) the Ashanti Regional Poultry Farmers' Association. These associations were formed, with individual farmers as members and around local interests, to provide vital services to their members. They are more commercial in character than the other groups and their functions include input supply and marketing, as well as seeking solutions to problems associated with their enterprises. The initiative to form these associations came from the members. The annual general meetings are the highest decision-making body and leaders are elected at such meetings.

- The crop associations, such as maize, rice and tomato growers' associations. Usually at village level, farmers interested in a particular crop organize themselves into crop associations. In most cases, they are formed to pool financial resources and for joint marketing. However, other incentives include the procurement of credit and input packages since these are easier and cheaper if obtained as a group rather than as an individual farmer.
- The cocoa societies. Most of the farmers within the forest region are members of the cocoa societies. This is the case since membership is obligatory, especially for the sale of produce.
- The groups are organized by the Ministry of Employment and Social Welfare to undertake farming activities. Since 1983 this Ministry has worked through the National Mobilization Program to organize redundant public servants and returnees from Nigeria into groups to undertake farming. They have been in rural communities and were given food aid during the first year of operation. The Mobisquad groups are spread all over the country and engage in various farming, food processing and marketing activities.

National associations. Two major associations are operational:

- The Ghana National Association of Farmers and Fishermen (GNAFF), formed on the initiative of the Ministry of Food and Agriculture (MOFA), has been effective since January 1993. Membership embraces all practicing farmers and fishermen from both cooperative and non-cooperative sectors of agriculture, irrespective of creed, religion, gender, tribe progression, marital status, and social standing. Specifically, the GNAFF, being the "umbrella" of all farmers' organizations, has the following objectives: to unite all farmers and fishermen into one strong body, to act as their mouthpiece, to arouse and increase public interest in farming and fishing, and to cooperate with the government in the pursuit of agricultural advancement.
- The Ghana National Cocoa, Coffee and Sheanut Growers' Association has evolved from the former regional and national cocoa farmers' organizations that were established in the 1930s, such as the Gold Coast Farmers' Congress, the Ashanti Farmers' Union and the Gold Coast Farmers' Association. The cocoa sector already had strong local cocoa marketing cooperatives in the 1920s. These cooperatives offered services to their members in the form of loans, bonuses and storage facilities, and later developed into the political voice agitating against British cocoa policy. Companies were also formed to establish new cocoa farms. Through these companies, farmers were able to pool their efforts to negotiate land rights and share work of first-year operations when heavy labor was required. Currently, the Ghana National Cocoa, Coffee and Sheanut Growers' Association functions as a lobbying organization for farmers' interests and is in a position to negotiate cocoa prices with the government. It has representatives in all the districts and regions of the country and serves as the umbrella for all societies and other formal or informal organizations in the sector. Theoretically, it is expected to serve as an organ of the Ghana National Association of Farmers and Fishermen, but the latter has not yet been able to gain control over it.

The different groups mentioned above could be placed under two broad categories based on the source of initiative. The first category is farmer-initiated organizations. These organizations were formed by farmers themselves, often to meet specific needs, and they

range from village- to regional-, and even national-level organizations. They seem to be more sustainable since the incentives to associate were usually very strong and urgent, and drove the groups to find structures that would enable them to function without external assistance. The second category comprises organizations/groups initiated by the government.

Kenya

Generalities

Owing to its natural endowment, its historical background, and positive agricultural policies, Kenya has achieved one of the best successes in agricultural development in Africa. For example, the large variation in altitude allows the production of both temperate and tropical products. Also, a good infrastructure was laid down by the colonial settlers which facilitated the marketing of agricultural inputs and products. Nevertheless, Kenya faces land constraints because part of the country is dryland. In addition, 60% of the 24 million Kenyans live on 12% of the land. Consequently, the country is experiencing land degradation as a result of over-cultivation. An important share of the country is only suitable for pasture.

Per capita GDP is about US \$340 and GDP grew at an annual rate of 4.2% between 1980 and 1991. The rate of growth of the agricultural sector, which accounts for 27% of GDP, was 3.2% for the same period. Kenya also enjoys one of the lowest illiteracy rates in Africa (31%) (World Bank, 1993).

Kenya's agricultural success has been achieved at the cost of an unequal distribution of land and income. A limited number of farmers exploit large estates, while some farmers face land constraints. A relatively high percentage of the population, especially in the rural areas, suffers from food shortages, while the country is a net exporter of agricultural products. This situation stems from the fact that, since independence, agricultural policies have pursued a growth objective and have not paid enough attention to equity issues.

Coffee and tea, produced mainly by commercial farmers, accounts for 50% of foreign exchange earnings. Commercial farmers also control the production of maize, sugar cane, wheat, and cattle. Smallholder farmers are the major producers of rice, horticultural products, and pyrethrum. They also raise cattle for milk production on a small scale (Ndiritu, 1991).

Research and Extension

In Kenya, agricultural research is undertaken by several public and private institutions. However, since the 1986 reorganization, the Kenya Agricultural Research Institute (KARI), with several centers and stations spread over the country, is the major agricultural research institution. Three other institutes are responsible for generating technologies in the areas of forestry, fisheries, and harvest and processing. These institutes are under the Ministry of Science and Technology.

Several other research agencies also exist. Each of the major commodities has its own development agency which carries out specialized research for farmers. The universities also carry out agricultural research. Finally, some private companies and organizations, including NGOs, are involved in agricultural research either separately or in collaboration with the public institutions.

Until recently, the focus of agricultural research was on generating technologies for the commercial farmers, though, in some cases such as the hybrid maize varieties, small-

holder farmers have also benefited from the innovations. More attention is now being paid to the subsistence sector.

The Ministry of Agriculture, mainly through the Department of Agricultural Extension Services, is responsible for technology transfer. It is currently implementing a World Bank project using the T&V approach to extension. Specialized services provided by the commodity development agencies also exist. Some NGOs are also active in the area of technology transfer.

Farmers' Organizations

Various types of farmers' organizations, ranging from local associations to well-structured cooperatives with more than 100,000 members exist in Kenya which also has one of the few genuine national and independent farmers' organizations in Africa (Kenya National Farmers' Union). Farmers' organizations can be grouped into three major categories:

Multipurpose groups. The two forms of heterogeneous local groups are: (a) interest groups ranging from 10 to 30 members who have some common attributes; these groups often pool resources such as labor to overcome common constraints or achieve a common objective; (b) community groups whose membership is acquired by the virtue of belonging to the community. These groups deal with community problems such as communal land management and feeder roads. In some respects these organizations are similar to those established during the community development era.

Agricultural cooperatives. There are four different types of agricultural cooperative: (1) The commodity groups, with membership ranging from 30 to 200, take advantage of economies of scale resulting from group activities such as the bulk selling of products or buying of inputs. (2) The district unions provide services to the local societies and were formed at the initiative of the government. The services provided are the bulk buying of inputs, credit and savings facilities, marketing of products, and training in management. The membership is made up of the local societies. (3) The national federations of cooperatives, essentially the Kenya National Federation of Cooperatives (KNFC), which includes cooperatives from the various sectors of the economy as members. Membership is acquired by purchasing shares. The KNFC promotes and represents the cooperatives' interests, and provides training to its members. (4) In addition to the above, there are the national cooperative unions and associations which are intensively involved in purchasing, processing and marketing of specific commodities such as coffee or tea. Part of the funds from cess on sales are used to finance a foundation which undertakes, among other activities, adaptive research. The Kenya Grain Growers' Cooperative Union (KGGCU), the Kenya Cooperative Creameries (KCC), and the Kenya Planters Cooperative Union (KPCU) are examples of such cooperatives.

National farmers' associations. The Kenya National Farmers' Union (KNFU) is the only national farmers' association in Kenya. Founded in 1947, it serviced large-scale farmers until independence when small farmers were allowed to become members. Its main mission is to lobby on behalf of farmers and to protect their interests. It is very active in monitoring prices and assisting its members to gain access to agricultural technologies through study groups. The KNFU's financial resources come from its members as subscriptions are complemented by donor grants.

4. Farmers' Organizations

Typology of Farmers' Organizations

Table 1 presents a descriptive typology of the various farmers' organizations found in the three countries studied. There are five major types of organization/group and each type listed was found in all of the countries. There were, however, differences in terms of size, institutional development and contextual factors.

The types of organization/group are:

- traditional associations/groups
- informal contact groups
- multipurpose associations/groups
- cooperatives
- national farmers' organizations

Traditional Associations/Groups

The traditional associations have their roots in the value systems and customs of the various ethnic groups found in each of the countries studied, for example, the "Nnonboa groups" in Ghana, or the "Poro" in Burkina Faso. Although powerful in the past, most of these organizations which have an educational, religious, and/or a communal function are nowadays struggling to survive as a consequence of the monetarization and urbanization process. They are also being challenged by the new religions. Policy-makers, as well as the intelligentsia, have a mixed view of them; sometimes they are seen as backward, anti-progress, and at other times they are the object of national pride because they are depositories of true local culture. Only a few have been used for development purposes, even though some of them have tried to add economic activities to their function.

Multipurpose Local Organizations/Groups

The multipurpose local organizations/groups are part of the heritage of the community development (Kenya and Ghana) and "Animation Rurale" (Burkina Faso) movements of the 1950s and 1960s. In Ghana and Burkina Faso, the government encouraged and assisted the formation of these village-level groups, which were perceived to be effective channels for the delivery of development services. NGOs and religious groups have also contributed to the formation of such groups, especially the women's groups. Some of these organizations/groups have been instrumental in community work, building socioeconomic infrastructures (schools, health centers, feeder roads), and natural resource management. They too are being challenged by the monetarization process because of the tendency of villagers to pursue individualistic rather than communal objectives.

Agricultural Cooperatives

Agricultural cooperatives, as well as rural saving and loans cooperatives, are found in all three countries. However, there are noticeable differences between the cooperatives in Kenya and those found in Ghana and especially Burkina Faso. The cooperatives in Kenya, for example, are in general larger and more advanced. Most of them have several thousand

Table 1. Types of Farmers' Organizations

Type	Size	Functions	Initiators	Sources of funding	Administrative levels of operation	Major problems
Informal contact groups	10 - 200 farmers	Vehicles for extension services and input and credit delivery	- Extension services - Research - NGOs	- Extension services - Farmers - Research	Village or a few clustered villages	Too dependent on extension or research; poor sustainability
Traditional associations	10 - 3,000 farmers	Provide forum for traditional education and community services. They may in some cases involved in productive activities	From tradition	- Members - Local communities	Village or a few clustered villages	Conflicts with the modernization process; often perceived as constraints to progress; often closed to outsiders thus cannot be used as vehicle for development activities
Multipurpose (local or communal level associations)	5 - 10,000 farmers	Community work; erosion control input and credit distribution; financing of economic and social investments; adult education, etc.	- Farmers - NGOs - Government	- Members - NGOs - Government	Village or a few clustered village	Lack of focus and sustainability in activities because initiatives are from outside; poor management; control of the organizations by affluent members
Agricultural cooperatives - local cooperatives - district level cooperatives (Union) - national level cooperatives (Federation)	10 - 10,000 farmers several local coop several district level cooperatives	Marketing of agricultural inputs and products; collective fields; distribution of agricultural and rural credits; acquisition and operation of farm equipment, etc.	- Farmers - NGOs - Government (often a special branch of extension)	- Members - Government - International donors - NGOs	- Village or town - District - National	Poor management; logistical and financial problems; too specialized in commodity crops and not available for the subsistence sector
National farmers associations	Several thousands to millions of individual farmers or several semi-autonomous local and district-level organizations	Defense and protection of farmers' interests through lobbying or representation of farmers on various forums	- Farmers - Government	- Members - Government - International donors - NGOs	Often national with district or regional sections; they can also have village and district-level semiautonomous organizations	Weak bargaining power; heavily influenced by the rich farmers and neglect of issues specific to resource-poor farmers; used by some members to achieve their political objectives; limited freedom by the government

members compared to a few hundred in Burkina Faso. For example, the membership of the largest cooperative entity in Burkina Faso, the National Federation of Agricultural and Horticultural Cooperatives (UCOBAM) is the same size as the Dairy District Union Cooperative of Kiambu in Kenya. The cooperatives in Kenya are also more structured and each of the major commodities have cooperatives at all administrative levels (from local to national). They also have well-trained staff and managers. The history of the cooperative movement in Kenya can be traced back to the colonial era.

In Ghana there are national and regional cooperatives, which are well structured with a qualified administrative and management staff such as those found in Kenya. Village-level cooperatives similar to those in Burkina Faso also exist. The major service provided to members in village-level cooperatives, such as the cocoa societies, is joint marketing of products. In a few cases they also supply inputs. The history of the cooperative movement here also goes back to the 1930s.

The situation in Burkina Faso is different as the development of cooperatives is recent, and the movement was somewhat induced by the state. Until recently the managers of UCOBAM and the other cooperatives of a certain size were civil servants.

Moreover, while in Burkina Faso most of the members of the village groups as well as the cooperatives are small farmers, the membership of the KNFU and of the major cooperatives in Kenya is more heterogeneous. This heterogeneity is due to the fact that commercial farmers were the original members of these organizations which have only recently admitted small farmers. The organizations were initially set up by the indigenous commercial farmers as a way of making themselves competitive *vis à vis* the white settlers. For the commodity associations, the situation in Ghana, in terms of membership, is closer to that found in Kenya.

The differences in the advancement of the cooperative movement between the two Anglophone countries and Burkina Faso stem from their different colonial history. The British were more open to the emergence of local associations than the French during the colonial era. The nature and level of development of the agricultural sector also explain why the cooperative movement is more advanced in Kenya than in Burkina Faso or Ghana. The former country has a more diversified and export-oriented agriculture which calls for more organization and efficiency in order to maintain the competitiveness of the country. Agricultural cooperatives are one way of achieving this objective.

However, the cooperatives in all three countries, whether they were established by the government or not, are provided with some form of assistance by a public institution, particularly in the area of management. The cooperatives must also follow the regulations laid down by the government. In the case of Kenya, the cooperatives have their own extension services managed by the umbrella organization of the cooperative movement of Kenya (the KNFC).

