

Planning Linkages between Research, Technology Transfer, and Farmers' Organizations

*Results of an Action-Oriented Project in Mali, Senegal,
Tanzania, and Zimbabwe*

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December 1999

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About the Authors

This report is one of the outcomes of a project on linkages with users that ISNAR carried out. Funding for the project was provided by the Netherlands Ministry for Development and Cooperation. **Thomas Eponou** was the leader of the project while a senior research fellow in the Policy and System Development Program at ISNAR, and one of the main co-authors of the report, together with **Anna Wuyts-Fivawo**, research analyst. **Warren Peterson**, senior research officer, took over leadership of the project at a later stage and together with **Michèle Wilks**, research analyst, also co-authored this report.

Citation

Eponou, T., W. Peterson. A. Wuyts-Fivawo, and M. Wilks. 1999. Planning Linkages between Research, Technology Transfer, and Farmers' Organizations: Results of an Action-Oriented Project in Mali, Tanzania, and Senegal. Research Report No.15. The Hague: International Service for National Agricultural Research.

AGROVOC descriptors

Partnerships; cooperation; planning; agriculture; research; extension activities; farmers

CABI descriptors

Partnerships; cooperation; planning; agricultural research; extension; farmers

Geographical descriptors

Senegal; Mali; Tanzania; Zimbabwe

ISSN: 1021-4429

ISBN: 92-9118-049-1

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Foreword

Virtually all agricultural knowledge information systems (AKIS) have recurrent problems with linkages that seriously affect the flow of relevant technology and information between producers and institutional actors in agricultural research and extension. The persistence of linkage breakdowns and failures led to ISNAR's initiation of research on the subject area in order to better respond to requests from national agricultural research systems (NARS) for assistance with improving linkages.

Between 1986 and 1995, ISNAR carried out various research projects related to linkages between agricultural research, extension, and producers. These studies involved national staff in the description and analysis of linkage approaches and problems in many regions of the globe. They resulted in the publication of the On-Farm Client-Oriented Research (OFCOR) and Research Technology Transfer Linkages (RTTL) series, and more recent research reports entitled *Partners in Agricultural Technology: Linking Research and Technology Transfer to Serve Farmers* and *Partners in Technology Generation and Transfer and Linkages between Research and Farmers' Organizations in Three Selected African Countries*.

In 1995 ISNAR moved, with national partners in sub-Saharan Africa, into a phase of applying the lessons and results of the linkage studies. These results indicated that building effective linkages revolves around improved interactions between AKIS partners, explicit attention to linkage strategies, joint planning of actions, agreements on resource responsibilities, and other activities that improve cooperation and communication.

The present Research Report is the result of an action-oriented application of methods and procedures for linkage planning. National teams in Mali, Senegal, Tanzania, and Zimbabwe, armed with the insights obtained from earlier collaborative research with ISNAR on linkages, embarked on practical steps to resolve linkage problems in each country. The results were promising, and more to the point, resulted in further knowledge about how to approach linkage planning and implementation. This Report is a summary of the experiences and improvements gained from testing procedures and methods developed during the earlier phase of research.

ISNAR's interest in building effective linkages and resolving linkage problems continues. It strongly endorses national initiatives to address linkages, and continues to support NARS efforts to provide farmers with technology that aids productivity and economic development.

Acknowledgments

ISNAR is grateful to the Dutch Ministry of Foreign Affairs for providing funds to implement this project. The project also benefited from the guidance and frank comments of K. Soels of the Department of Rural and Urban Development, Ministry of Foreign Affairs.

The leadership and commitment provided by managers of host research institutions in the participating countries made this project possible: the ISNAR team thanks in particular Dr. M. Bakhayoko of ISRA, Senegal; Dr. O. Niangado of IER, Mali; Dr. R. Gata of DR&SS, Zimbabwe; R. Rukuni of the Agricultural Research Council, Zimbabwe; and Dr. F. Shao of the Department of Research and Training, Tanzania. In each country, the support, interest, and involvement of national project teams that included representatives from research, extension, and farmers' organizations were instrumental for the success of the project.

The ISNAR team gratefully acknowledges the contributions of other ISNAR staff, with special thanks to K. Sheridan, R. Peyra, and R. Claase of ISNAR's publications unit and from Z. Peixoto-Franca, H. Hambly-Odame, A. Huybrechts, J. Verhage, and M. Breedveld of the training unit. Throughout, comments and assistance were provided by Dr. H. Elliott, deputy director general; Dr. H. Tollini, director of the policy program; and Dr. N. Bosso.

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Abstract

Linkages between major institutional actors in agricultural knowledge and information systems (AKIS) are widely recognized as essential for an effective flow of technology and information between research, extension, and farmers. The types and nature of linkages between actors within an AKIS directly influence its effectiveness for improving levels of production, particularly for non-commercial and resource poor producers. It is commonly recognized by AKIS stakeholders that poor performance of the system is often related to linkage problems. Based on lessons learned through a series of ISNAR studies on research-user linkages, methods of improving linkages were applied to the conditions and realities of four countries — Senegal, Mali, Tanzania, and Zimbabwe.

The application of linkage planning concepts and procedures, derived from ISNAR's experience, took place within the context of a three-year project, supported by the Government of The Netherlands, Ministry of Foreign Affairs. It was carried out by national teams representing research, extension, and farmers' organizations, with methods and facilitation provided by ISNAR.

The objectives of the project were to assist the participating countries in addressing research-user linkage problems, to build a capacity to analyze and resolve these problems, to improve methods and guidelines for linkage planning and implementation, and to disseminate linkage knowledge, lessons, and experiences. These objectives were achieved, albeit with varying degrees of success, in the four countries participating in the project. An increased awareness of the importance of linkages and improved communication and cooperation between farmers' organizations, research, and extension were among the more marked achievements. Project outputs include the establishment of institutional frameworks for strengthening linkages and the development of linkage strategies and action plans. The approach developed by ISNAR was adapted by the participants to specific country conditions. Based on their experiences, important lessons emerged and requirements for success in linkage planning and implementation were identified.

Résumé

La bonne qualité des mécanismes reliant les principaux acteurs institutionnels intervenant dans les systèmes de connaissance et d'information relatives à l'agriculture (AKIS) est une condition essentielle pour assurer l'efficacité des échanges de connaissance et de technologie entre chercheurs, vulgarisateurs et paysans. Les types de liaison et la nature de ces liaisons ont une influence directe sur l'efficacité du système et sur la capacité à rehausser les niveaux de production, tout particulièrement dans le cas des agriculteurs de subsistance et des producteurs disposant de très peu de ressources. La plupart des parties prenantes des systèmes AKIS reconnaissent que la médiocrité d'un système est fréquemment le résultat de problèmes se situant au niveau des liaisons. Partant des leçons tirées d'une série d'études sur les liaisons entre chercheurs et utilisateurs, l'ISNAR a entrepris d'appliquer des méthodes conçues pour améliorer ces liaisons, aux conditions réelles de quatre pays sélectionnés – le Sénégal, le Mali, la Tanzanie et le Zimbabwe.