The National Associations

In all three countries some organizations more or less similar to the farmers' organizations in the western countries were encountered. In Kenya, the Kenyan National Farmers' Union (KNFU) is organized and managed in the same way as comparable organizations found in Europe. Its mandate is to defend the interests of its members (see Box 1).

In Ghana, the GNAFF was established by the government to represent farmers and fishermen *vis à vis* the public sector. Because of its strong links with the government, it is difficult to see the GNAFF effectively representing farmers' interests at the different levels of decision-making.

Box 1. Case Study. The Kenya National Farmers' Union

The Kenya National Farmers' Union was formed in 1947 with an aim of representing farmers to the government and other authorities. At that time the membership was composed only of large-scale farmers with a minimum of 100 acres. After independence small-scale farmers were admitted to its membership.

The main functions of the KNFU are lobbying to promote and protect farmers' interests, and taking legal action to support farmers. This is achieved through the monitoring of producer and input prices and ensuring that payments are made promptly. The KNFU gives advice to the farmers and through its influence tries to ensure that farmers have all the facilities they need. The KNFU is also a member of certain committees including the National Seed Regulation Committee, Fertilizer Committee, Kenya Bureau of Standards, District Development Committee, and the District Agricultural Committee on which it represents farmers.

Funds for operations are obtained from member subscriptions. Currently the minimum fee is Kshs.120 per annum, depending on acreage owned.



In Burkina Faso, the "Naam" Federation operates as a national organization while at the local level each member group still fulfills activities similar to those of the multipurpose groups described above. The local groups, as well as the unions found at the district level, have more autonomy than the local and district branches of the KNFU. An attempt in the 1980s by the government, similar to that which took place in Ghana, to establish a national farmers' association failed because the farmers did not recognize that association as theirs. Discussions are underway among the existing farmers' organizations to set up a broader federation which will defend their interests in the policy arena.

These different organizations provide various services to their members and are involved in a wide range of activities, as described in Table 1. Resource pooling for productive or communal activities, marketing and credit services, and social and educational services are among the major activities.

Strengths and Weaknesses of the Organizations

Playing an effective advocacy role to defend the interests of farmers is not part of the activity of most of the organizations. Lobbying in the policy arena, for example, to improve the welfare conditions of farmers is undertaken by a few organizations such as the KNFU in Kenya, to some extent by some of the major cooperatives in Kenya, and by the Ghana National Cocoa, Coffee and Sheanut Growers' Association. The high dependency of most of the organizations *vis à vis* the government, itself induced by the overall public policy and attitude towards these organizations, partially explains why putting pressure on the government or lobbying in the policy arena is not high on the agenda of these organizations. Through regulations and other devices, the governments in all three countries have successfully defined the tolerated domain of intervention of these organizations. In Kenya, for example, before it merged with the Kenyan Grain Growers' Cooperative Union in 1984, the Kenya Farmers' Association (KFA) experienced several government policies restricting its domains of intervention. Cooption of organizations by the public sector or infiltration and control of the organizations by politicians are other devices used to limit their power. The establishment of the Ghana National Association of Farmers and Fishermen by the government is partially intended to curb the political power of the Ghana National Cocoa, Coffee

and Sheanut Growers' Association by making it a simple member of the former (Tsini *et al.*, 1994).

Some authors suggested that the lack of an effective agricultural lobby group in most African countries is due to the fact that the larger farmers, who should take the lead in such action, have been "bought out" and are part of the clientism movement which is the major determinant of policy decision-making in African countries (Healy and Robinson, 1992). This may be true at least in Ghana and Kenya. According to Hyden (1983), most African farmers are at a pre-capitalist stage of development and have limited dependence on the market and limited technological needs. Consequently they can easily "exit" from the formal system and that makes the need to lobby for their interests less important. This may be partially true in Burkina Faso (Dabiré *et al.*, 1995) and for some sections of the farming community in Ghana and Kenya. In all three countries some form of apathy or resignation on the part of the farmers was felt when interviewing them.

It was also observed that in the few cases where the organizations do play an advocacy role, they seem to react to policy decisions rather than being proactive in suggesting policy orientations to the government. This organizational behavior has also been reported by Bratton and Bingen (1994). By purposely avoiding sensitive issues, farmers' organizations do not experience confrontational situations.

Instead of lobbying at the policy level, the "Naam" Federation has successfully used market intervention to defend the interests of its members. By selling their products directly to retailers, bypassing the wholesalers, and withdrawing from the market when its intervention was no longer necessary, it has been effective in improving producer prices. Through the same process it has improved the involvement of its members in exporting horticultural products at the expense of the exporters.

In spite of the relative freedom to set up local and national organizations in the Anglophone countries, it was found that when it comes to bargaining with public institutions the situation in Ghana and Kenya is no better than in Burkina Faso. The bargaining power of the organizations in these countries is very limited and often non-existent. Over the years, part of the bargaining power has, in some cases, been lost to the government through more stringent rules, more rigid political control or because of other rising forces in the urban areas. This is the case with the Ghana National Cocoa, Coffee and Sheanut Growers' Association (Rimmer, 1986). (See Box 2.) Surprisingly, since the 1980s, farmers seem to have more bargaining power *vis à vis* research and extension in Burkina Faso where the degree of organization of farmers is lower. This change came about because the revolution of the 1980s needed the support of farmers to control the urban elite which was opposed to the revolution.

The attitude of the governments toward farmers' organizations has been analyzed by several authors and the following explanations have been advanced:

- The need to create an effective state from a set of ethnic groups pooled together during the colonial era. There is the fear that farmers' organizations will be based on ethnic groups and will hamper or delay the formation of an effective nation. In short, the argument for having one party was also "valid" to avoid strong farmers' organizations.
- Farmers' organizations are perceived as potential constraints to extracting the agricultural surplus. The new states need resources to finance the development process and want to have free access to the surplus from the agricultural sector; the belief is that the less organized the farmers are, the easier it will be to collect the surplus.

Box 2. African Farmers

All scholars agree on the essential political weakness of peasants or small farmers in Africa. Hyden (1983) takes the view that the peasant producers do not need the state since they have limited dependence on markets and limited technology, and so can and do easily “exit” from the formal economy. For him this low level of interdependence on the part of a basically pre-capitalist class discourages the bargaining approach to politics which is a pre-condition of democracy .

Bates (1981) takes the same view, that peasants form a weak interest group, and seek to “exit” from official marketing and government policies (via subsistence agriculture, crop switches, smuggling, migration) rather than voicing their concerns collectively. He places much weight on the large number of them in scattered locations and the high costs for them of lobbying, organization, negotiation and communication. Herbst (1990) takes the view that the opportunities for poor African agriculturalists to “exit” by migration are becoming increasingly limited, and thinks that there will be political consequences if they exercise their “voice” instead (Healey & Robinson, 1992).

- The urban elites, to whom the power was given at independence, were afraid to lose it to strong rural organizations. In fact, in many cases, they dismantled existing farmers’ organizations which were instrumental in the struggle for independence.

These reasons were reiterated by leaders of farmers’ organizations and managers of public institutions, at least in Burkina Faso. It is also important to emphasize that the development theories of the 1960s and 1970s, in general, did not take a positive view of the role of local organizations in the development process. This was due to the importance of the role assigned to the central government and this reinforced the position of many African leaders (Esman and Uphoff, 1984).

In all three cases there is some ambiguity in the attitude of the government toward farmers’ organizations. The government is supportive of limited-size organizations such as small-size cooperatives, producers’ unions and self-help groups which undertake activities complementary to its own development activities. The government is more restrictive towards large advocacy-oriented organizations. The government can preempt the emergence of an effective organization for advocacy by creating one itself as is the case in Ghana (Tsini *et al.*, 1994).

However, the situation is evolving favorably for farmers’ organizations for several reasons:

- the erosion of the governments’ capacity to respond to the needs of rural people because of the financial crisis;
- the restrictions on the domains of public intervention, the call for privatization and the fiscal policies imposed by the structural adjustment programs;
- the democratization process which allows interest groups to be more vocal; and
- the pressure from donors to involve farmers more actively in development projects.

It was also found that the involvement of farmers and their organizations can improve when strategic alliances with them are important to resist pressure or to fight opposition from other segments of the population. This was the case in Burkina Faso during the revolution. Elsewhere in Africa, political parties are struggling to create farmers’ organizations as

a way of reinforcing their constituencies. In Côte d'Ivoire, for example, the newly created farmers' organizations were initiated by the major political parties.

Some organizations, especially the local groups, have motivation problems because their members are neither well informed nor well prepared before they join the organizations. In some cases, it looks as though some members join because it is simply better to be within the organization than out of it. Poor literacy, vulnerability to external control, and the use of traditional decision-making processes, instead of those of the bylaws as underscored by Gubbels (1993), are other shortcomings of the local groups.

Managerial and logistical problems were also reported. In addition, if on paper these organizations seem to be run on a democratic basis, in reality, several of them are controlled by a small number of farmers, generally the wealthy ones. In short, several organizations/groups would not score highly if they were to be assessed using the following IFAP criteria:

- degree of representation with respect to the farming community in the country;
- democracy in the internal functioning of the organization, regularity of election, etc.;
- accountability;
- transparency of procedures;
- credibility *vis à vis* membership, public, governmental and other institutions.

This situation is mostly due to historical reasons, the socioeconomic and political context of the organizations and some of the issues listed by Gubbels (1993).

It is also important to emphasize that almost all the organizations found in the different categories, except the traditional associations/groups, are dependent in one way or another on outside donor funds. This is the case, for example, for the KNFU which has been supported for years by the Scandinavian countries, or the FUGN which receives financial support from two NGOs, themselves financed by European donors. Most of the organizations will collapse without external donor funds and their financial self-sustainability is unlikely in the near future.

Women farmers in general tend to be less organized. When they are members of an organization, they play a relatively less active role in terms of management, the sole exception being the FUGN in Burkina Faso, where women represent 52% of the membership and have the same number of representatives as the men on all the committees. The discrimination against women stems from their limited resources (land, especially) and some social rules which exclude them from the decision-making process. Women may have their own organizations, but when it comes to important decisions they have to follow the views of the men.

Linkage Policies of Farmers' Organizations

State of the Art

The farmers' organizations encountered can be grouped into four categories in terms of linkages. The first category consists of organizations with an explicit linkage policy which is effectively implemented. Only one organization was found in that category. It is the FUGN of Burkina Faso which, in 1993, formally approached the INERA and requested the establishment of full cooperation for generating and transferring technologies to its members. The areas and mechanisms for cooperation, and the resources to be provided by the FUGN are clearly specified in the agreement document. Before seeking full collaboration,

the FUGN started implementing a research project on cowpeas in northern Burkina Faso in cooperation with the INERA in 1992. The proposal for the project was jointly developed and funds were jointly sought for its implementation. In the years before this project, collaboration was limited to ad hoc and informal contacts initiated by the FUGN to get whatever technologies it needed from the INERA (Dabiré *et al.*, 1995).

The second group of organizations is those with an explicit linkage policy but which have only informal contacts with research. Three such organizations were encountered:

- The KNFU of Kenya has established study groups which use material it produces from KARI publications (Waweru, 1991). Even though this is done without any direct involvement of scientists from KARI, the approach relies heavily on KARI's research results which are obtained through informal mechanisms, such as obtaining research reports. Members of the KNFU also sit on the center committees of KARI, in their own capacity, and are able to obtain useful information which can be used in defining the content of the study groups.
- Some commodity cooperatives such as the Coffee Farmers' Cooperatives in Kenya. These cooperatives organize seminars for their members and invite both researchers and extension agents to attend as resource personnel. Even though the seminars are on coffee and the participating researchers are from the Coffee Foundation, they are, from time to time, attended by scientists from KARI. Materials from both the Coffee Foundation and KARI are used as the basis for these seminars. These cooperatives have also planned annual training programs for their members as required by the cooperative regulations, and the implementation of the programs may call for assistance from KARI in addition to that provided by their own foundation. Some of them also hire technical professionals to advise their members on specific issues. However, providing these services to their members depends to a great extent on the financial endowment of the cooperatives (Wuyts-Fivawo and Sum, 1995).
- The Association of Poultry Producers in Ghana. This Association also used to link informally with research in order to seek specific assistance, but because of the financial difficulties facing the Association, these informal contacts have stopped (Tsini *et al.*, 1994).

The third category is made up of a set of organizations without any explicit linkage policy but which have been drafted into linkage activities either by research or extension. Several of the organizations encountered were in that category which includes:

- informal contact groups in all three countries; the contacts are often through the extension services;
- multipurpose local- or communal-level associations; in all three countries these associations are often those involved in on-farm research;
- the local-, district- and national-level cooperatives, especially in Kenya and to a lesser extent in Ghana; links here are often ad hoc; and
- national farmers' associations; the Ghana Cocoa, Coffee and Sheanut Growers' Association has members sitting on the committees of the Cocoa Research Institute of Ghana at the request of the government.

The fourth category includes the organizations/groups which have not had any contact with research and these are the majority of the organizations/groups encountered in the study. Most of the contact groups formed by the extension services, the multipurpose associations, and almost all the traditional associations are in this category. Interestingly, many of them

are unable to make a distinction between research and extension services and some of them completely ignore the existence of research.

The differences among farmers' organizations in terms of how they behave with regard to linkages cannot be traced back to their attributes as described in Table 1. Instead, an in-depth analysis of the leadership and the history of the organizations reveals that those with a linkage policy have strong working relationships with other farmers' organizations based in western countries. These organizations, especially those with a national dimension, have also benefited from technical assistance on technology-related issues from external organizations. This has led them to recognize that access to agricultural technologies is a key service to their members.

The KNFU, for example, is a member of the International Federation of Agricultural Producers (IFAP) and has had working relationships with Swedish farmers' organizations which also financially support the study group program. Furthermore, the KNFU was originally created for commercial farmers during colonial era and was somewhat influenced by the model prevailing in Great Britain at that time which emphasized linkages with research.