Un projet étalé sur trois ans et financé par le Ministère des Affaires étrangères des Pays-Bas constitua le cadre d'application de concepts et de procédures de planification tirés de l'expérience de l'ISNAR. L'exécution du projet fut confiée à des équipes nationales composées de chercheurs, de vulgarisateurs et de représentants d'organisations paysannes. L'ISNAR fournit les méthodes et facilita les efforts.

Le projet avait pour objectifs d'aider les pays participants, d'abord, à examiner les problèmes affectant les relations entre chercheurs et utilisateurs, puis à développer leur aptitude à analyser et résoudre ces problèmes. Il visait de plus à améliorer les méthodes de planification des liaisons et les guides de mise en oeuvre, et enfin, à diffuser les expériences et les connaissances acquises dans le domaine. Ces objectifs ont été atteints dans les quatre pays, bien que le degré de succès varie d'un pays à l'autre. Parmi les résultats les plus notables, il faut relever une conscience accrue de l'importance des liaisons ainsi que de meilleures communications et collaborations entre les organisations paysannes, les chercheurs et les vulgarisateurs. Le projet a débouché entre autres sur la constitution de cadres institutionnels pour promouvoir le renforcement des liaisons, et sur l'élaboration de stratégies et de plans d'action relatifs à la création de liaisons. Les participants ont adapté l'approche conçue par l'ISNAR aux conditions spécifiques de leurs pays. Leurs expériences leur ont permis de tirer des leçons importantes et de déterminer quelles sont les conditions requises pour garantir le succès des efforts de planification et de mise en place de liaisons.

Resumen

Los vínculos entre los principales actores institucionales en los sistemas de conocimientos e información agrícolas (SCEA) son ampliamente reconocidos como esenciales para el flujo efectivo de la tecnología e información entre la investigación, la extensión y los agricultores. Los tipos y la naturaleza de los vínculos entre los actores dentro de un SCEA influyen directamente su eficacia en el mejoramiento de los niveles de producción, en particular para los productores no comerciales y de escasos recursos. Los interesados de un SCEA comúnmente reconocen que un pobre desempeño del sistema está relacionado frecuentemente a problemas de vínculos. Basados en las lecciones aprendidas a través de una serie de estudios realizados por el ISNAR sobre vínculos entre los usuarios de la investigación, se aplicaron métodos para mejorar los vínculos a las condiciones y realidades de cuatro países – Senegal, Malí, Tanzania y Zimbabwe.

La aplicación de los conceptos y procedimientos sobre planificación de vínculos, derivados de la experiencia del ISNAR, tuvo lugar dentro del contexto de un proyecto de tres años de duración, apoyado por el Ministerio de Relaciones del Exterior del Gobierno de los Países Bajos. El mismo fue ejecutado por equipos nacionales representantes de la investigación, la extensión y de las organizaciones de agricultores, con métodos y facilitación proporcionados por el ISNAR.

Los objetivos del proyecto fueron asistir a los países participantes a enfrentar los problemas de vínculos de los usuarios de la investigación, para desarrollar capacidad de análisis y resolver estos problemas, para mejorar los métodos y guías para la planificación e implementación de vínculos, y para diseminar conocimientos, lecciones y experiencias sobre vínculos. Estos objetivos fueron logrados, a pesar de los distintos grados de éxito, en los cuatro países participantes en el proyecto. Entre los logros más sobresalientes se encuentran una mayor conciencia de la importancia de los vínculos y mejoras en la comunicación y cooperación entre las organizaciones de agricultores, la investigación y la extensión. Entre los productos del proyecto se incluye el establecimiento de marcos de trabajo para el fortalecimiento de los vínculos y el desarrollo de estrategias y planes de acción para vínculos. El enfoque desarrollado por el ISNAR fue adaptado por los participantes a las condiciones específicas de sus países. Basados en sus experiencias, identificaron importantes lecciones y requisitos emergentes para el éxito en la planificación de los vínculos y su ejecución.

Acronyms

AGRITEX	Department of Agricultural, Technical, and Extension Services (Zimbabwe)
AKIS	agricultural knowledge and information system
ARC	Agricultural Research Council (Zimbabwe)
CFA	African Finance Community
CNCR	Comité National de Concertation des Ruraux (Senegal)
COFRE	Committee for On-Farm Research and Extension (Zimbabwe)
CONGAD	Conférence des Organisations Non-Gouvernementales pour les Actions de Développement (Senegal)
DR&SS	Department of Research and Specialist Services (Zimbabwe)
FAO	Food and Agriculture Organization of the United Nations
FO	farmers' organization
IER	Institut d'Economie Rurale (Mali)
ISNAR	International Service for National Agricultural Research
ISRA	Institut Sénégalais de Recherches Agricoles
ITA	Institut de Technologie Alimentaire (Senegal)
NARS	national agricultural research system
NGO	nongovernmental organization
ODA	Overseas Development Administration (now Department for International Development, United Kingdom)
ODI	Overseas Development Institute
OFCOR	on-farm client-oriented research
PNVA	Programme National de Vulgarisation Agricole (Mali)
TOR	terms of reference

Executive Summary

A collaborative project on applying linkage lessons was initiated to assist actors of the agricultural knowledge and information systems (AKIS) in Mali, Senegal, Tanzania, and Zimbabwe to strengthen linkages and improve methods and guidelines for planning such linkages. The actors involved were from agricultural research institutions, extension services, and farmers' organizations. This Research Report presents the results of that project.

The specific objectives of this project were to: assist the four participating countries in addressing the linkage problems of their agricultural knowledge and information systems; increase capacity within the selected NARS and their key partner organizations to diagnose and resolve linkage problems; improve linkage analysis methods and guidelines for linkage planning; and to disseminate linkage knowledge, lessons, and experiences through in-country application by national staff, and through the development of training materials for wider dissemination.

The project used an action-oriented and participatory approach to apply lessons from previous ISNAR studies on AKIS linkages. Those studies indicated that solutions to achieving synergy among AKIS actors and making relevant technologies available and accessible to farmers lie in improved interactions between the actors, through the development of linkage strategies, joint planning of actions, agreements on resource responsibilities, and other activities that improve cooperation and communications.

The project was undertaken in collaboration with national teams comprised of representatives from research, extension, and farmers' organizations. ISNAR provided guidelines and procedures which, in the course of the project, were adapted to suit the conditions of each country. Thus the process varied in each country, but always included the following four steps:

1. an initial workshop to bring the actors together and establish a common understanding of their system and the need for linkages, and to form a national project team and steering committee;
2. an analysis of the linkage situation conducted by the national project team, upon which linkage strategies and action plans were developed;
3. a second workshop to agree on the proposed strategies and action plan and to decide on an implementation plan;
4. implementation of the action plans with monitoring and periodic evaluation.

The project had a significant impact in each country and from the perspective of all the stakeholders was a successful initiative, despite differences and varying degrees of progress in the countries. Furthermore, the project initia-

tives are expected to influence linkage planning in the participating countries for some time to come. Nonetheless, a number of challenges were encountered which should be addressed in future efforts.

The project's main achievements were: establishing a stronger systems perspective among the actors, with an appreciation for the need to strengthen linkages among them; developing a stronger sense of partnership, with actors inviting input into activities they would otherwise have carried out without consultation; reinforcing the involvement of farmers' organizations within the participating AKIS with recognition of mutual responsibilities and benefits; analyzing the linkage situation, leading to a formulation of linkage strategy and action plans, and initiating a framework for dialogue at various levels with priorities and responsibilities defined for each actor; and contributing to the restructuring of research itself by highlighting the importance of linkages in the decentralization and re-engineering of research institutions.

The design and subsequent implementation of the project underestimated the extent of the complexity of the linkages context and the effects of the activities of other AKIS actors (e.g., donor agencies and NGOs) on linkage planning. Despite the successes outlined above, several problems remain.

Financial resources for implementation of linkage plans were insufficient. While different actors were expected to make provisions for their involvement, this was the first time such joint plans were made and there was no existing government funding for the action plans. Farmers' organizations needed to demonstrate the benefits to their members first before they could raise funds to contribute to the action plans.

Communication among actors at different levels was insufficient and led to delays in commitments and follow-up, as well as limited publicity about linkage initiatives. There was limited involvement of other relevant actors such as universities, NGOs, and the private sector.

In some cases representatives of farmers' organization had limited capacity, both in skills and resources, to actively participate in the planning and implementation process. The three year time period this project allocated for the institutionalization of linkage improvements was unrealistically short. While from the perspective of all stakeholders involved this was a very worthwhile start to promising partnership, more time (perhaps five to seven years) was needed to achieve the consolidation of the linkages that were initiated and more substantive benefits. The process of planning linkages within an agricultural knowledge and information system presents formidable challenges. From the experience of this project key lessons were learned which should be taken into account in similar efforts in the future.

Awareness, consensus, and commitment are of the utmost importance if linkages between different actors are to yield benefits for them all. To achieve

this continuous communication is necessary to build and maintain trust and proximity among the actors.

Support from policy makers is necessary to guarantee allocation of resources, as well as to sanction collaboration among institutions with different focuses, priorities, or outlooks. Therefore, it is vital to ensure their meaningful participation in the linkage planning process.

The establishment and implementation of linkage plans should be expected to take longer than three years, as such initiatives call for many changes involving different actors with different capacities and characteristics. Furthermore, the implementation of linkage plans involves an element of trust which is built up over time.

Adequate funding for linkage planning and implementation must be assured. This should be dealt with earlier in the process and reliable funding sources must be sought to ensure the implementation and sustainability of linkages. The process of linkage planning has to take place at different levels: regional/district and local levels. This implies substantial effort with associated costs. However, it is indispensable if the initiatives are to achieve the expected impact. This project also yielded improvements in linkage planning methods. Following the experiences of and feedback from national teams, revisions were made to the framework and procedures for planning linkages which had originally guided the project. These revisions included changing the focus from events to phases within the linkage planning process, and broadening the perspective of linkage processes to take into account the context of the overall planning cycle.

1. Introduction

Poorly planned and managed linkages between producers, research, and extension have remained significant and recurrent problems for virtually all agricultural knowledge and information systems (AKIS)¹ despite frequent attempts by governments and donors to improve the situation. National agricultural research system (NARS) managers and other stakeholders have consistently identified problems with effective interactions and communications between AKIS component parts related to technology flow as major impediments to agricultural technology flow (Arnon 1989; Eponou 1993a, 1996; FAO 1995; Merrill-Sands and Kaimowitz 1990; Kaimowitz 1990). For these reasons, assistance in solving linkage problems is one of the most common requests received by ISNAR from NARS.

Project Background

ISNAR initiated a series of studies in 1986 to better understand the causes of persistent linkage problems. Table 1 summarizes these research projects related specifically to linkages between research and technology users that have been carried out by ISNAR. From the beginning, ISNAR's research in this area has been carried out in close collaboration with national staff from developing countries (Eponou 1993c, 1996; Kaimowitz 1990).

Supported by various donors at different times and focusing on separate aspects of linkages, these studies were aimed at understanding and resolving the chronic problems for technology generation and transfer that are created by deficient linkages between various actors within an AKIS. These previous projects had multiple objectives, including the development of diagnostic procedures, of practical guidelines for managers, and of publications, training modules, and other materials for dissemination.

The results of the earlier studies all highlighted the importance of developing linkage strategies and planning actions jointly within an agricultural knowledge and information system, as well as making joint decisions on responsibilities, if the quality of communication and interaction between the components of any AKIS were to be improved to facilitate technology flow. These lessons would be the conceptual basis of future ISNAR projects on linkages.

¹ An AKIS is a concept used to describe "system" actors (farmers, private and public sector organizations, and other stakeholders) involved in the generation, transfer, and management of agricultural knowledge and information.

A project entitled “Linkages between Research, Technology Transfer, and Farmers’ Organizations: Application of Linkage Lessons in Four Countries” was initiated in 1995. In this three-year study ISNAR’s earlier linkage research results were applied under the conditions prevailing in Tanzania, Zimbabwe, Mali, and Senegal. It was designed as an action-oriented effort and supported by the Ministry of Foreign Affairs of the Government of the Netherlands. This progression, from descriptive and analytical research to the actual application of these research results, represents a practical step involving the use, adaptation, and refinement of linkage knowledge.

The initiatives undertaken in the four participating countries were led by national teams² with the active participation of various national stakeholders in identifying linkage problems, devising linkage strategies, and developing linkage action plans for each country. The process was guided by ISNAR linkage planning concepts and was facilitated by ISNAR staff. The project stimulated actions and agreements on linkages in each country.

Table 1. ISNAR’s Research-User Linkage Projects

Project	Objectives	Countries	Outputs
On-Farm Client-Oriented Research (OFCOR) 1986	1. Develop guidelines for research managers on the integration of client-oriented research into the research system	Bangladesh, Ecuador, Guatemala, Indonesia, Nepal, Panama, Senegal, Zambia, Zimbabwe	<ul style="list-style-type: none"> • Guidelines on institutionalization of OFCOR • Training module on managing linkages in relation to OFCOR
Research-Technology Transfer Linkages 1987	<ol style="list-style-type: none"> 1. Identify key factors which influence linkages 2. Analyze weaknesses of linkages 3. Draw lessons and prepare guidelines for research managers 	Ivory Coast, Nigeria, Tanzania, Costa Rica, Colombia, the Dominican Republic, the Philippines	<ul style="list-style-type: none"> • Lessons and recommendations on the management of linkages • Tools for analyzing linkages
Linkages between Research and Farmers’ Organizations (FO) 1992	<ol style="list-style-type: none"> 1. Assess the existing linkage situation 2. Make recommendations to research managers and leaders of farmers’ organizations on improving linkages 3. Develop guidelines for analyzing and managing linkages between research and farmers’ organizations 	Burkina Faso, Ghana, Kenya	<ul style="list-style-type: none"> • Recommendations to research managers and leaders of FOs of three countries • Guidelines for analyzing and managing linkages between research and FOs
ISNAR/ODI Farmers’ Organizations Project 1994	<ol style="list-style-type: none"> 1. Examine the ability to express demand and exert pressure on public sector research 2. Examine the capacity to work as partners with public sector research 	Bolivia, Mali, Zimbabwe	<ul style="list-style-type: none"> • Understanding constraints on partnership with research • Enhanced capacity of FOs to influence and link with research

² The national teams were composed of representatives from research, extension, and farmers’ organizations.