The FUGN, through its supporting NGO, has been working with farmers' organizations based in France and its leaders have attended many international conferences and workshops on farmers' organizations. The French farmers' organizations have also financed technology-related assistance, e.g. trials conducted by agronomists. "Six S", the NGO providing technical assistance to the FUGN is international, with a strong agricultural technology orientation. The same is also true for the other organizations with linkage policies, such as the Ghana Poultry Association which received support from international NGOs.

Awareness among the leaders of farmers' organizations regarding the possibility of, and the expected gains from, linkages is a key factor determining whether or not the organizations will have an explicit linkage policy. Awareness among the leaders seems to have been supplemented by financial, technical, and moral support from external organizations.

The following questions arise when assessing the present situation:

- Why are some organizations unaware of the possibility of linking with research?
- Why do those organizations which are aware not have a linkage policy.
- Why do some of the organizations which do have a linkage policy not fully implement it?

The following section provides explanations based on the information given by leaders of farmers' organizations and managers of research.

Why Some Organizations Are Not Aware of the Possibility of Linking with Research

According to farmers' organizations/groups there are two reasons why some of them are unaware of the possibility of linking with research. The first is the lack of information regarding the possibility of, and the gains from, linking with research. The public institutions which help form the organizations, or which provide them with technical assistance, do not have technology-related issues in their programs. Consequently, they have never mentioned the possibility of linking to the organizations and no other public institution has provided that information. These public institutions only deal with cooperative laws and management-related issues. In none of the countries did information on public institutions and linkages with these public institutions form part of the assistance provided to farmers' organizations.

Moreover, the official documents and regulations for farmers' groups and cooperatives focus on access to agricultural inputs, credits and markets as the primary objectives of these organizations. Some social and educational objectives may be added to the objectives of local organizations. As stated by Mwape (1994), the organizations are not expected to act as interest groups representing farmers' interests, most of them are simple vehicles for implementing government policies. No provision is made for farmers' organizations to play an advocacy role. It is not surprising that access to agricultural technologies is not found to be one of the major objectives of the organizations. Access to technology is perceived as the responsibility of individual farmers. Even when finding a technological solution becomes a concern of the organization, because of a serious problem such as the outbreak of disease, the extension services are perceived as the sources of technologies. In such a case, the organization can only informally inform the extension service without having any real power to exert pressure on the service for a quick solution.

The second reason why farmers' organizations are unaware of the possibility of linking with research implies that they are aware that linkages can be established, but that they believe that the initiative to establish such linkages lies with the public institutions. Some farmers' organizations/groups were really surprised when they were asked why they have not established any linkages with research. The answer often was that they had not been approached by research and it was not up to them to make an approach.

This view on how links are to be established is in line with the overall development policy and the perceived role of farmers and their organizations in the economic development process. Farmers' organizations have passively accepted the role assigned to them in the development process. Farmers are still seen and treated as passive receivers and implementers of orders and decisions, not as actors in the planning and formulation of development decisions. This treatment stems from the fear that strong political leaders may emerge in rural areas, as discussed earlier. This fear has been reinforced by the erroneous assumptions that: (a) the capacity to make rational choices at any level is a function of the level of education; and (b) that any choice made by public institutions is necessarily the best for farmers. These assumptions underlie most researchers' belief that if agricultural development is to take place they are the ones who should make the technological choices for farmers. The idea that researchers are in a better position to make decisions on behalf of farmers was found to be strong within the scientific community.

It should be noted that the perception of farmers as passive recipients of assistance and their exclusion from the decision-making process are not specific to agricultural research. This is also the case in other sectors where reasons such as the poor degree of organization of farmers, and their illiteracy and conservatism have been used to exclude them from the decision-making process. These reasons, which may not withstand an in-depth analysis, were mentioned several times by managers of research and extension, researchers, and extension agents.

Leaders of farmers' organizations still believe that, in spite of the rhetoric of recent years concerning the more active participation of farmers in the development process, farmers and their organizations are not really "welcome" in the decision-making process at any level, but especially at the policy level.

When they were told that involvement in research *per se* could not be seen as a threat by the government, some farmers' leaders said that this was not the view of policy-makers who, they felt, would raise the following question: "What insurance do we have that, if empowered to influence the research agenda, farmers' organizations will not challenge the government on pricing and on overall development policies?" Policy-makers in Burkina Faso who were confronted with this view did not explicitly confirm the analysis of the lead-

ers of farmers' organizations, but they gave the impression that this concern was valid. In short, the policy environment is not enabling for linkages and farmers' organizations are still viewed as a threat by policy-makers, who are very selective in involving them in the policy decision-making process.

As an illustration of policy-makers' resistance to change, in the three countries studied, the various devices used to reduce the power of farmers' organizations, to hinder the emergence of strong organizations, or to control existing ones have not yet been revised as a consequence of the democratization process or the call for a greater role for farmers' organizations. The recent attempt by the Government of Ghana to establish a national farmers' and fishermen's association, for example, is seen by many observers in Ghana as a means to preempt the emergence of a genuine and autonomous farmers' organization (Tsini *et al.*, 1994).

Why Some Informed Organizations Do Not Have a Linkage Policy

Some of the farmers' organizations which are aware of the possibility of establishing linkages with research have not made the move in that direction for several reasons. The first is the place that access to agricultural technology occupies among the objectives of the organizations. As noted earlier, the objectives of the farmers' organizations and cooperatives are, primarily, access to agricultural inputs, credits and markets. In addition, some social and educational objectives are included in the objectives of local organizations. Access to agricultural technologies was not found to be one of the major objectives and was left to each individual member. This is the case in many district unions/cooperatives in Kenya (Wuyts-Fivawo and Sum, 1995) as well as in the Cotton Growers' Association in Mali (Bingen, 1995).

The second reason, related to the first, concerns the expected gains from linkages. This is also one of the key considerations. For several reasons, the leaders of some of the organizations are skeptical about the benefit to be derived from linking with research, the most important one being the lack of accountability of research *vis à vis* the farmers' organizations. Some leaders think that as long as research is financed by public funds and does not receive direct financial support from farmers, it will pursue the objectives of the government, and farmers' organizations will have no chance to influence the research agenda. Other organizations, such as some cooperatives in Kenya, are aware of the high regard their members have for improved technology, but they have somewhat refrained from establishing links with research institutions because they find the work of the research institutes too academic. According to these organizations, the expected gains from linkages might not be greater than the costs, and this explains why they focus on issues such as marketing and credit which can benefit their members more in terms of income. The time it takes to achieve a significant contribution from research is another consideration because the timescale seems too long for those organizations which have several immediate concerns.

Finally, the passiveness of most of the farmers' organizations, especially the small ones, may be due to the type of membership. Most of the members are small-scale farmers and, according to IFAP (1994), partly due to political and historical reasons, small-scale farmers have been silent, preferring not to voice their ideas. This argument can also be seen in terms of opportunity costs for the subsistence African farmers not to link with research. This is in line with their preference for an "exit" strategy as discussed by Hyden (1983).

Why There Are Differences in the Degree of Implementation of Policies

For those farmers' organizations that do have an explicit linkage policy there are differences in the degree of implementation of these policies. These differences stem from the variation among the three countries in the degree of government acceptance of farmers' organizations and NGOs in the development process.

Following the 1983 revolution in Burkina Faso, farmers, for both strategic and political reasons, were put at the center of development. Serious efforts were made to make them more active in the decision-making process. A special ministry was created to achieve this aim. NGOs were encouraged and their activities were taken into account in the national plan. Fiscal incentives were even provided to encourage their activities. Even though all the mechanisms for linking these organizations and public institutions were not worked out, the achievements of the revolution remain and the new government has pursued the same strategy of involving farmers' in the development process. Several events which took place recently underline the willingness of the government to see farmers' organizations play an active role. Last April, a national forum was held to discuss how the contributions from NGOs can be made more effective, and a special session was held on linkages between research and NGOs. Also, representatives of the major farmers' organizations were active participants at a national meeting to discuss the new economic development strategy after the devaluation of the CFA franc in January 1994. The "distance" between farmers and public servants is felt less in that country.

The Governments of Kenya and Ghana have, for political reasons, been less innovative and more control still exists over farmers' organizations and NGOs. The last attempt by the Kenyan government to establish a coordinating body for NGOs is an indication of this control. The organizations with a linkage policy in these two countries have not been very active in linking with research because of the distribution of gains from linkages. The expected gains could not, as mentioned by some managers, cover the potential losses.

Even with the political changes going on in these countries, the farmers' organizations have not received a clear signal that the role assigned to them in the development process should change. In Kenya, reluctance to move towards stronger linkages with research still prevails even though some organizations, such as the KNFU, are willing to attempt to establish more direct links with the KARI.

In Ghana, the latest move by the government in setting up the GNAFF can be interpreted in two ways. According to the officials the new organization will facilitate farmers' participation in the decision-making process. Others believe that it is a setback for farmers as it is a strategy for controlling their activities. The position of the latter group is emphasized by the active role of the Ministry of Food and Agriculture in establishing the GNAFF, organizing the elections of the leaders at different levels, and making it the sole representative of farmers.

5. Non-Governmental Organizations (NGOs)

Types, Functions, and Problems

Several types of NGOs are found in all three countries. There are local, national, regional and international NGOs and the international ones are from more than 20 countries, in particular from Western Europe, the United States and Canada. Several of these international NGOs have a religious background or are financed by religious groups. Even though these organizations have been operational in Africa since the sixties, their number has grown rapidly in each of the three countries over the last decade. The pauperization process, the failure and decay of public institutions, the effects of drought on the rural population, and the change in the opinion of bilateral and multilateral donors toward these organizations explain such evolution. Many donors believe that NGOs will be more effective where public institutions have failed; there is what Vivian (1994) calls the “magic bullets syndrome” about African NGOs in the minds of some donors and development agencies.

Agriculture, natural resource management, particularly erosion control, soil fertility restoration, watershed management, and social activities are the major areas of NGO intervention in the three countries and this is in line with their major objective of poverty alleviation on a sustainable basis. Table 2 shows the distribution of NGOs by major area of activity in Burkina Faso. While such distribution figures are not available for Kenya and Ghana one can assert that the overall pattern is the same in all three countries. However, energy saving, forestry, adaptive research, and seed production activities seem to be more widespread in Ghana and Kenya than in Burkina Faso, where more focus is put on hunger relief activities such as food aid and cereal banks management. A Canadian NGO, “Union de Producteurs Agricoles”, for example, is using a modified forward-pricing approach, in collaboration with village-level organizations, to balance the interseasonal supply and demand of grains in the northwestern part of Burkina Faso.

Table 2. Distribution of NGOs by Major Domain of Activity in Burkina Faso

Domain of activity	Number of NGOs
Agriculture	78
Livestock	14
Environment	31
Training of farmers	63
Funding of development projects	21
Water management and distribution	81
Health	67
Social activities	68
Cultural and religious activities	12
Other activities	32

Source: Estimated from BSONG data (1993).

The total number of NGOs in the study was 165. Many NGOs are involved in more than one domain of activity.

Financing the development projects of other NGOs or of public institutions is another domain of intervention. Fondation Jean Paul II, an NGO established after the visit of the Pope to the Sahel is one such NGO (Dabiré *et al.*, 1995).

In Kenya, the empowerment of local organizations seems to be one of the objectives of NGOs such as the Kenyan Energy and Environmental Non-Governmental Organizations (KENGO) and those affiliated to the Catholic Church (Copestake, 1993). KENGO, for example, is very active in increasing the awareness of both rural and urban communities of their right to fight for the protection of their environment. In Burkina Faso, empowerment of farmers' organizations does not seem to be an explicit objective of the NGOs (Dabiré *et al.*, 1995).

NGOs, especially the local ones, are highly dependent on external resources and this can, in many cases, make their activities non-sustainable. Even though they may be involved in activities in several parts of the country, the spatial area covered in a given region is often very limited, and that itself reduces the impact of a given intervention.

In all three countries, NGOs have tried to coordinate their efforts, and reinforce their bargaining power *vis à vis* the public institutions by establishing coordinating bodies, such as the Secrétariat Permanent des Organisations Non-Gouvernementales (BSONG) in Burkina Faso. In some cases such mechanisms are also used to secure funds.

The governments have also set up a special bodies or units to deal with NGO matters. However, while in Burkina Faso and Ghana such a public move is to facilitate the implementation and the operations of these organizations, it seems that in Kenya the objective is to control and monitor their activities. This attempt by the Kenyan government to have more control over NGOs has created some resentment among the NGO community.

Linkage Policies

None of the NGOs interviewed in the three countries has an explicit linkage policy with research. However, many of those involved in the agricultural and natural resource management sectors have some linkage practices. Often these practices are ad hoc and informal, as reported by Wellard and Copestake (1993). The links are often in the form of contacts with individual scientists or visits to a research station to obtain specific information or technology. Through such contacts, NGOs obtain technologies for further testing or dissemination of seeds for multiplication/distribution.

Despite the lack of explicit linkage policy NGOs are responding more and more positively to invitations from the research institutes to participate in program planning or review meetings. This is being formalized in Burkina Faso and Ghana. In Kenya, such practices have not yet happened with KARI, even though they exist with other research institutes and centers.

Another interesting form of linking is the sharing of scientists by a research center and an NGO. This is, for example, the case with some scientists from KENGO who are also university staff. A similar situation was also found in Ghana.

Collaboration between NGOs and research institutes for on-farm trials is another usual practice in all three countries, even though KARI as such is not involved in this form of collaboration. FSR teams in INERA in Burkina Faso, and in Ghana, have used these means of collaboration, the process being initiated by either one of the parties.

In a few cases in Burkina Faso, NGOs and INERA have signed formal financial agreements for specific technological generation activities. Both parties have found such forms of collaboration very useful and positive.

In Kenya, KENGO has a richer experience in linking with research institutes. It has formal links with:

- the Department of Food Science and Technology of the university;
- the Kenyan Industrial Research Institute;
- Jomo Kenyatta College of Sciences and Technologies;
- the Kenya Forestry Research Institute.