Project Rationale

The quality and type of linkages between research and users³ directly influence the efficiency and effectiveness of agricultural knowledge systems for improving levels of production, particularly for non-commercial producers (Bagchee 1994; Eponou 1993a, 1993b, 1996; Gustafson 1994; Schwartz and Kampen 1992; World Bank 1990, 1994). Experience indicates that technologies should be tailored to producer conditions, and that the producers themselves should have a dominant voice in research problem identification and program orientation, planning, and resource allocation (Eponou 1993c; Zijp 1994). Yet the significance of linkages is frequently overlooked or ineffective solutions are attempted, such as changing policies or restructuring and reorganizing research and extension organizations (Eponou 1993c, 1-4).

Improvements in linkages between research, extension, and farmers represent one of the most promising means of reaching producers of all types with relevant technology, including resource-poor and subsistence-level producers. ISNAR research strongly indicates that solutions lie in the sphere of improved interactions between AKIS partners, through the development of linkage strategies, joint planning of actions, agreements on resource responsibilities, and other activities that improve cooperation and communications.

There are many *reasons* for the persistent and intractable nature of *linkage difficulties*, but the most fundamental, based on analysis, are

- continual and frequent changes in the institutional environment of the AKIS (including changes in leadership and decision making, and in structure and organization);
- changes in the conditions and needs of producers;
- insufficient financial and staff resources for linkage planning and implementation;
- multiple actors (especially various donors) using different approaches for linkage planning;
- inadequate communications and cooperation between the principal partners (research, extension, and farmers).

These constitute factors in the environment and context within which an AKIS functions, as well as elements that relate to linkage planning and consensus. Better linkage planning procedures and processes can influence, improve, or allow adjustments in both.

The resolution of recurrent linkage problems between research, extension, and producers involves addressing the *causes for linkage failure* that have been identified through ISNAR's research. In many countries these causes include lack of commitment and resources by investors and other major actors, poor coordination of linkage planning, lack of explicit resource

³ In this report "users" refers to the direct and primary targets of technologies produced by research, i.e., farmers' organizations and extension agents.

budgeting for linkages, absent or dysfunctional linkages caused by incomplete analytical procedures, and insufficient opportunities for consensus and agreement between the component organizations in the AKIS of individual countries.

Project Goal and Objectives

The aim of the project was to raise the capacity of managers of national agricultural research, extension, and farmers' organizations in four selected countries to plan and manage linkages. The project provided the opportunity to initiate effective linkages by establishing appropriate linkage strategies, mechanisms, and action plans, adapted to country conditions. The principal objectives were to

- assist participating countries (Mali, Senegal, Tanzania, and Zimbabwe) in addressing the linkage problems of their agricultural knowledge and information systems (AKIS);
- increase capacity within the selected NARS and their key partner organizations to diagnose and resolve linkage problems;
- improve linkage analysis methods and guidelines for linkage planning;
- disseminate linkage knowledge, lessons, and experiences through in-country application by national staff, and through the development of training materials for wider dissemination.

Ultimately, the project was intended to foster linkage improvements that will allow the AKIS of the participating countries to achieve

- significant input and influence from farmers, farmers' organizations, and extension on the research agenda;
- more effective dissemination of and improved access of farmers to research-generated knowledge, information, and technologies;
- effective participation of farmers, farmers' organizations, and extension services in adaptive research;
- improved mobilization of resources for the adaptation of technologies.

The principal anticipated project outputs for each country included

- analysis of the existing linkage situation;
- a linkage strategy;
- action plans for linkages.

In addition, the project aimed to refine and disseminate methods for improving linkages which incorporate lessons from the participating countries.

2. Project Design

Project Orientation and Strategy

The project began with initial guidelines for linkage planning derived from ISNAR's earlier research. The principal assumption was that the relevance and appropriateness of these methods and procedures would be decided by national staff, after their application under the unique conditions and realities in the participating countries.

The project used an action-oriented and participatory approach characterized by

- the use of a systems perspective (Röling 1990; Eponou 1996; Swanson and Peterson 1991) in addressing linkage issues, and the identification of shared objectives and a common mission;
- a consensus approach that focuses on the principal actors in establishing and managing linkages: research, extension, and farmers' organizations (as representatives of each country's producers);
- initiating and stimulating actions for linkage improvement in each of the four participating countries by providing concepts and some resources for linkage analysis and planning;
- the adaptation of ISNAR procedures, concepts, and methods by national teams to fit country and system conditions and needs, and the development of linkage strategies and solutions unique to each country;
- leadership of the initiatives and decisions by national project teams, with ISNAR staff playing only a facilitation role;
- a focus on developing realistic linkage action plans for consideration by investors and decision-makers.

The success of the linkage planning procedures and their further development was determined by national staff members in the four countries. In each country, the progress and path of linkage planning was different and unique, and the impact of the project was considered substantial by those participating.

Linkage Planning Process

A recommended process for organizing the planning of linkages with users was provided by ISNAR at the outset of the project, and is summarized in table 2. The framework suggested the following series of events and actions to guide the process of strengthening linkages:

- a *first workshop*, bringing together all AKIS partners, to generate greater awareness of and interest in linkage issues, to assess the linkages in place, to reach a consensus on the need to improve the linkage situation and on

how to proceed, and to create a national task force and a steering committee to follow up on the decisions taken;

- an *analysis*, by the national task force, of the linkage situation. Based on the analysis and a greater understanding of linkage issues, appropriate strategies and a realistic action plan would be developed, and responsibilities allocated;
- a *second workshop* to discuss and agree on the proposed strategies and action plan, and on their implementation and follow-up. To the extent possible, the participants should be the same as those who took part in the first workshop to avoid or minimize renewed discussion of issues previously resolved;
- a *periodic review and evaluation* of strategy and action plan implementation, with a view to monitoring their progress, maintaining dialogue among the partners, and adjusting the process where necessary.

Table 2. Framework for Organizing the Linkage Planning Process

	First Workshop	Analysis of Situation	Second Workshop	Monitoring and Evaluation
Objectives	<ul style="list-style-type: none"> • Obtain consensus on the need to improve linkages • Identify main constraints • Set up analysis team and steering committee 	<ul style="list-style-type: none"> • Obtain better understanding of the constraints in order to recommend solutions • Prepare draft action plans 	<ul style="list-style-type: none"> • Discuss and adopt the draft action plan and recommended solutions • Approve means of monitoring linkage activities 	<ul style="list-style-type: none"> • Improve linkage strategy and plans • Investigate quality of information flow between actors
Inputs	<ul style="list-style-type: none"> • Introductory concept paper by facilitator • Experiences and position paper from each partner 	<ul style="list-style-type: none"> • List of constraints • Reports of past linkage events • Results of interviews with people involved in linkages 	<ul style="list-style-type: none"> • Draft action plans and analysis of recommendations • Monitoring mechanism draft 	<ul style="list-style-type: none"> • Action plans and implementation schedule • Staff allocated for linkage monitoring and evaluation
Outputs	<ul style="list-style-type: none"> • Consensus to improve the situation • List of constraints and issues • Analysis team and steering committee 	<ul style="list-style-type: none"> • Recommendations to address constraints • Draft of action plans 	<ul style="list-style-type: none"> • Approved action plans and proposed solutions for constraints • Approved monitoring mechanism 	<ul style="list-style-type: none"> • Improved linkage strategy • Improved action plans
Actors	<ul style="list-style-type: none"> • NARS, extension, farmers' organizations, donors, facilitator 	<ul style="list-style-type: none"> • Analysis team, steering committee, facilitator 	<ul style="list-style-type: none"> • NARS, extension, farmers' organizations, donors, facilitator 	<ul style="list-style-type: none"> • Analysis team, steering committee, monitoring unit

It was expected that this framework would need to be adapted to the different needs, conditions, and opportunities in each country. During the course of the project, such modifications to the framework were made by national teams; flexibility was important for the success of the project. Box 1 provides some examples of adaptations in participating countries.

Box 1. The Linkage Project Followed a Unique Path in Each Country

A framework for organizing linkage planning was suggested by ISNAR, to be adapted to AKIS conditions in each of the participating countries. National leadership and ownership of the action-oriented project for linkage planning resulted in unique processes and outcomes in each of the four participating countries.

Mali: The linkage planning process proposed in the ISNAR framework was most closely followed in this country. A first workshop established the linkages task force, identified issues, and laid out a work plan. A second workshop formulated agreements on solutions to linkage problems and developed an action plan. Regional meetings were then held to discuss the solutions and adjust the action plan based on the needs of each region.

Senegal: Since the country had previously established a task force to work on linkages, the process was altered. The first workshop proposed by the ISNAR guidance framework was not held because many of its outputs had already been accomplished by the existing task force (i.e., consensus to improve linkages, constraint analysis). Instead, the task force combined some objectives from both workshops proposed in the ISNAR framework (e.g., the definition of an institutional framework for linkage and the planning and resolution of some basic issues). In addition, decisions were made to develop regional linkage strategies and action plans through meetings in each region and to establish a monitoring unit.

Tanzania: The first and second workshops followed the process suggested by ISNAR and developed a linkage strategy and action plan for the national level. Subsequently, it was decided to develop action plans for selected districts in the Northern Zone of the country on a pilot case basis. Tanzania was the only country to bring linkage planning at the local level as an added objective. Future planning will focus on similar local level planning in other zones.

Zimbabwe: A first workshop was held, as suggested in the process framework, and produced the results expected. However, the process was disrupted at that stage and further linkage planning was subsumed by the Agricultural Research Council. The ARC established national, regional, and provincial committees with linkage planning responsibilities. Development of action plans for the provinces was delayed by government re-organization activities.



Figure 1: The four case-study countries

3. Country Experiences, Activities, and Achievements

Two countries in Francophone Africa, Senegal and Mali, and two in Anglophone Africa, Tanzania and Zimbabwe, participated in the three-year project. In each country, ISNAR provided facilitation in organizing the process and guidance with basic concepts. The project provided funds for linkage meetings related to establishing the process, analyzing the linkage situation, and developing linkage action plans.

In each country the linkage process was adapted to existing conditions and situations, and the experiences and results were different. This was a reflection of a project design that included leadership and decision making by national staff, flexibility to adjust to country linkage needs and situations, and a role for ISNAR limited to broad conceptual guidance and facilitation.

The points discussed below for each country are drawn from two regional assessment workshops held in 1997,⁴ various meetings, and notes.

Senegal

A significant proportion of Senegal's population is economically active in agriculture (approximately 30%), and agriculture's share in GDP is around 18% (Mazzucato and El-Habib Ly 1994). In spite of the importance of agriculture in the country, decreasing financial resources for public sector research and extension since 1985 have diminished their capacity to respond to farmer needs.

Producers traditionally have played a passive role in providing input into research and extension agendas, but due to recent trends in the AKIS, attempts are being made by government to improve linkages with producers and other actors in the system. Recent trends in the AKIS context include

- decentralization of government research and extension efforts to the regional level;
- continued decreases in resources for research and extension, and increased donor involvement;
- increased importance of farmers' organizations and their access to donor funds;

⁴ The first was held August 27–29 in Dar es Salaam, Tanzania, and the second was held September 15–17 in Saly, Senegal, not far from Dakar.

- increased involvement of the NGO community, related to their work with farmers and farmers' organization;
- limited involvement of the private commercial sector in technology development and dissemination.

The devaluation in the region of the African Finance Community (CFA)⁵ franc improved market incentives for farmers, which resulted in greater producer demand for technology. The emergence of a more open and integrated regional market with improved access for producers was also a factor in the increased demand for technology. Both factors created new pressures for more effective and responsive research and extension in Senegal, as well as an AKIS that emphasizes partnership and cooperation between component actors. In this context, the linkages project was initiated; it coincided with a recognized need to improve linkages.

The process

ISNAR's first visit, aimed at discussing the project with the managers of the AKIS, took place in January 1995. These managers were aware of the ineffectiveness of linkage policies and strategies in place and on their own initiative had appointed a task force, called the *cellule de réflexion méthodologique*, to assess the linkage situation and to suggest solutions. The members of this task force were from the core institutions of the AKIS, namely, the Institut Sénégalais de Recherches Agricoles (ISRA, the Senegal institute of agricultural research), the Institut de Technologie Alimentaire (ITA, the institute of food technology), the Programme National de Vulgarisation Agricole (PNVA, the national program of agricultural extension), and the Comité National de Concertation des Ruraux (CNCR, the major federation of farmers' organizations).

Given the awareness of the AKIS managers about linkage weaknesses and the actions already taken (an analysis of linkage problems and constraints had previously been carried out by the task force), it was decided there was no need to have the first national workshop as suggested in the process framework. Instead, a meeting of the task force, extended to include a few representatives of other institutions involved (including CONGAD, the national council of NGOs), was organized to enhance its effectiveness and speed up the analysis.

The major outcomes of the meeting were: a work plan, a timetable, and a redefinition of the task force's assignment and expected output. It was agreed that the task force would define an institutional framework for strengthening partnerships within the AKIS, that specific linkage strategies and mechanisms for technology generation and transfer would be identified at the regional and local levels, and that the types of technologies needed by each of the diverse farming systems of the AKIS should be taken into account.

⁵ The African Finance Community includes Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo (Brazzaville), Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea-Bissau, Mali, Niger, Senegal, and Togo.

The approach was based on the principles that there is no single recipe for linkages; and that mechanisms should be selected according to the nature of the technologies, the type of gap in information flow, the resources available, and the capacities of the actors involved in the technology generation and transfer process.

At a meeting organized in September 1995, the task force shared its results and recommendations with representatives of selected institutions. In addition, the meeting sought inputs from a panel of other researchers, extension agents, and farmers considered by the committee to be knowledgeable in linkage issues. Inputs were also sought from ISNAR, which was invited to the meeting. A preliminary institutional framework for building a strong partnership within the AKIS was discussed and improved. The project was instrumental in creating this framework, which is composed of a national orientation committee, a national coordination committee, and regional research subcommittees.

The national orientation committee: The national orientation committee is the highest AKIS policy- and decision-making body and is made up of top managers from CNCR, ISRA, PNVA, and ITA. It defines the major orientations and strategies of research and technology transfer, including linkages, and seeks the resources needed to make the process effective. This committee was established to address several weaknesses (Eponou, 1996), including

- lack of an enabling environment for linkages;
- absence of leadership;
- nonrecognition of the policy dimension of linkages;
- absence of a systems perspective.