Other formal collaboration between NGOs and research institutes other than KARI have been documented (Wellard and Copestake, 1993). Care-Kenya and KEFRI (Kenya Forestry Research Institute), for example have been collaborating on a joint agro-forestry research project in the Siaya District since 1985 (Charles and Wellard, 1993).

Not only do the above institutions provide support to KENGO in terms of basic and applied research, but also some university students are sent to KENGO to work on their thesis. However, as far as KARI is concerned, the only contact has been limited to using some of its scientists as a resource on a private basis.

In spite of these links, the general situation is that there are not enough linkages between NGOs and public research institutions, and some NGOs are still reluctant to establish any kind of link with these institutions. Other NGOs wish that there were more linkages and are eager to develop them, even though there is still a lot of suspicion between NGOs and the public research institutions in all three countries. Many NGOs wish they could influence the research agenda to make it more relevant to their own activities, which they perceive as similar to what the farmers want, and also to involve research more in their projects, especially at the farm level. The NGOs which are reluctant to link either question the relevance of the research, as reported by Wellard and Copestake (1993), or, in a few cases, have had a bad experience with the research system.

As with farmers' organizations, there are some NGOs who are also unaware of the possibility of linking with research and do not know much about the ongoing activities of research. Most of these are local NGOs. These have a tendency to deal with extension services when it comes to technological matters.

According to several NGOs, the situation in terms of linkages has improved significantly over the last five years, for reasons such as NGOs hiring staff who previously worked with the research institutes, and graduates from the same universities as some scientists from the research institutes. Scientists have also approached NGOs working in their own area of origin and have in some cases made valuable recommendations or suggestions to NGOs. Finally, there is no evidence that salary differentials have altered linkages between research and NGOs, because the differentials which favor those working in NGOs are compensated by a higher social status and the job security enjoyed by the scientists in public research institutes.

6. Linkage Policies and Practices of Research and Extension

In this section, the linkage policies and practices of public research and extension institutions are discussed. It is important to note that the analysis is only relevant for the institutions covered. Since not all the agricultural research institutes were covered by the study, the conclusions cannot be generalized to the whole sector.

Linkage Policies and Practices of Research

With reference to the linkage practices in western countries, it is expected that the research institutes will have a linkage policy (implicit or explicit) which is widely understood by managers at various levels and by researchers. This policy can be positive, negative, or neutral with regard to linkages with farmers' organizations, extension and other agrarian interest groups, especially NGOs. It can also differ according to the types of farmers' organizations (e.g. linkages may be encouraged with commercial farmers' associations only) or agrarian interest groups (e.g. linkages with international NGOs only).

It was found that in none of the three countries, did the research institutes studied have an explicit linkage policy with farmers' organizations. Linking with these organizations is not written into any of their official documents and is not compulsory. However, it is mentioned in the bylaws or statutes of the institutes that they should collaborate with farmers to generate technologies relevant to producers' needs. Each institute has acted on this element of its bylaw and has established some linkages with individual farmers and/or farmers' organizations.

In Burkina Faso, INERA, until recently, only had a set of linkage practices which involved certain types of farmers' organizations. Representatives of village-level farmers' groups are invited to the technical center and the program committee meetings. Farmers from the same organizations are also involved in on-farm and/or multilocal trials. Recently, INERA has established full partnership with the "Naam" Federation (Dabiré *et al.*, 1995) as discussed earlier.

In Ghana, ad hoc and informal contacts between research and representatives of farmers' organizations are very common at the level of adaptive research. This is the case for the CIDA grain project of the Crop Research Institute and the trials conducted by Crop Services. In addition, representatives of Cocoa farmers' associations sit on the Cocoa Board where policy decisions with regard to the cocoa industry, including technology-related issues, are made.

In Kenya, individual farmers sit on the board of KARI. Others are also invited to the technical center and the commodity committees. However, these are individual farmers selected by policy-makers or by the management of KARI. They do not represent any specific organization, though they may be members of KNFU or a cooperative. The FSR team also has contacts with farmers but again these are individual farmers or farmers from local groups. KARI managers have stated that farming systems research and strong linkages with extension services are the major means of bringing a farmers' perspective into its research agenda (Ndiritu, 1991).

In the three countries, other contacts are made either with representatives of farmers' organizations or with individual farmers through the mechanisms set up by the extension service as part of the T&V approach. But, as will be discussed later, these contacts are in-

tended to facilitate the transfer of technologies already generated and are often with local groups or contact groups formed by the extension services.

The most striking aspect of the situation is that linking with farmers' organizations and NGOs does not appear to be a need felt by many managers of the research institutes covered. They seem to be satisfied with the prevailing situation which is not a surprise since, as will be shown later, the existing situation is favorable to them. In some cases, the contacts they have with farmers or with representatives of farmers' organizations were initially imposed by donors through the approach to research (FSR/OFCOR), or extension (T&V), or are part of the design of the system. Some researchers and managers at the operational level are even resentful about donor pressure to link with farmers.

Linkage Policies and Practices of Extension

Traditionally, agricultural extension is viewed as the primary mechanism for the dissemination of improved technology to farmers. As such it can initiate, facilitate, or discourage direct and indirect linkages between farmers and research and between research and agrarian interest groups. Extension may have an explicit or implicit policy with regard to these linkages.

The key feature in terms of linkages as far as the extension service is concerned, is that it has set up mechanisms as part of the T&V approach which allow direct contact between researchers and farmers. In some cases, it also assists the research system to implement linkage mechanisms with farmers (FSR/OFCOR). However, all these linkage activities are intended to facilitate the transfer of existing technologies and the farmers are not necessarily from farmers' organizations. When they are, the organizations are generally approached because they facilitate the choice of farmers and the extension service is not really interested in working with the organizations *per se*.

The extension services in all three countries have helped to form village/community-level associations and provide assistance to these associations on both managerial and technical matters. In Kenya, the local- and district-level cooperatives still receive assistance from the extension branch of the Ministry of Cooperatives. The same type of service is provided by the Ministry of Social Welfare of Ghana and the Department of "Action Cooperative Paysanne" in Burkina Faso. But in none of the cases, has an organization been advised to link directly with research. In fact, the extension services consider themselves as the sole institutions in charge of linking research and farmers as far as technological issues are concerned. The intervention of any other organization is perceived as an intrusion into their territory and in some cases as a threat to their own existence. There is a real fear that direct linkage between researchers and farmers' organizations will be made at the expense of those between research and the extension services. During the interviews, the message sent out by the extension services was that there should be more contact between researchers and farmers but that this should be done in collaboration with extension agents. In short, the extension services simply want to improve upon the existing system whereby researchers and farmers meet through them.

Extension managers and agents perceive direct linkages between research and farmers' organizations as a threat. There is some resistance to change and extension has promoted these linkages only up to the point where they do not encroach on what it perceives as its "own prerogatives". There is real "territorial behavior" on behalf of the extension services. This is why linkages promoted by the extension services are on the transfer side. These services see input into the research agenda and feedback on technologies as their "do-

main". There is a problem of awareness and lack of information on the part of extension service managers and agents. The contribution of direct linkages between research and farmers' organizations to the effectiveness of the technology systems of developed countries is unknown by most extension service managers.

This situation is also reinforced by the idea that only extension agents have the basic training to make effective contacts with farmers. This idea is shared by both researchers and extension managers and officers.

The T&V approach to extension may have revitalized the linear model. This is at least the case in Ghana where efforts were made to do away with the linear model before the adoption of the T&V approach (Tsini *et al.*, 1994). In none of the three countries, did the close research-extension linkage and farmer feedback claimed by this approach take place. Moreover, there seems to be duplication of effort and competition between the extension services and the FSR programs over who should identify farmers' needs.

Factors Explaining the Absence of Explicit Linkage Policies

Several interrelated factors explain the absence of an explicit linkage policy for the research institutes to link with farmers' organizations. The major ones seem to be:

- the role of farmers' organizations in the development process;
- the research policy;
- the strong adherence to the linear model of technology transfer by research and extension;
- the ambivalence of the FSR approach; and
- expected gains from linkages.

The Role of Farmers' Organizations in the Development Process

The overall development strategies and the perceived role of farmers and their organizations in the development process, which were discussed earlier, are strong factors explaining the lack of explicit linkage policies. In Ghana, for example, some scientists argued that the overall development process will be slowed down if farmers are the ones to make decisions with regard to which types of technologies should be developed. Moreover, even when managers are convinced of the need to link with farmers' organizations, there is still some hesitation because of the absence of new, explicit policy guidelines from the highest level of the administration on how public institutions should deal with non-governmental organizations in the light of the recent political and socio-economic changes. For example, one issue raised in Burkina Faso was how can the research system alone treat farmers' organizations as partners without being perceived as subversive if other government bodies maintain the status quo? Furthermore, if farmers' organizations should be involved in decision-making, other areas of agricultural policy making, such as pricing, and marketing, which have a direct and immediate effect on farmers should be the first to experience the change in the decision-making process.

A few managers and researchers also questioned the rationale of having farmers' organizations influence the research agenda since these organizations do not contribute directly to financing research. According to these managers and researchers, research has no reason to be accountable to farmers' organizations and it is unfortunate to attempt to transplant what is going on between research and farmers' organizations in the western world to Africa.

The Agricultural Research Policy

Even though making technologies available to farmers is the key objective of the research institutions in the three countries, the research policies were not explicit enough on how these institutions should proceed to achieve that objective. The overall approach followed is similar that of the other public institutions as far as farmers' involvement in the decision-making process is concerned. This situation is reinforced by the absence of clear indicators, and monitoring and evaluation system to assess whether the institutions are achieving their objectives. It seems as though nobody really cares about the contribution of research to agricultural development, in spite of the rhetoric about agricultural research being one of the key instruments in achieving that aim.

Recently, owing to donor pressure, the research institutions are in one way or another being forced to take into account users' perspectives in designing the research agenda. As a consequence, attempts are made here and there to involve farmers in planning and priority setting at various levels. New practices have been adopted but in fact, neither the policies nor the culture of the institutions have changed, and there are clear indications that, in many cases, what is actually done by many scientists does not reflect these new perspectives. There are no mechanisms to ensure that these perspectives are taken into account, nor any sanctions with regard to the actions of the scientists. One of the key findings of this study is that many scientists perceive linkages as being supplemental to their normal scientific assignment.

Moreover, in all the three countries the existing incentive structure does not motivate researchers to pursue links with farmers and their organizations, because it does not take into account linkages when assessing their achievements. In the case of Burkina Faso, for example, where the assessment of researchers' performance is based only on their scientific publications, researchers could be penalized by becoming heavily involved in linkage-related activities. The negative effects of the incentive structure with regard to linkages with users have already been well documented in ISNAR's previous work on linkages (Eponou, 1993; Merrill-Sands and Kamowitz, 1990). This is seen by many extension service managers as one of the key factors hindering linkages between research and its partners.

The Strong Adherence to the Linear Model

One of the key factors explaining the present position of research and extension with regard to linking with farmers' organizations is the strong adherence to the linear model of technology transfer. For historical reasons, the linear model of technology generation and transfer was the first to be introduced in the three countries studied and it has strongly influenced their agricultural technology systems. The linear model, found in a large percentage of national research and transfer systems, operates according to the following principles (Röling and Seeger, 1992):

- Research, as representative of the scientific method, considers itself to be the sole source of technology.
- Knowledge generation, transfer, and use are sequential, but without any interaction or feedback loops.

- There is a science-practice continuum. The sequence is basic research, applied research, adaptive research, action by subject-matter specialists, extension, and application by farmers. The institutions of the system are organized accordingly. There is no need for synergy and there is a clear division of labor: research generates technology; technology transfer delivers technology to farmers; and farmers use technology.
- There is no collective responsibility for the outcome of joint effort, and research does not necessarily see the generation of practical technologies as the required output of its efforts.

The basic view underlying this model is that technology is generated by research, transferred by extension, then utilized by farmers in a simple sequential process. This view assumes that research is at the beginning of the innovation process — that research initiates and gives the process direction. It also implies that the effectiveness of the process depends solely on the successful implementation of the independent roles of the research and extension organizations. Accordingly, because the roles are sequential and not necessarily inter-related, they can be assessed in isolation from each other. Farmers do not play any role in the process of technology generation.

On several occasions these principles were stressed by researchers and extension agents. Some leaders of farmers' organizations also believe that is the way the system should function.

One of the key effects of the intensive use of the linear model is the "cultural gap" between researchers and farmers which makes any form of collaboration between the two groups difficult. Many scientists do not know how to "manage" the collaboration with farmers and their organizations and this was acknowledged by many research managers in all three countries. In Ghana, for example, some scientists asserted that to ensure effective collaboration between researchers and farmers' organizations, the former may have to receive some training in extension sciences.

The T&V approach to extension, adopted recently, may have revitalized the linear model. This is at least the case in Ghana where efforts were made to do away with the linear model before the adoption of the T&V approach (Tsini *et al.*, 1994). The formalization of the diagnosis of farmers' needs by extension agents and of the mechanisms for channeling these needs to research has made some extension managers and agents believe that there is no need for direct links between researchers and farmers beyond what the extension service is already providing. The problem, however, is that the close research-extension linkages and farmer feedback claimed by this approach have not taken place. Moreover, there seems to be duplication of effort and competition between the extension services and the FSR programs over who should identify farmers' needs.

The Ambivalence of FSR

The ambivalent place of the FSR paradigm within the research institutes is another factor explaining the absence of explicit linkage policies. FSR might have played an important role in setting the forum for collaboration between research and farmers but it is being used as an alibi to avoid other forms of farmers' participation in the research process. Most managers and scientists believe that FSR is the best approach to link research to farmers and have relied on it as the key mechanism. In spite of its limitations, especially farmers' incapacity to influence the research agenda and policies in a substantive way, and the lack of tangible results after several years of experience, it is still preferred within the research

institutes. In some cases, such as in KARI, some researchers wonder why they should go further than what they are already doing with the FSR teams. The preference for the FSR approach is in line with the argument that, left alone, research will attempt to link with farmers' groups at the operational level.