The national coordination committee: The national coordination committee, with two representatives from each of the four institutions mentioned above, is a technical body responsible for

- applying the decisions of the national orientation committee;
- assisting regional subcommittees in designing appropriate strategies and mechanisms;
- monitoring linkages and adjusting solutions over time.

The task force which designed the framework became the national coordination committee, composed of the same members. The committee has a secretariat based at CNCR with a permanent secretary who also operates as the technical assistant to CNCR for technology generation and transfer.

The national coordination committee organized several meetings and workshops at the regional level to inform the actors of technology generation and transfer of the new philosophy and approach to linkages. It also assisted seven regional subcommittees in organizing themselves and designing appropriate mechanisms for implementing research and development projects.

The regional subcommittees: Regional subcommittees (established under pre-existing parent committees) for technology generation and transfer were

set up in each of the ten administrative regions of Senegal to implement linkage strategies and actions. Members of the subcommittees were drawn from all agricultural development institutions, including NGOs and farmers' organizations. The parent committees remained in charge of coordinating agricultural development programs and projects at the regional level.

The regional subcommittees design linkage strategies and action plans at the regional and local levels, and assist in implementing and monitoring them. They can request assistance from the national coordination committee. The regional subcommittees also have fora to exchange experiences.

A national workshop was held in February 1996 to present the institutional framework for linkages to the managers and staff members of the institutions involved. At the request of farmers, the workshop was held in Wolof, the most widely-spoken national language. The framework was well received, especially by farmers who acknowledged a substantial improvement in the participation and role of their organizations in technology generation and transfer. Not only was CNCR treated as an active partner in the system, but it also had a voice equal to that of the research and extension service institutions.

In order to make the institutional framework effective, the various committees are being connected through e-mail and a database is being established to allow for increased flow of information among the parties.

Linkage planning achievements — Senegal

The specific outputs from the project planning initiatives in Senegal were

- an action plan;
- linkage strategies for some regions;
- an institutional framework composed of two national committees and the regional subcommittees.

The major achievement was the establishment of a stronger systems perspective among partner institutions in the AKIS, an important step in linkage improvement. All the components of the AKIS are now aware that this perspective is essential for improving the performance of the system. An attempt was made at a special workshop in April 1996 to bring the private sector, the universities, policy makers, and other users of agricultural technologies into the system. Other achievements include the following:

- The policy dimension of linkages is recognized. The system's top level managers provide more leadership than in the past.
- There is a stronger partnership among the institutions of the AKIS. Activities which normally would have been undertaken by individual institutions without consulting the others, are now discussed within the context of the new institutional framework.
- There is a framework for dialogue at various levels, and responsibilities are clearly defined for each of the bodies set up within it.

- The institutions and their staff have a better understanding of each other's roles and assignments. This has improved the climate for collaboration.
- The actors in the AKIS feel that they have more ownership since the institutional linkage framework was designed by them with limited external involvement.
- The federation of farmers' organizations (CNCR) is treated as a full partner in the technology generation and transfer process. This enhanced its confidence in dealing with technology-related issues and strengthened its position in the process. Its members are convinced that they can play a role in dealing with their technological problems. The CNCR has recently initiated research and technology transfer projects in collaboration with the FAO. It is also willing to contribute to financing some aspects of agricultural research.

As a result of these actions and achievements, there is now an improved in-country capacity to analyze linkage problems and to find appropriate solutions.

Problems and challenges — Senegal

Improving linkages is a long and complex process; consequently, some problems or obstacles emerged during the project, and some challenges remain to be dealt with.

The problems experienced by Senegal included⁶

- insufficient communication mechanisms, with poor circulation of information;
- insufficient financial and human resources provided by the partner institutions for linkage planning;
- un-sustainability of planned initiatives due to lack of resources;
- duplication of linkage planning efforts;
- funding decreases for government research and extension, leading to decreased public sector intervention for linkage planning and implementation;
- lack of follow-up;
- limited involvement of other actors (private sector, universities, etc.).

The challenges include

- setting up effective programs for linkage actions in each of the country's ten regions;
- improving linkage mechanisms at the operational level;
- mobilizing and sharing resources among partners;
- securing financial resources to sustain the new institutional framework for linkage planning.

⁶ The problems were discussed in a background paper and at working sessions during the regional assessment workshop for participating francophone countries (Institut Sénégalais de Recherches Agricoles and ISNAR, 1997).

At the close of the project, the following were identified as actions to be pursued in the future:

- developing regional linkage strategies and action plans through joint planning, using a participatory approach. This provided the opportunity to train more scientists, extension agents, and farmers in adopting the participatory technology-development approach;
- designing appropriate linkage strategies and mechanisms at the regional and local levels, improving the e-mail network, and establishing a linkage database. The mechanisms were to be tested through specific (jointly-selected) projects and progressively extended to all technology generation and transfer projects;
- identifying mechanisms for resource mobilization and sharing. The possibility of setting up a foundation for technology generation and transfer was explored.

Prospects for making more progress in strengthening AKIS linkages in Senegal are good, given the commitment at all levels of the system. The increasing interest of donors in the changes taking place also reinforces the likelihood of success.

Mali

The relative importance of agriculture in Mali is high, with the agricultural share of GDP approximately 45%, and 80% of the population economically active in agriculture (Mazzucato 1994). Trends affecting the AKIS in Mali are similar to those observed for Senegal: declining resources (staff and funds) for public sector research and extension; decentralization of government research and extension efforts to the regional level; increased donor involvement; increased importance of farmers' organizations and their access to donor funds; increased involvement of the NGO community with producers; and limited involvement of the private commercial sector in technology development and dissemination.

These contextual forces have created pressure for the government to strengthen the partnerships and linkages between components of the AKIS. As in Senegal, the devaluation of the CFA franc (mid-1990s) and improved regional market access triggered increased producer demand for improved technology as they responded to market incentives. Since resources for public sector technology development and dissemination were decreasing, government initiatives to improve linkages became even more important. The government also decided to re-structure its agricultural institutions to solve problems of duplication of effort and inefficiency in technology generation and flow.

Since 1982, the Institut d'Economie Rurale (IER), the major agricultural research institute in Mali, has initiated several actions to enhance the flow of relevant technologies to farmers. Although not all of these actions were successful, Mali was one of the first Francophone countries to adopt the Farming

Systems Research approach. Policy makers as well as research managers continue to seek ways of improving the effectiveness of research. It is in this context that the top-level managers of the AKIS decided to participate in the linkages project.

The process

Top-level managers of key AKIS partners were first contacted during ISNAR's visit in January 1995. They included grassroots farmers' organizations, a users' committee set up by the World Bank to represent the whole farming community, as well as the Chamber of Agriculture and Union of Cotton Producers as independent bodies representing farmer interests.

Given the context, the AKIS managers showed great interest in the project and were keen to try the approach suggested by ISNAR. The major outcomes of the visit were

- an agreement among top-level managers to test the approach for strengthening linkages;
- the appointment of a national counterpart for the implementation of the project;
- a tentative date and agenda for a first national workshop.

First workshop: This workshop took place in June 1995. It was organized along the principles and instructions defined by the ISNAR approach (Eponou, 1996) and had as its objectives the following:

- raising awareness of the importance of linkages;
- reaching a consensus among the institutions of the AKIS to address ineffective linkage policies and strategies;
- selecting a steering committee and a task force to do the analysis.

The major outcomes of the workshop were

- the identification/analysis of broad linkage problems related to (1) research and extension policies, (2) the ineffective organization and structure of research and extension, (3) the lack of appropriate linkage strategies and mechanisms, (4) the inadequacy of resources; (5) heavy donor interference in the AKIS, and (6) the limited capacity of farmers' organizations to be partners in the technology generation and transfer process;
- the establishment of an institutional framework for linkages;
- the definition of terms of reference for the task force;
- a time table for the implementation of the project.

The institutional framework for linkage planning, established at the workshop, consisted of (1) a steering committee, (2) a task force, (3) regional committees, and (4) user committees (national, regional, local).

The steering committee (*comité de réflexion*) was established to examine linkage policy issues. It was composed of the director general of IER, the director of the national extension program (PNVA), and the chairman of the national users committee.

A task force was established to develop linkage strategies and action plans and to provide technical direction and support at the regional level. The group was made up of representatives from the national users committee, the Permanent Assembly of the chambers of agriculture, research (IER), extension (PNVA), the NGO coordination committee, the national directorate of cooperatives, the national project for natural resource management, and the Malian Company for Textile Development.

Regional committees were established under the project to implement and manage the action plans. These committees were made up of representatives from the key actors within the AKIS, though their composition varies from region to region. In general, regional committees were composed of the directors of regional offices of research and extension, regional research and extension staff, research station staff, the leaders of farmers' organizations important in the region, staff from major development projects active in the region, and representatives of major commercial enterprises important to the region.

Users committees at the national and regional levels had been established under a donor project. They were strengthened under the linkage project initiative by adding producer representatives from local communities selected by grassroots farmers' organizations. The local users committees convey farmer needs and feedback to other partners of the AKIS.

Analysis of linkage situation: The analysis took approximately four months and was done by the national project team. In accord with project design there was very limited input from ISNAR staff. Three techniques were used for data collection:

- 1. Literature review:** The task force started the data collection process by doing a literature review to familiarize itself with linkage issues and to derive lessons from past experiences. The documents reviewed include minutes of program formulation and priority-setting meetings. The review was useful in that it helped the task force to focus its investigations.
- 2. Interviews:** Top-level managers, policy-makers, station and regional managers, scientists, extension agents, leaders of farmers' organizations and NGOs, individual farmers and donors were interviewed in Bamako and in four regions. For effectiveness, the task force split itself into three teams and interview guidelines were prepared.
- 3. Direct observations:** During their visits to the regions, the teams took part in linkage events, such as diagnosing farmers' problems, bi-monthly meetings of extension services, priority-setting meetings, etc.

During the analysis and formulation of solutions to linkage problems, the task force maintained contacts with the steering committee and its individual members. ISNAR views were sought on specific issues. The major outputs of this phase were an analysis of the situation, suggestions for dealing with the issues, and an action plan for implementing the solutions.

Second workshop: In February 1996 the results of the analysis, the recommendations, and the action plan were shared with the managers and staff of participating institutions. Major problems identified during the workshop are described on page 32.

The recommendations made during the workshop were aimed at achieving the following:

- better coordination among various extension services, including NGOs involved in technology transfer;
- improvement of existing linkage mechanisms and establishment of additional mechanisms where gaps in the flow of information and knowledge were identified;
- strengthening of farmers' organizations and improvement of their capacity to operate as full partners in the AKIS; and
- mobilization and improved management of resources for linkages.

Actions to be implemented during the period 1996-2000 were identified. Even though some of the actions, especially those dealing with research and extension policies, were not linkage matters in a strict sense, they were important for the project initiative because of their heavy bearing on the effectiveness of linkages (e.g., the need to acquire adequate resources, improvements in structure and organization, etc.).

Organizational and structural weaknesses (heavy centralization, duplication of efforts, absence of internal communication channels, etc.) were identified during the course of the project. These findings were used during the restructuring of public sector rural institutions, which took place shortly thereafter.

The task force went back to the regional committees to discuss the results of the study, including the action plan. Each region was requested to define linkage strategies and mechanisms within the overall national framework. The strategies and mechanisms were to take into account the characteristics of the farming systems in the regions. The task force provided assistance where necessary to the regional linkage committees.

Monitoring and evaluation: After November 1996, the task force monitored the implementation of the action plan and progress made in improving linkages. Four means of improving implementation were identified for possible action: delegation of responsibility to extension technical staff for the implementation of field tests; training of extension staff in experimental protocols; authority for extension to select farmers and villages for collaboration with research; and the possible establishment of follow-up research or extension missions to assess test results.

Linkage planning achievements — Mali

The major outputs of the project in Mali were

- a full assessment of the linkage situation and solutions to deal with the issues identified;

- an action plan to strengthen linkages;
- a national framework for strengthening linkages;
- regional strategies for planning and implementing linkages.

As in the Senegalese case, the major achievement was the building of a systems perspective in the AKIS. All the components of the AKIS are now aware that this perspective is essential for improving the performance of the system. Here too, an attempt has been made to broaden the AKIS by bringing in other institutions and small scale industries, especially those dealing with agricultural product processing. Other achievements include the following:

- The policy dimension of linkages has been reinforced through the establishment of a steering committee. Owing to the committee, there is greater leadership in the AKIS.
- The position of farmers' organizations within the AKIS has been reinforced by involving grass-roots farmers' organizations to complement the users' committees. Other community level organizations have also been sensitized to the usefulness of having linkages with research.
- National capacity to analyze linkage problems and find appropriate solutions has improved.
- The various actors within the AKIS "own" the results achieved through the process, and this has reinforced their confidence in seeking solutions to the problems they face.
- As in the case of Senegal, improving linkages has moved up in the list of priorities for making agricultural research effective.
- The recognition of farmers and their organizations as constituencies for agricultural research has improved and could result in more funding for research.

Finally, the project has contributed to the restructuring of rural institutions by identifying and analyzing issues related to structure and organization (e.g., the need for decentralization, and the duplication of tasks and responsibilities among institutions).

Problems and challenges — Mali

In spite of the achievements listed above, problems and challenges remained. During the workshops in 1995 and 1996, and at the working sessions in 1997, the more important linkage problems discussed related to

- insufficient and ineffective mechanisms to mobilize funds;
- the financing of farmer participation;
- limited and delayed exchanges of information, and poor publicity about linkage initiatives;
- limited commitment by directors of regional users committees, and weak links between these committees and other partners;
- the absence of formal ties between the various actors;
- the limited capacity of producers and producer organizations to participate in planning and implementation.

The most important challenges that remained at the end of the project included

- refining strategies and appropriate mechanisms for each region; more needs to be done in this area in spite of the progress made;
- mobilizing and sharing resources among partners;
- securing financial resources to sustain the process of strengthening linkages;
- strengthening farmers' organizations;
- using new communication technologies to improve information exchange between the institutions of the AKIS.

Given the high degree of AKIS commitment to improving linkages, the prospects for more progress are good, in spite of the problems and challenges mentioned above.