However, FSR is used as an excuse by some managers of research for not exploring other ways of linking with farmers. It was at times during the interviews obvious that some scientists, especially those who are not using the FSR approach, do not see its relevance and still question the rationale for having it within the institutes. This emphasizes the contribution of donor pressure, through "conditionality" in funding, to the establishment of linkages between research and farmers, because many scientists acknowledge the fact that the existing links have been imposed by donors. It can also be underlined that in the three countries studied, donors have played a greater role than the governments in enhancing the relevance of the research agenda and in facilitating the transfer of technologies by making linkages with farmers and their organizations part of their projects. Furthermore, almost all the FSR activities are financed by donors in all three countries.

The key lesson learned is that two decades of FSR have not drastically changed the culture of the research institutes in terms of involving farmers in the decision-making process. There are individual scientists who are fully open to this idea, but many more do not see its relevance and even perceive it as a practice imposed by donors.

Expected Gains from Linkages

Several issues related to linking with farmers' organizations were raised, including the following:

- There are many different types of farmer organizations. These organizations vary in terms of administrative coverage (local, provincial, national, international). Research cannot work with all the farmers' organizations in the country. It has to be selective. The question is with which organizations should research associate itself in order to improve its effectiveness? Is there a risk of creating equity problems?
- National organizations do not necessarily represent the interests of resource-poor farmers. These organizations are usually controlled by commercial farmers who may not be familiar with the problems faced by small-scale producers. If so, how can research get genuine inputs from resource-poor farmers? What changes are needed in the present program design approach used in many research systems?
- Sustainability is a serious problem with farmers' organizations, particularly those created with external support. Research is a long and slow process. How can research develop linkages with unstable organizations?
- Some governments have discouraged the formation of strong farmers' organizations. But the stronger the organizations, the better the linkages are likely to be. How can a public research institution work effectively with the existing farmers' organizations which are often weak?
- Most of the organizations have as members small scale farmers who cannot be effective actors for linkages as experiences from FSR have shown. Will the gains from their involvement be great enough to compensate for the additional costs?

The lessons to be derived from these questions are: (i) not enough thought has been given to linking with farmers' organizations by the research institutes; and (ii) there is still resistance from researchers to having these organizations as partners. However, there seems to be a

clear difference between the researchers who are familiar with on-farm research and those who have never been involved in that type of research, the latter being more conservative. This is expected because linking with farmers for on-station research presents more methodological and organizational challenges than for on-farm research. The new generation of researchers, in general, also seem more open to the idea of linking with farmers' organizations.

7. Analysis of the Existing Linkages

In this section, the existing linkage mechanisms that were encountered are described and the effectiveness of linkages between research and farmers' organizations are assessed. The assessment combines the views expressed by the various actors interviewed and the analysis of the situation by the research teams.

Attributes of Linkages and Linkage Mechanisms

The need to identify the key attributes of linkages stems from the proposition that there is a relationship between the effectiveness of linkages and the attributes of the mechanisms used to sustain them. These attributes are related to the nature of the mechanisms, the actors, and the use of the mechanisms. These three aspects or attributes are subsequently analyzed.

The Nature of the Mechanisms

The major variables retained here are those which are likely to influence the effectiveness of the linkage mechanisms and they are derived from past linkage studies (Eponou, 1993; Merrill-Sands and Kamowitz, 1990). These are:

The degree of formality of the linkage mechanisms. Although, under specific conditions, informal mechanisms can enhance linkages (Eponou, 1990), in general, the more formal the mechanisms, the greater is the likelihood that they will be sustainable, institutionalized, and binding for the parties. They are, therefore, more likely to be effective. As can be seen in Table 3, most of the existing mechanisms are formal. The degree of formality does not seem to be a problem.

The decision-making power attached to the mechanisms. Being binding for the parties and prescriptive, mechanisms which incorporate decision-making power stand a greater chance of achieving their objectives. Only three mechanisms had some kind of decision-making power attached to them but it was reported that these three mechanisms did not always make decisions and may be pure formalities. When decisions are made through these mechanisms, they are not always backed by financial resources because those who make resource allocation decisions are not always involved in the mechanisms.

The initiators of the mechanisms. Because whoever initiates a linkage mechanism has a tendency to control it, it seems likely that linkages are more balanced when the mechanisms are initiated by all the actors involved. In the three countries studied, most of the mechanisms are initiated by research and/or extension/projects.

Out of the sixteen mechanisms encountered in Burkina Faso, three are statutory (research), ten were initiated by research and extension, one by a farmers' organization, one jointly by research and a farmers' organization, and one by NGOs (Dabiré *et al.*, 1995). Many mechanisms have been established because of the farming systems research programs or projects which are fully externally funded. For example, three out of the eleven mechanisms found in Kenya are related to the farming systems research activities and three others are connected to the T&V project (Wuyts-Fivawo and Sum, 1995). Only a few mechanisms are part of the bylaws of the research institutes. Unfortunately, these mechanisms have a tendency to be-

Table 3. A Descriptive Typology of the Linkage Mechanism Encountered

Type of mechanism	Degree of formality	Administrative/ facilitative	Decision-making power	Origin/initiator	Content/ purpose	Administrative level	Actors	Locus of control
Management committee/ board	Very formal	Administrative	Yes in all cases	Government - part of the bylaw of the institute	Strategic/policy decision. strategic planning and steering of the organization	National	Representatives of key ministries; Director of institutes; representatives of farmers/farmer's organizations and extension services	Ministry of scientific research in principle but actually the research institute has the real control.
Program/ commodity committee	Formal	Can be either one or both	Purely consultative	Part of the bylaw or initiated by the institute	Program design and evaluation and priority setting within the program	National, but can also be regional	Representatives of farmers/farmers' organizations and NGOs; representatives of extension services; researchers of the program (some-times resource personnel are invited)	Research
Center technical/ advisory committee	Formal but sometimes informal contacts with NGOs	Either one or both	Purely consultative	Part of the bylaw or initiated by the institute or at the request of extension services or donors	Review and planning of the activities of the regional center	Regional	Representatives of farmers/farmers' organizations and NGOs; representatives of extension services; researchers of the program (sometimes resources persons are invited)	Research
Farming systems research activities	Partially formal	Facilitative	Consultative	Donors initially but more and more the institute	Adaptation of technologies to meet the needs of target groups and identification of needs and production conditions of these groups	National, regional, district and local	Researchers; individual farmers or selected farmers from local groups; regional, district, and local extension agents	Research

Table 3. A Descriptive Typology of the Linkage Mechanism Encountered (contd.)

Type of mechanism	Degree of formality	Administrative/ facilitative	Decision-making power	Origin/initiator	Content/ purpose	Administrative level	Actors	Locus of control
Meeting for planning extension service activities	Formal	Facilitative	Consultative	Initiated by extension service as part of the T&V approach	Planning and review of extension service annual activities	Regional	Researchers; individual farmers or selected farmers from local groups; regional, district, and local extension agents	Extension service
Monthly/bi-monthly T&V meetings	Formal for links between research and extension but informal for those with farmers and farmers' organizations	Facilitative	Consultative	Initiated by extension service as part of the T&V approach	Training of extension agents and joint visit to tests on farmers' plots	Regional	Researchers; local groups or ad hoc groups formed by extension; district, and local extension agents and subject-matter specialists	Extension service
Multilocal trials	Formal for links between research and extension but informal for those with farmers and farmers' organizations	Facilitative	Consultative	Initiated by extension service	Testing of new technologies in various agro-ecological zones to find out their degree of adaptability in these zones	Local	Researchers; extension agents from the R/D division; individual farmers or selected farmers from local groups	Shared by research and extension service
Joint research-extension on-farm trials	Formal but sometimes informal contact with NGOs	Facilitative	Consultative	Initiated by extension as part of the T&V approach	Testing of technologies on farmers' plots to verify their relevance with farmers	Local	Researchers; extension agents from the R/D division; individual farmers or selected farmers from local groups	Shared by research and extension service
Field days	Formal	Facilitative	Consultative	Initiated by research and extension services	Showing of research results to farmers and other users of agricultural technologies	Regional	Research ; extension; individual farmers and representatives of farmers' organizations; NGOs and other users of agricultural technologies	By research, if organized by research and by extension service if organized by it

Table 3. A Descriptive Typology of the Linkage Mechanism Encountered (contd.)

Type of mechanism	Degree of formality	Administrative/ facilitative	Decision-making power	Origin/initiator	Content/ purpose	Administrative level	Actors	Locus of control
Extension-research liaison officer position	Formal for links between research and extension but informal for those with farmers and farmers' organizations	Administrative but also facilitative	Consultative	Extension service	Ensuring permanent links between research and extension	National and regional	Extension agents	Extension
Farmers' organizations-extension joint training sessions	Partially formal	Facilitative	Consultative	Farmers' organizations	Obtention of information from research	Local	Farmers' organizations; extension service; research	Shared
Quarterly meetings	Formal	Facilitative	Consultative	Extension service	Discussion of commodity problems and seeking advice from research	Local	Extension service; local groups; research	Extension service
Commercial company seminars	Formal	Facilitative	Consultative	Commercial companies	Testing and demonstration of new technologies to farmers	Local	Commercial companies; farmers' organizations; extension service; research	Commercial companies
Contracts between NGOs and research	Formal	Facilitative	A decision-making power is attached	NGOs	Generation of specific knowledge or technologies for the contracting NGO	National, regional or local	NGO; farmers' organizations; research	Shared by research and NGOs

Table 3. A Descriptive Typology of the Linkage Mechanism Encountered (contd.)

Type of mechanism	Degree of formality	Administrative/ facilitative	Decision-making power	Origin/initiator	Content/ purpose	Administrative level	Actors	Locus of control
Memorandum of understanding between research and farmers' organizations	Formal	Facilitative	A decision-making power is attached	Farmers' organizations; research	Generation of specific knowledge or technologies for a farmers' organization	National, regional or local	Farmers' organizations; research; donors	
Technology release committee	Formal	Administrative						
Visits to research stations by farmers' organizations and NGOs	Informal	Facilitative	Consultative	Farmers' organizations; and NGOs	Obtention of specific information or products (seeds)	Regional	Farmers' organizations; NGOs; research	Shared by the actors
Publication of research	Informal	Facilitative	Consultative	Research	Dissemination of research results	National and regional	Research	Research
Informal contacts with individual scientists	Informal	Facilitative	Consultative	Farmers' organizations; and NGOs	Obtention of specific information or products	Regional or local	Farmers' organizations; NGOs; research	Shared by the actors

come simple routine according to the actors. The mechanisms set up by farmers' organizations/groups and NGOs are in the form of contracts or are informal and ad hoc. This is the case, for example, with those mechanisms set up by KNFU or the coffee cooperatives in Kenya. The agreement recently signed between INERA and the "Naam" Federation in Burkina Faso seems to be the only exception.

Administrative location of the mechanisms. Since the nature and the scope of the decisions made differ from one administrative level to another, the location of the mechanisms is indicative of the type of involvement of farmers in the research process. Mechanisms are found at the national, regional, and local levels. However, there are more at the local level. In Ghana, for example, seven out of the fourteen mechanisms encountered are at the local level (Tsini, *et al.*, 1994). This reflects the focus on technology consolidation and transfer. Actually, according to the researchers interviewed, not all the mechanisms at that level include seeking inputs from farmers as an important objective. Finding out whether technologies are suitable for the agro-ecological regions or attempting to transfer technologies are other objectives pursued through some of the mechanisms. This is the case with the multilocal trials or the mechanisms with contacts groups. In short, there is a bias toward transfer at the expense of ensuring relevance of technologies.

The control of the mechanisms. Strong control of the linkage mechanisms by one actor is likely to hinder the emergence of an effective partnership because, as stated previously, it affects the distribution of the benefits and costs. Most of the mechanisms are controlled by research; the locus of control is only shared when there is a contract or when the mechanisms are initiated by another actor such as extension or an NGO. In all three countries, the percentage of the mechanisms controlled solely by research is above 50%, and about half the remaining are jointly controlled by research together with the extension services.

The purposes of linking. A balance between seeking farmers' inputs and transferring technologies is desirable because it allows linkages to achieve their two broad objectives. The purposes seem diversified, but there are more purposes related to transferring technologies than to ensuring the relevance of technologies (formulation of research strategies, policies and programs and priority setting). At least 70 % of the mechanisms in Ghana seem to have the transfer of technologies as their main objective.

It is important to stress that these features are already indicative of problems related to the effectiveness of linkages; the most critical features, with regard to effectiveness, are the decision-making power, the control and the purposes of the mechanisms. The apathy of farmers' organizations in initiating mechanisms, as discussed, is also a problem since it is related to the control and the purposes of linkages. These are indications that the objectives pursued are those of research which focus more on technology transfer. In the three countries, the position of research in this respect is reinforced by that of the extension services which also do not seem to have a positive policy towards direct linkages between research and farmers' organizations.

The Actors

With regard to the actors, there are two major issues:

- The appropriateness of the representatives of the farming community. The first question is whether the farmers who are involved reflect the diversity and heterogeneity of the farming systems at the different administrative and decision-making levels of the process? If not, do those representing farmers have sufficient knowledge of the various systems in order to share their perspectives with research? To what extent are farmers' representatives able to speak on behalf of and accountable to the farming community.
- The capacity of representatives to participate effectively in linkage-related activities. This issue was raised several times by researchers.

The identified linkage mechanisms are described in Table 4 with a focus on the representation of farmers' organizations and NGOs. For technical reasons, it was difficult to investigate the second issue above.

At the policy and strategic decision-making level, there is a tendency to use individual farmers rather than representatives of farmers' organizations. This is the case in Kenya (Wuyts-Fivawo and Sum, 1995). The individual farmers are often well-to-do whose conditions of production are different from those of the majority of farmers. Even when the farmers are from the farmers' organizations, they are in a minority and are out-numbered by representatives of public institutions. In Burkina Faso for example, there is only one farmer among the twelve members of the management committee (Dabiré *et al.*, 1995). NGOs are not involved in the mechanisms at that level.

The difficulty of making farmers' representatives effective participants in linkage activities was raised on many occasions by researchers. The research institutes seem to be confronted with a dilemma, because often those farmers who can be effective participants are not really representative of the farming community and are not accountable to the resource-poor farmers whose needs should be preeminent.

Most of the representatives of farmers' organizations are often from local- or village-level organizations. In several cases, the farmers are selected by extension services and they are not always perceived and treated as representatives of these organizations. Actually, in these cases, the organizations provide a population of farmers from which "a sample of individual farmers" can be selected. The organizations/groups play somewhat a facilitating role in the process. This is often the case for the FSR activities, the multilocal trials and the mechanisms initiated by extension services. The focus on linkages with local organizations is not a surprise as it is coherent with the emphasis on transfer as an objective and on on-farm research as far as linkages are concerned.

Leaders and technicians from farmers' organizations are more involved in informal mechanisms, as is the case for the study groups and the farmers' seminars in Kenya. Leaders and technicians seem to be more active only in the case of the newly established links between the "Naam" Federation and INERA.

NGOs are not involved in many of the linkage mechanisms; they are actors in the linkages they initiate alone or jointly with research, the sole exception being the program/commodity committee and the technical center committee. Their participation in these committees is new, not fully institutionalized, and is not even valid in the Kenyan case.

There seems to be discrimination against women and their associations; women are less represented than men in linkage activities, though the situation is less pronounced in Burkina Faso than in the two other countries. In none of the countries were linkages between

Table 4. Representation of the Various Actors for Each of the Linkage Mechanisms Identified

Linkage mechanism	Farmers' organizations	Non-governmental organizations	Research	Public extension services
Management committee/board	Often individual farmers sit on them; one or two representatives of farmers organizations	no representation	Director of institute; some researchers may attend as observers	Top managers of agricultural extension
Program/commodity committee	A few individual farmers or representatives of farmers' organizations	A few representatives may attend the meetings	All the researchers working in the program are invited; researchers from other programs or institutes may participate	Extension managers and regional officers
Center technical committee	A few individual farmers or representatives of farmers' organizations	A few representatives may attend the meetings	All the researchers of the center are invited; researchers from other centers and institutes may participate	Regional extension officers
Farming systems research activities	Local groups; farmers selected from the groups; and individual farmers	Field-level agents	Farming systems research team; on-station researchers may be involved on specific issues	Regional extension officers, district level and front-line agents
Meetings for planning extension service activities	A few individual farmers or representatives of farmers' organizations	Managers of NGOs and field-level agents	Directors of regional centers and a few selected researchers (those involved in the on-farm trials)	Regional extension officers and district-level agents
Monthly/bimonthly T&V meetings	Local contact group farmers or individual farmers	Not involved	Selected researchers (selection based on the topics to be discussed)	Regional extension officers, district level agents and front-line agents
Multilocal trials	Local contact group farmers or individual farmers	Not involved	Selected on-station researchers	District-level agents
Joint research-extension on-farm trials	Local group, village group or individual farmers	Not involved	Selected on-station researchers and/or FSR team	R/D staff of extension service
Field days	Local group, village group or individual farmers	Leaders and agents in some cases	Research managers and scientists	Extension managers and agents
Extension-research liaison officer positions	Regional, district and local organizations and individual farmers	Leaders and agents in some cases	Managers of regional centers; FSR teams; individual scientists	Regional managers of extension; district-level agents

Table 4. Representation of the Various Actors for Each of the Linkage Mechanisms Identified (continued)

Linkage mechanism	Farmers' organizations	Non-governmental organizations	Research	Public extension services
Farmers' organizations-extension joint training session	Managers and members of farmers organizations	Not involved	Selected scientists	District-level agents
Quarterly meetings	Individual farmers or farmers from contact groups	Not involved	Selected scientists	Regional and district level managers and agents
Commercial company seminars	District-level managers and members	Not involved	Selected scientists and/or FSR teams	Regional, district level and front-line agents
Contracts between NGOs and research	Leaders and members of village groups or cooperatives	Leaders and technicians	National and/or regional managers of research and selected scientists	Not always involved
Contract between projects and research	Leaders and members of village groups or cooperatives	Leaders and agents in a few cases	National and/or regional managers and selected scientists	Not always involved. the project may have its own transfer agents
Technology release committee	Not involved	Not involved	National and/or regional managers and selected scientists	Managers of extension
Visits to research stations by farmers' organizations and NGOs	Leaders and/or technicians of farmers' organizations and/or cooperatives	Leaders and/or technicians of NGOs	Managers of research and/or individual scientists	Not involved
Publication of research	Leaders and technicians of farmers organizations and/or cooperatives	Leaders and/or technicians of NGOs	Publication units or managers of research	Managers of extension
Informal contacts with individual scientists	Leaders and technicians of farmers organizations and/or cooperatives	Leaders and/or technicians of NGOs	Managers of research, FSR team, and/or individual scientists	Managers of extension and individual agents

research and a women's organization/group reported. Perhaps linkages of this type did not occur because the NGOs which could assist women's organizations/groups often play an intermediary role.

These elements, relating to the representation of farmers and their organizations in linkage activities, also have a strong bearing on the effectiveness of linkages. The situation can be summarized as the inappropriate representation of farmers because those who represent them do not really do so and cannot influence the decision-making process.

The Use of Linkage Mechanisms

The use of linkage mechanisms is as important as the two other set of attributes discussed above because it affects the flow of information and knowledge in terms of direction, and regularity, and the quality and usefulness of the information and knowledge channeled. A poor use of an appropriate mechanism, for example, may alter the flow of information by impeding effective participation by the representatives of farmers' organizations. The following are the major observations as far as the use of the mechanisms is concerned: Technically linkage mechanisms are intended to ensure a two-way flow of information between research and farmers and their organizations. However, in many cases, there is greater flow from research and extension services to farmers (Table 5).

- In most cases, farmers have a lower status during the linkage process. The lower status of farmers, which already exists because of the way society perceives the different professions, is reinforced by the mode of organization and operation of the activities attached to the mechanisms. For example, most of the activities are conducted in English and French and because of this farmers cannot fully participate. Farmers' contributions are solicited in their own language and then translated into English and French, the rest of the activity is conducted in these languages and is not translated so that farmers cannot follow the process. It may even be the case that the farmers do not have a clear understanding of their role in the process (see Box 4).
- There is a lack of regularity in the linkage events for some mechanisms; this is due to the fact that these events are often not budgeted and are canceled as soon as resources are short. In some cases this is because the holding of the event is left up to a manager, e.g. program manager.
- Many mechanisms are ad hoc because they are project related. It is the project which defines the set of linkage mechanisms present at a given moment and this again highlights the importance of donor pressure in establishing linkages between research and technology users. For example, in all three countries, many mechanisms are directly related to the T&V project financed by the World Bank, and others to the FSR projects. These mechanisms are likely to disappear at the end of these projects. Only a few mechanisms really form part of the structure of the system.
- All the mechanisms are intended for two-way flow of information; but in reality, because of the way the events are organized, the flow has a tendency to be one way. Often the meeting venue is alien to the participating farmers and the meetings are essentially held in French or English which prevents the full participation of farmers. Often, more time is devoted to formal presentations by researchers than to the discussions. The attitude and behavior of researchers and extension agents inhibits farmers from expressing their views openly and with confidence.

Table 5. The Use of the Linkage Mechanisms

Type of mechanism	Activities involved	Frequency of use	Regularity in using the mechanism	Real direction of flow of information or resources	Status difference among actors using the mechanism	Actor in charge of managing the mechanism
Management committee/board	Meetings	Once or twice a year	Regular	Two-way flow	Not much in many cases	Director of institute and/or chairperson of board
Program/commodity committee	Meetings	Once a year or once every two-three years	Not regular in all three countries; sometimes the convening of the meeting is left to the director of the program; meetings may not be held because of financial constraints	Two-way but more from research to farmers	Often lower status for farmers	Research program director
Center technical committee	Meetings and sometimes field visits	Once a year or once every two-three years	Not regular in all three countries; sometimes the convening of the meeting is left to the director of the center; may not take place because of financial constraints	Two-way but more from research to farmers	Often lower status for farmers	Director of research center
Farming systems research activities	Diagnostic surveys and on- farm trials	Permanent as long as donor support is available	Regular but locations may change	Two-way flow but more from research to farmers	Lower status for farmers and the gap is wide	Director of FSR program
Meetings for planning extension service activities	Meetings and field visits	Once a year	Regular when the T&V approach to extension is used	Two-way flow but more from extension and research	Lower status for farmers	Director of extension service
Monthly/bimonthly T&V meetings	Meetings, training workshops and field visits	Monthly or bi-monthly	Not as regular as planned	Not much flow from farmers	Lower status for farmers	Director of extension service

Table 5. The Use of the Linkage Mechanisms (contd.)

Type of mechanism	Activities involved	Frequency of use	Regularity in using the mechanism	Real direction of flow of information or resources	Status difference among actors using the mechanism	Actor in charge of managing the mechanism
Multilocal trials	Trials and meetings with farmers on the sites of the trials	Annual program	Regular	Most of the flow is from research and extension service	Lower status for farmers	Individual researchers and extension agents
Joint research-extension on-farm trials	Trials and meetings with farmers on the sites of the trials which are often farmers' fields and field visits	Annual program	Regular in the case of the T&V approach	Two-way flow but more from researchers and extension agents; farmers only provide answers to the questions or research and extension	Lower status for farmers; they may be reduced to providing labor and answers	Individual researchers and extension agents
Field days	Display and demonstration of research results	Organized when research managers wish	Ad hoc	Two-way flow but more from research	The differences between researchers and farmers are less pronounced than is the case for some other mechanisms	Managers of research
Extension-research liaison officer position	Coordination of several activities	Permanent	Regular	Two-way flow	Farmers have a lower status	Managers of research or extension services
Farmers' organizations - extension joint training session	Training meetings	Variable from one organization to another	Not regular	More flow from research and extension service	Farmers have a lower status	Leaders of farmers' organizations
Quarterly meetings	Meetings	Quarterly	Not regular	Two-way flow but there is a tendency for more flow from research and extension	Farmers have a lower status	Managers of extension service
Commercial company seminars	Trials of chemicals	Variable	Ad hoc			
Contracts between NGOs and research	Variable	Not frequent	Ad hoc	Two-way flow	No status difference with NGO staff but farmers have a lower status	Leaders of NGOs and research managers
Contract between projects and research	Variable	Not frequent	Ad hoc	More flow from research	Farmers have a lower status	Project and research managers

Table 5. The Use of the Linkage Mechanisms (contid.)

Type of mechanism	Activities involved	Frequency of use	Regularity in using the mechanism	Real direction of flow of information or resources	Status difference among actors using the mechanism	Actor in charge of managing the mechanism
Technology release committee	Meetings	Not frequent, depends on the will of the managers of the mechanisms	Not regular	Little contribution from farmers	Farmers have a lower status	Research and/or extension managers
Visits to research station by farmers' organizations and NGOs	Visits and discussions	Not frequent	Not regular	Two-way flow	No major difference	Leaders of NGOs and farmers' organizations
Publication of research	Production and dissemination of reports and articles	Variable	Not regular in all three cases	Flow from research to farmers	Does not apply	Managers of research
Informal contacts with individual scientists		Variable	Regular	Frequent	Variable, depends on the type of farmer and the context	Farmers and individual scientists

- There are problems with the selection of farmers whether they are individual farmers or from farmers' organizations. There is a tendency to select well-to-do farmers and to discriminate against the less well-to-do and women farmers. It is not certain that the selected farmers fully inform other farmers of the outcome of the linkage events in which they are involved. There may not even be any sharing of information among farmers when individual farmers are selected. In most cases, the farmers are "used" by research to achieve its own ends.
- The coordination of the linkage effort at the institutional level is not evident. It seems that each program, center, unit, or project has its own linkage mechanisms and there is no channel for exchanging information and knowledge resulting from the use of the mechanisms between them. Duplication of effort in relation to obtaining information on farmer's needs and conditions is very common within the institutes.
- There is no monitoring and evaluation of the linkage mechanisms to find out whether they are achieving their objectives or not. Consequently, it seems that some linkage events are run simply as a formality.
- Many researchers are still not convinced of the usefulness of direct linkages with farmers and see the move toward such linkages as a donor-driven agenda. Many extension officers share this view. Consequently, linkages with farmers are seen as a formality and supplementary to the technology generation and transfer process, and, therefore, do not receive the necessary attention and effort required to make them effective.
- Because of the financial crisis which has reduced the real income of researchers, involvement in linkage activities is in some cases based on financial gain rather than on the necessity of having links with partners. Consequently, achieving the objectives of the mechanisms becomes a secondary aim.

Effectiveness of Linkages

Measuring the effectiveness of linkages is a difficult task because of the problems attached to the choice of performance indicators. In this study the set of problems encountered by each of the actors is used as a first set of indicators. The teams also used the degree to which the objectives of the partners — farmers' organizations and research — are met by the existing linkages.

The Views of the Actors

According to farmers taking part in linkage activities, they have had access to new information and in a few cases this information has been of direct use to them. This seems, however, to have happened mostly in the case of those involved in on-farm trials. In some cases, farmers have adopted some varieties and cultivation practices directly from research, owing to their involvement in the trials. Access by "Naam" Federation members to cowpeas technology or the availability of horticultural technology to the members of the Horticultural Development Association in Kenya are practical examples of the achievement of technology transfer owing to direct linkages between research and farmers' organizations. The adoption of several maize varieties in the grain project of the Crop Research Institute of Ghana provides an other example. In addition to information, farmers have had access to free inputs such as seeds and fertilizer. Most of the farmers believe that in one way or another their in-

volvement has broadened their knowledge base and they have learned more about research and how it operates.

However, many farmers emphasized the following issues:

- The objectives and the reasons for their participation are not explicit enough for them; farmers in Burkina Faso reported that they had visited the local trials without being clearly informed of the reasons why these visits were organized; in Ghana farmers reported that they thought that the trials conducted on their fields were for “academic exercises”;
- They do not always know what is expected of them; Box 3 below illustrates this situation.

Box 3. Involvement of Farmers’ Organizations in FSR

For several years an FSR team operated in a village in northern Burkina Faso. During the whole period, the farmers never approached the researchers with a technological problem because they were not aware that they could do so. Farmers thought that their role was limited to answering questions during the surveys and doing what the scientists wanted them to do for the trials. The only requests put to the researchers were about having seeds of a particular variety or obtaining fertilizer. The village as a whole also derived some prestige from hosting the research team.

- Farmers only have a consultative role and cannot really influence the research agenda or the research process; farmers in Ghana and also in Kenya complained that, in some cases, the decisions seem to have been made before the meetings; they added that, in the case of the cocoa sub-sector in Ghana, their inputs were determined by research.
- In some cases farmers have difficulty in being active participants because of the ways the events are organized; the key problem raised in this respect is the partial use of English or French during linkage activities.
- Discussions within the committees or during meetings are too academic.
- Farmers attend planning and programming meetings unprepared because often the relevant documents are not given to them on time; as a consequence, it is sometimes difficult for them to take part in the discussions.
- There is no continuity in the linkages and often researchers stop the linkages without informing the participating farmers and their organizations.
- Sometimes researchers do not show up to collect the results of the trials or, when they do, they do not share the results with the farmers.
- Some researchers are not open to the idea of taking into account farmers’ suggestions; they discard these suggestions with condescension;

For the researchers interviewed, the key problems are:

- Getting good farmers’ representatives, that is farmers who can participate and at the same time be genuine representatives of the farming communities.
- In some settings the social structures impede effective representation of farmers because the scientists have to deal with farmers selected by their own communities.

- Participation of farmers at higher levels of decision-making is difficult because differences in statutes arise and inhibit their participation;
- Serious communication problems can arise; farmers, for example, often focus on issues which are not technology related and it is difficult to ensure their participation until some of the other problems raised by them have been dealt with.
- The research institutes often face serious resource constraints.

The Assessment of the Situation by the Teams

In this study, it is assumed by the teams that linkages are effective if the objectives of the partners — farmers' organizations and research — are met. For farmers' organizations these objectives are: (a) the capacity to influence the research agenda; and (b) having access to relevant information and knowledge when needed. Those of research are: (a) having relevant information on farmers' needs and production conditions; (b) having access to additional resources; and (c) being able to disseminate information, knowledge and technologies to users. If these objectives are fulfilled and if the system has the required human and financial resources and its context is enabling in terms of technology generation and transfer, one may expect "relevance" and "responsiveness of technologies to all the clients".

It is important to stress the fact that the teams never considered "control of the research agenda by farmers' organizations" as a measurement of effectiveness even though it is well established that there is a strong correlation between the two. The teams avoided the use of that measurement because they recognized that such effectiveness can only be reached at very high costs for some farmers (e.g. resource-poor farmers), other stakeholders (eg. consumers), and society as a whole (e.g. deterioration in the environment).

This analysis might be subjective, but it seems to provide the best way of evaluating linkages. At least it allows the identification of their major pitfalls. The situation found in the three countries can be summarized as follows:

Farmers' organizations have almost no influence on the research agenda. The existing mechanisms allow research to have adequate information on farmers conditions and needs; but this information is not always taken into account when defining the research agenda. It seems that data collection on farmers' conditions and needs has become an end in itself; consequently this is an area of duplication of effort by all the various actors attempting to serve the farmers. This reflects the status difference among the actors, the lack of decision-making power attached to the mechanisms, the heavy focus on transfer of technologies and the predominance of a "one-way flow" of information.

The organizations, in most cases, do not have access to relevant information, knowledge, and technologies when needed. Most of the information and knowledge farmers' organizations have access to are irrelevant to their immediate needs. In some cases they are not even considered as the target when this information or knowledge is being generated. Farmers and their organizations have benefitted from linkages only on a few occasions, in the context of on-farm trials, especially in the case of crop varieties. Well-to-do farmers have also used informal mechanisms to obtain information or support from research. It is often up to research or the extension service to decide what information or knowledge should be passed to farmers and this highlights the strong control of linkages by research and the apathy of the farmers' organizations in the linkage process.

Research has access to additional human resources and land for its adaptive research.

However, access to extra financial resources occurs only when there is a contract with an NGO.

The linkages provide a forum for research to disseminate information. Unfortunately the information and knowledge disseminated are mostly irrelevant. This can be traced back to the focus on the flow of information from research to farmers.

From the above, one can conclude that linkages between research and farmers' organizations in the three countries are not effective and that the losers in the process are the organizations and all the "gains" are captured by the research institutes. The outcome for society as a whole is not positive, because the linkage process does not result in greater access to technologies by farmers. One may even assert that society bears a heavy opportunity cost because the resources made available for linkages could be used in a more productive way elsewhere.

Even though the lack of effectiveness of the linkages can be traced back to the nature of the mechanisms, the actors involved, and the way the mechanisms are used, there seems to be a key element in explaining the situation; this is *the heavy control by the research institutes over the linkage process*. The other elements can be seen as consequences of this control. The fundamental question is why research has so much control over the linkage process? This heavy control stems from:

- the asymmetry of power between research institutions and farmers' organizations resulting from the role assigned to farmers' organizations in the development strategy, as discussed earlier;
- the heterogeneity, scale, degree of information, and lack of bargaining power of the organizations mentioned by researchers;
- the history and experience of the countries in agricultural technology generation and transfer; and
- the research policies of the countries with regard to the mission of the agricultural systems and their adequacy vis à vis the incentive and promotion structures. In none of the three countries does the existing incentive structure motivate researchers to pursue links with farmers and their organizations. The negative effects of the incentive structure on linkages with users have already been well documented in ISNAR's previous work on linkages (Eponou, 1993; Merrill-Sands and Kamowitz, 1990). This is seen by many extension service managers as one of the key factors hindering linkages between research and its partners.

Positive Examples of Linkages

There were, however, a few positive examples of linkages and linkage mechanisms. One such example was found in Burkina Faso where the "NAAM" Federation (FUGN) and INERA have established formal links which seem to work fairly well (see Box 4). Owing to these linkages, INERA has been able to transfer several varieties of cowpeas to farmers in the northeast of Burkina Faso. This case was the most positive one encountered in terms of the involvement of a farmers' organization, the representation of the actors, the mechanisms in place, and the ways these mechanisms are used.

Box 4. Linkages Between FUGN and INERA

Linkages between the “Naam” Federation (FUGN) and INERA have evolved over recent years from informal and ad hoc contacts to more formal collaboration. Contacts were previously limited to informal visits to the research station or obtaining research results for further on-farm testing. Technicians and farmers from the Federation are now invited to the program and center technical committee meetings where the research agenda is defined. The two institutions have gone further by signing an agreement to collaborate and make cowpeas a major source of income for the members of the Federation and to that aim are implementing a research project which was jointly prepared and submitted to a donor. The role and tasks of each institution, as well as the mechanisms for collaboration, are clearly spelled out. Farmers assisted by the technicians of the Federation are heavily involved in the decision-making process and are seen by the scientists as partners. For example, the crop varieties to be tested were selected together and local varieties are being tested along with the improved ones at the request of the farmers.

Both INERA and the Federation are satisfied with the mode of collaboration. As a consequence, the Federation has approached INERA to expand the domain of cooperation to all the relevant technological needs of its members. Discussions are underway to implement full cooperation (Dabiré et al., 1995).

The program formulation linkage mechanisms used in the Ghana grain project was effective enough to ensure incorporation of farmers’ perspectives in the research program (Box 5).

The coffee growers’ cooperatives of Kenya, as discussed earlier, are also positive examples of good linkages between research and farmers’ organizations. As in the case of Burkina Faso, the organizations play a very proactive role in the linkage process and use the alternatives available to them to meet the technological needs of their members. It seems that, in each case, they are taking into consideration the existing socio-political context and are subsequently adjusting the implementation of their linkage policies.

Box 5. Planning Workshop in the Ashanti Region of Ghana

The last planning workshop of the Ghana Grain Development Project of the Crop Research Institute for the Ashanti Region was held with researchers, extension officers and ten representatives of farmers’ organizations, six men and four women. All the Districts of the Ashanti Region were represented. The objective of the meeting was to review the activities of the year and define those of the following year. Participation of farmers was possible through the financial support of the Global 2000 Program. Although farmers were a minority and some of them have some command of English, the meeting was held in Akan, the local language, to allow full participation of the farmers. Farmers were given plenty of time to comment on the reports made by researchers and extension officers. They had working group sessions on their own to exchange views among themselves and to reach agreement, before making suggestions and recommendations to research. They also were involved in all the other working group sessions as full members. The organizers of the meeting provided space on the agenda to let the farmers inform the other participants of their production conditions and other constraints which could not be tackled directly by agricultural research, such as access to inputs, credits, marketing, etc. The researchers attending the workshop found the participation of farmers very constructive, informative and enhancing for the relevance of their activities.

8. Key Lessons, Recommendations and Conclusions

Key Lessons

Various types of farmers' organizations exist in Africa, but most of these organizations are small in size, weak, heavily dependent on public institutions and donor funds, and have limited bargaining power. There are several noticeable differences between the three countries studied in terms of the development of farmers' organizations. In their present state, most of them cannot establish effective linkages with research.

Although both the research institutions and the farmers' organizations encountered (with a few exceptions) do not have explicit linkage policies, there exist well-established linkage mechanisms between them. Almost all the mechanisms have been established and managed by research. In a few cases, they have been established by the extension services which share their management with the research institutes.

The existing linkages are not very effective for farmers because they do not always allow farmers to have an input into the research agenda and farmers do not often get access to new information. The lack of effectiveness from the research side is due to the fact that the information on farmers' needs and conditions of production are not always incorporated into the research agenda because of methodological and organizational problems which have not been dealt with properly. In most cases, incorporating this information is seen as the responsibility of the individual scientists because there is no corporate culture or mechanism for incorporating this information.

The policy context, especially the perception of farmers' organizations and the role assigned to these organizations in the development strategies by policy-makers, is not always conducive to the establishment of effective linkages which would allow the organizations to influence the research agenda and to have access to the type of information and knowledge they want. However, the situation is improving.

There are many farmers' organizations which are unaware of the possibility of linking with research, and others which have not considered having these linkages as an area of interest to their members because access to technology is not often one of the reasons for forming the organization. There is, therefore, a serious question of accessibility of information on the side of the farmers' organizations.

The gains from linkages are not well perceived both by farmers' organizations and the research institutions. The reasons for this, however, are different for both parties. For the farmers' organizations it is more a question of information, while the research institutions may believe that the cost of setting up a different type of partnership outweighs the gains.

In spite of the contacts between the research institutes and farmers and their organizations, the basic model existing in all three countries is the linear model. A few isolated scientists may from time to time alter this model by involving farmers more intensively, but at the institutional level there has not been any effective change in the philosophy and the approach to technology generation and transfer.

There are many problems with regard to the nature of the linkage mechanisms, representation of farmers' organizations, and the way these mechanisms are used which hinder the effectiveness of those linkages that are in place. However, exceptions were found in each of the countries, since effective mechanisms do exist which have allowed the flow of relevant technologies to farmers, especially improved crop varieties.

The current situation can be traced back to the attributes and function of the existing farmers' organizations, the agricultural development strategies, the research policies and strategies, and the management of linkages. This is an indication of how complex improving the current situation is. However, the root of the problem is the political economy and the economic development strategies of the countries, especially the perception of, and the role assigned to, farmers and their organizations in these strategies. Most of the problems identified at the organization and research institute level stem from the basic issue of the place of farmers' organizations in the development process. The research institutes, as well as the farmers' organizations, are "victims" of the strategies and their current attitudes and behavior are in line with these strategies which hinder realization of the gains from linkages for both research and farmers' organizations. Consequently, in order to improve the linkages, fundamental changes are required in the development strategies.

Administrative and/or legal statements instituting direct linkages between research and farmers (or farmers' organizations) do not necessarily lead to more effective technology systems. Linkages are doomed to fail if the power distribution is biased against farmers and their organizations because the research organizations who control the linkages do not necessarily implement them fully.

So far, pressure from donors, as a substitute for the power of farmers' organizations, has led to the establishment of linkage mechanisms between research and farmers (or their organizations). It seems that this pressure does not go so far as to ensure the effectiveness of the mechanisms because it is of the same nature as the administrative and legal statements. Thus, donor pressure can help but it cannot be a substitute for an enabling environment for linkages, e.g. a proactive attitude on the part of farmers' organizations.

The effectiveness of linkages is influenced by many factors and these factors may vary from one system to another, and also over time for the same system. This makes addressing linkage problems very complex. The contextual factors of the system, the choice and management of linkages, the resources available, the strengths and weaknesses of research and the agrarian interest groups, and the respective linkage policies of research, the agrarian interest groups and the public extension services are among them. Linkages may also be influenced by the attitudes and behavior of the partners while linking. Finally, the key propositions identified earlier can also affect linkages. Most of these factors are interrelated and result in the strong control of the linkages by research.

One of the key findings of this study is that the current linkage situation is a result of the history of technology generation and transfer, the political economy, the development strategies, and the institutional development of the countries. For example, the absence of linkage policies, the behavior of linkage actors, as well as the factors listed above, are themselves a result of these contextual elements of the technology systems.

It is also important to emphasize that, even though research benefits from it, the current situation is not the result of a deliberate plan made by research managers. Actually, the behavior of research as well as that of farmers' organizations is determined by the contextual factors and the structure of the technology system, over which research managers have limited power. In short, the behavior of research is coherent with the contextual factors of the technology system which are not conducive to strong linkages.

Recommendations

From the analysis of the three countries, it is obvious that the condition for achieving the key objectives of linkages, that is: (a) relevance of the technologies generated, and (b) an effec-

tive access of farmers to these technologies, is the establishment of a true partnership between farmers' organizations and the research institutes. Establishing such a partnership requires two key improvements: (a) a more balanced decision-making power between farmers' organizations and the research institutes over the setting and implementation of the research agenda; and (b) the use of more effective and additional linkage mechanisms. Unless these improvements are made, the gains for farmers' organizations from linking with research institutes will be outweighed by the costs and, thus, there will be no incentive for the organizations to link with research. All these call for defining explicit linkage policies and appropriate linkage strategies for the systems.

Balancing the Decision-Making Power with Regard to Setting and Implementing the Research Agenda

The objectives of balancing decision-making power are to allow farmers' organizations more influence or control over the research agenda, and to make the research institutes more accountable to farmers and their organizations. This calls for several actions and changes:

Establishment of stronger organizations in terms of size, management and technical skills. In many cases, especially in Burkina Faso and Ghana, some of the local groups should set up higher administrative-level units because if they stay at the local level they will not have any bargaining power. Farmers' organizations should also hire well-trained technicians who are able to communicate with the scientists and policy-makers, who will help them analyze whatever situation may arise, and who are loyal to the organizations, as is the case with the "NAAM" Federation in Burkina Faso and the KNFU in Kenya. Such organizations should try to solve their internal management problems. They should also become more democratic in order to produce effective members who fully participate in the activities of the organization.

Enhancing the awareness of the organizations of the need and the potential benefit of linking with research. Efforts should be made to raise the awareness of many of the organizations of the potential gains from linking directly with research. It is also important for some of the organizations, especially those with a national coverage, to be aware that bargaining power is not granted but earned and that regardless of the openness of the governments in these countries there will always be some resistance to increasing the organizations' power. Their power will be a function of their own strength and their capacity to mobilize farmers to lobby for or to defend their interests. They should also realize that the "exit" option they have mostly followed so far is not in the interests of their members nor of society as a whole. One strategy to gain bargaining power is to build strategic alliances with other organizations that have political power such as trade unions, international organizations, and donors.

Changing the perception and the role assigned to farmers' organizations in the development process by policy-makers. Policy-makers should realize that even though strong farmers' organizations may voice their views and grievances in the arena of agricultural policies, and may preempt the fetching of the agricultural surplus, in general they can be positive mechanisms for agricultural development. Policy-makers should weigh the short-term benefits from limiting the role of these organizations against the long-term benefits from involving them more actively in the development process.

For this to happen, the negative perception should be reversed to a positive one and policy-makers should realize that most of the reasons for avoiding having strong farmers' organizations at the time of independence, such as the need to build a unified nation, are no longer valid. The emergence of the multiparty system has done away with that argument. Other reasons, such as the need for a strong centralized government to speed up the development process, have by experience been proven wrong because, by hindering total participation by the masses, they have, in some cases, created a gap between the masses and their leaders which has been detrimental to the development process.

Moreover, given the present situation of most of the African countries and the pressures from donors to privatize some of the functions so far performed by the public sector, it is obvious that enhancing the role of farmers' organizations is a key condition for an effective execution of these functions, and thus for agricultural development in Africa. It is also obvious that these organizations cannot be effective if they do not have any bargaining power and cannot voice their views. They should be given the freedom to exploit all the opportunities which can enhance the productivity and the effectiveness of their members. This calls for a change in the agricultural development strategies and philosophies which consider farmers to be passive recipients of what the government thinks is good for them. Farmers should be active participants from the conception to the post-evaluation of projects and programs, and their organizations should provide them with the forum to do that effectively. Agricultural research is one of the areas where farmers' organizations should be most active.

Adapting the regulations relating to farmers' organizations to allow them to grow and to engage in linkages with public institutions. As noted earlier, regulations exist for farmers' organizations, agricultural cooperatives, and NGOs and, in some cases, they constrain the development and effective operation of these organizations. Sometimes, regulations borrowed from the western countries are incompatible with farmers' value systems and they prevent the full participation of farmers or hinder the operation of their organizations. These regulations should be revised and made compatible with the new role of the organizations and the value systems of the majority of the farmers.

Making the research institutes accountable to farmers and their organizations. One of the reasons why farmers' organizations cannot influence the research agenda is the lack of accountability of research *vis à vis* these organizations. It is up to the policy-makers to forge that accountability and that can be done using different strategies such as making the release of research funds conditional on some kind of approval for the programs by farmers' organizations or partially financing research through farmers' organizations. Direct financing of research by farmers' organizations will also enhance their status in developing accountability. This will call for a revision of the bylaws of the research institutes. So far, reference is made to farmers in these bylaws and the institutes have taken advantage of that by linking mostly with individual farmers. As we all know, linkages with individual farmers do not lead to more relevant programs and technologies, and linkages with powerless farmers' organizations do not yield better results either. Some of the organizations found in all three countries are able to express their opinions on the research programs and activities but that alone will not be sufficient if they do not have the authority to ensure that decisions and recommendations arising from linkages are implemented. Ensuring that the research institutes have sound and explicit linkage policies with farmers' organizations and NGOs should be the starting point for the governments.

Sensitizing research and extension to the importance of linkages with farmers' organizations. All available means should be used to sensitize researchers and extension agents at all levels to the benefits of linking with farmers' organizations. The view that linkages with users is subsidiary to normal research activities should also be changed.

Support from other actors. Donors, NGOs and other organizations such as IFAP have a role to play in encouraging the emergence of more effective farmers' organizations in the three countries studied, and in Africa in general. They can provide resources, technical assistance and exert pressure on the governments to be more open to the emergence of strong farmers' organizations.

All these changes should result in clearly defining the linkage policies of research institutions with regard to farmers' organizations. These policies should be backed up by appropriate linkage strategies for their implementation. Both policies and strategies should be defined with the full participation of farmers' organizations.

Establishing More Effective Linkage Mechanisms

The desired objectives will not be achieved if research alone has a control over linkages. A condition for effectiveness is, therefore, the sharing of the locus of control by research and farmers. This should be achieved if farmers' organizations establish mechanisms over which they have control and the existing mechanisms are revised. The following are indicative of mechanisms which could be initiated by farmers' organizations:

A policy-level mechanism, for the five year research conference. Every five years the organizations could call a high-level national meeting attended by top officials from the Ministries of Agriculture, Planning and Finances, Sciences and Technology, parliamentary representatives, and research and extension managers. The major donors could be invited as observers. The objectives of such a meeting will be: (a) to discuss and review research strategies and policies; (b) to make an assessment of research activities and results for the past five years; (c) to suggest the broad orientation of the research programs for the coming five years; and (d) to identify solutions to overcome constraints faced by research. The meeting will be more useful if it is held before the preparation of the five year research programs. The meeting could use, as the basis for the discussion, a paper prepared beforehand, perhaps with the assistance of consultants. The farmers' organizations should be fully in charge of organizing such a conference. Since most of the institutes do not yet have such a high-level meeting, there is room for maneuvering for the farmers' organizations. The meeting will be beneficial for both the organizations and research. It will be a forum in which the farmers' organizations may influence the orientation of research at the strategic level. Research will benefit from the support of farmers' organizations as its constituents. In short, the organizations will trade support for accountability from research.

Technical biennial national or regional meetings. These meetings, which could be held at the national or regional level, should be used to define the areas of cooperation between research and farmers' organizations and also to assess the results of that cooperation. Key priority areas identified by farmers' organizations could be discussed and four courses of action could be taken, depending on the nature of the problem: (a) specific contracts with research to deal with the problem; (b) a joint proposal to seek funds to deal with the problem; (c) on-farm trials by the farmers' organizations with assistance from research; and (d) incorporation of the problem in the research agenda. The activities, their results and the mode of

collaboration, including the mechanisms through which the program should be carried out, should also be reviewed at these meetings.

Setting up a joint monitoring and evaluation system. Farmers' organizations could also, in collaboration with research, set up a joint monitoring and evaluation system which allows a continuous dialogue. If the organizations want some control over the mechanisms they should take the lead in installing such a system. Many donors would be willing to help establish such a system if the initiative came from the farmers' organizations.

Signing a memorandum of understanding. Establishing a memorandum of understanding for work on specific technological issues could be another way of linking effectively. For this to be effective, farmers' organizations need to have the capability to formulate farmers' constraints into research questions. These questions would then be turned into joint projects which could be financed by the organizations from donor funds or cess from export crops earmarked for such projects. The organizations and the research institutes could also jointly seek funds for these projects.

Contracting research to backup farmers' organizations for on-farm trials. Farmers' organizations can run their own on-farm trials if they have skilled technicians. They might, however, contract research to supply assistance to ensure the quality of the trials and enhance the probability of success. Not only will this release research from the various trials but it would also be a source of additional resources for research. In the long run, there is a chance that an effective partnership will develop between research and farmers' organizations for on-farm trials. The case of the "Naam" Federation in Burkina Faso is informative in this respect (Dabiré *et al.*, 1995).

The most appropriate mechanisms in each case depend on how far both partners are willing to go in terms of collaboration. The agreement of policy-makers, even implicit, may be necessary for some of the suggested mechanisms. The extension services will also need to be part of the collaboration to ensure its success.

For the mechanisms that need to be improved, the key ones are the commodity/program and center committees and the various on-farm trials. For the committees, some of the decisions should be made binding for research and provision should be made to ensure that these decisions are implemented through some form of accountability of research to its stakeholders and clients.

Improving the representation of farmers. The representation of farmers needs to be revised so that farmers' representatives who are accountable to their colleagues and who can really articulate farmers' needs take part. In some cases, assistance from the technical staff of the organizations may be needed and that implies that the organizations are fully aware of the agendas of the committee meetings so that they can do preparatory work, and select the farmers and/or technicians who can best represent them.

Changing the way the mechanisms are used. The format of the meetings, the language and the techniques used may also need some thought in order to allow effective participation of the farmers. Using the local languages, and holding the meetings in areas which are not totally alien to the farmers will reduce the cultural barriers between farmers and researchers and will enhance their participation, as was seen in Burkina Faso and Ghana. This might increase the costs of the meetings by making them longer, but the net gain might more than

compensate for these increased costs because the potential for achieving the relevance of the research programs and activities will be enhanced.

Making more linkage mechanisms part of the system. There should be more linkage mechanisms which are part of the technology system, and the ones called for by the projects should complement these instead of the projects defining the set of mechanisms in place. The continuing changes in the mechanisms as new projects arise weaken the mechanisms because the actors know that the mechanisms are temporary and may not invest enough effort in mastering them. The mechanisms are seen as fashions, they are just there for a certain length of time and then will go away; thus, the actors forget the purpose of linkages and consider them to be simple formalities which satisfy the project donor.

Giving more responsibility to farmers' organizations for adaptive trials. Part of the responsibility for adaptive research could be transferred to the farmers' organizations with research providing some kind of technical assistance, as mentioned earlier. Again, in all three countries, there exist organizations which can undertake some simple on-farm trials. FUGN has done it in Burkina Faso with some degree of success and without any assistance from INERA. At annual local planning meetings, farmers' organizations, extension services and research institutes can agree on the division of responsibilities as far as these trials are concerned. Resources for such trials can be secured from donors, cess on export and in some cases the farmers' organizations may be able to bear the costs of their own trials if the costs related to the assistance are borne by research.

Inviting researchers to the annual and technology-related meetings of farmers' organizations. This will improve the understanding of farmers' organizations by researchers.

Formalizing some of the visits to research stations. This will allow farmers to be better informed of the technologies that are in the pipeline.

Workshops and meetings have been held in all three countries on linkages between research and extension services. Various strategies have been tested but without much success. It seems that little has been said regarding the purpose and usefulness of linkages, instead focus has been placed on what to do and as a consequence many researchers are still not convinced of the usefulness of these linkages. In fact, they see linkages as supplements to the technology generation and transfer effort and not as a component. Perhaps it is necessary to take one step backward and sensitize researchers to the necessity of having effective linkages not only with extension but also with farmers and the other users of the products of research. The move towards such an initiative should be taken at the national level and it will be desirable to limit outside participation to avoid the effort being seen as a donor-led agenda.

Changing the incentive system for researchers by rewarding linkage activities and having better coordination of linkage activities within research are pre-requisites for effective linkages in the three countries. This implies that the initiatives and the willingness to improve linkages should come from all levels of the national research system.

Donors, NGOs and other organizations have a role to play in directly strengthening the linkages. This can be in terms of providing technical assistance to farmers' organizations, financing the mechanisms to be put in place by farmers' organizations, joint projects, or simple research activities initiated by farmers' organizations.

Conclusion

Given the state of the art, drastic improvement cannot occur overnight. Improving linkages will take some time but it should be considered an integral part of the institutional development of the technology system. Looking at the changes which need to occur one may be pessimistic about the willingness of the actors involved, especially policy-makers, to bring about these changes because they will alter the existing power structure. The question is not whether such changes are desirable as they are a pre-condition to effectiveness of agricultural research in the countries covered by the study. The current linkage situation cannot be maintained, if research is to be successful in serving resource-poor farmers.

Three types of actions will be necessary to improve the present situation:

- Sensitization of all the actors to the necessity to change their perspectives on the agricultural knowledge and information system; the awareness of actors must be raised with regard to the benefits of effective linkages within the system.
- New linkage strategies should be put in place using a participatory approach to ensure that there is a consensus among the actors regarding their respective roles and responsibilities. This approach is also likely to yield a more equitable balance of power among the actors. Training the key managers of linkages from both research and farmers' organizations in managing linkages. The need for such training stems from the complexity of linkages and the continuous adjustments required to keep them effective.

Finally, even though the scope of the study covered three countries, some of the findings, lessons and recommendations are valid for other African countries because the fundamentals, in terms of farmers' organizations, development strategies and linkages between these organizations and public institutions are not very different. In fact, the results and recommendations might even have been the same if other countries were selected. Changes should also be initiated in the other countries. However, the specific way of implementing changes and setting up new mechanisms need to be analyzed in order to tailor them to the conditions of each country.

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International Service for National Agricultural Research

Headquarters

Laan van Nieuw Oost Indië 133, 2593 BM The Hague, The Netherlands

Correspondence

P.O. Box 93375, 2509 AJ The Hague, The Netherlands

Communications

Tel: (31) (70) 349-6100, Fax: (31) (70) 381-9677, Telex: 33746
Email: ISNAR@CGNET.COM World Wide Web: <http://www.cgiar.org/isnar>