Box 2. Project Similarities and Differences between Participating Francophone Countries

Similarities between Mali and Senegal:

- An AKIS change process was underway in both countries at the time of project initiation.
- Both countries provided national resources for the project, indicating strong commitment.
- Both countries defined linkage strategies at national and regional levels.
- Open and egalitarian discussions were characteristic of interactions between representatives of the key linkage institutions, and both countries had committed and analytical task forces.
- Insistence on linkage solutions defined by national project teams was essential in discussions with major donors; both countries proposed and adopted alternatives developed by their national project teams.

Differences between Mali and Senegal:

- There was a pre-existing linkage task force in Senegal and more initial knowledge of linkage problems existed.
- The Senegal research system is more decentralized and therefore regional task forces, in addition to a national task force, were established. Mali used one task force for both national and regional levels, reflecting a more centralized system.
- More progress was made toward the establishment of a linkage monitoring system in Mali.

Tanzania

Tanzania is heavily dependent on agriculture, which accounts for about 58% of GDP, 85% of exports, and employs 90% of the economically-active population. Since the early 1980s Tanzania has pursued institutional and policy reforms aimed at restoring economic growth. Among the reforms have been cost-sharing arrangements to address budgetary constraints, and the re-trenchment of staff to balance the government budget.

Tanzania has also adopted political reforms, and in 1995 held its first multi-party elections. These political reforms call for greater accountability, as well as the participation of the population in decision making. Agricultural markets have been liberalized, although this has had negative effects on market-dependent farmer cooperatives, the dominant form of producer organization.

In Tanzania linkages have been affected in the past by excessive centralization of government research and extension services, characterized by a linear and top-down generation and transfer of technology. The ISNAR linkages project was undertaken by the Department of Research and Training in the Ministry of Agriculture and Cooperatives as a means of improving this situation.

The project was initiated in the political, market, and policy context described above during widespread agricultural program and project planning by government and donors. It supported efforts to implement government reforms and improve the role and voice of farmers in the AKIS.

The process

The project started in Tanzania in February 1995 with a visit by ISNAR to Tanzania to initiate the process and discuss procedures with core partners in the AKIS: the departments of research and training and of extension services of the Ministry of Agriculture and Cooperatives; and two farmers' organizations (the Tanzania Federation of Cooperatives, and the Tanzania Cooperative Movement).

Top-ranking officials from these organizations were contacted because of the need for high-level commitment and decision-making for linkage planning, and because collaboration among principal actors required the endorsement and sanction of those in authority.

The major outcomes of these preliminary meetings included

- broad interest, recognition, and acceptance of the importance of a linkages initiative;
- acknowledgment of the failure of previous attempts to forge strong linkages between the key organizations within the AKIS;
- recognition of the lack of cooperation and communication between farmers' organizations, research, and extension.

Following the deliberation and endorsement of the project by these actors, preliminary arrangements were made for a first workshop to bring the three major organizations together to improve linkages between research and technology users.

First Workshop: The first national linkage workshop in Tanzania was convened in April 1995, with representatives from the Department of Research and Training, the Department of Extension Services, the Tanzania Federation of Cooperatives, the Tanzania Cooperative Movement, and ISNAR. Observers from donor organizations and NGOs were also present, including the Netherlands Embassy, the Tanzania office of the World Bank, and Sasagawa Global 2000. The objectives of the workshop were to

- share the project approach and linkage concepts with research, extension, and farmers' organization participants;
- identify linkage issues for in-depth analysis and formulation of recommendations;
- agree on an institutional framework (including the selection of a project team and the nomination of an advisory committee) and an implementation strategy.

The outcomes of the workshop were an assessment of the existing linkages situation, an identification of linkage issues, and the definition of an institutional framework and organization for linkage responsibilities. These are described in greater detail below.

1. The major points discussed during the assessment of the linkages situation were
 - the lack of farmer or farmers' organization involvement in research agenda setting, implementation, and dissemination of results;
 - the infrequency of linkage planning meetings and events due to lack of funds;
 - the absence of policy statements regarding the involvement of partner organizations in linkage planning and implementation;
 - the lack of explicit budgeting for linkage plans, leading to few joint linkage activities;
 - the lack of resource contributions for linkages by farmers' organizations;
 - the limited involvement of NGOs in linkage planning and activities;
 - the need for full involvement of partner organizations in relevant events and meetings.
2. Issues related to facilitating linkage planning and implementation were identified at the first workshop for further investigation by the linkages team. These issues included
 - resources for linkages;
 - linkage management;
 - staff motivation for linkage actions;
 - coordination of activities and structures;
 - organizing resource contributions from farmers' organizations;

- system and awareness building;
 - defining linkage actor representation and the sharing of responsibilities;
 - developing a policy statement conducive to effective linkage planning.
3. The institutional framework and organization for linkage responsibilities defined during the workshop includes linkage project teams and advisory committees. Both were established at the national and zone levels, with representation from farmers' organizations, and the research, and the extension departments.

The terms of reference for the linkage teams were to

- conduct in-depth studies of the linkage situation to explore the feasibility of implementing the proposed strategy;
- produce consolidated linkage action plans;
- undertake other activities as the need may arise.

The terms of reference for the advisory committees were to

- provide guidance to the linkage project teams;
- monitor implementation of the plans;
- seek policy support or authorization for activities of the project that may need such support.

These teams and committees were committed to operating in a participatory manner, consulting and involving major stakeholders as much as possible.

Second Workshop: In November 1995 a second workshop was held to discuss the diagnosis of the linkage situation and to outline a viable action plan acceptable to all the major stakeholders. The workshop was attended by representatives from the research and extension departments, farmers' organizations, and NGOs.

The specific objectives of the workshop were to

- discuss and ratify the linkage action plan presented by the national-level linkage team;
- generate procedures for monitoring the implementation of the linkage action plan;
- agree on an implementation schedule.

The primary outcomes from the workshop were

- adjustments in the status and authority of the key partner organizations;
- an agreement among representatives that government would need to seek the resources to finance linkage-related activities;
- an agreement to provide farmers' organizations with training in linkage concepts and procedures.

Resolutions were made to establish district level teams to coordinate the linkage activities of development projects with the linkage action plans. These

teams would be responsible for implementation of linkage activities at the grassroots level.

Additional activities and meeting were carried out by the linkage teams in Tanzania in 1996 and 1997. The most significant of these were

- the identification of linkage needs and activities for producers in the Northern Zone, carried out jointly by research, extension, and farmers' organizations;
- a pilot linkage action plan, developed by research, extension, and farmers' organizations for selected districts in the Northern Zone. It identified resource contributions and partner organizations' responsibilities for implementation;
- a proposal for funding the Northern Zone action plan, prepared for donor consideration;
- a series of progress and assessment meetings, held in April 1997 between the national linkage team and ISNAR.

A final regional workshop involving Tanzania, Zimbabwe, and ISNAR was held in Dar es Salaam in July 1997 to assess progress and exchange experiences among project participants.

Linkage planning achievements — Tanzania

The specific outputs of the project in Tanzania were

- the formation of a steering committee and national and zone level teams to establish linkages improvements;
- a diagnosis/analysis of the linkages situation, carried out by a national team with representation from farmers' organizations, extension, and research;
- the development of a broad strategy for the improvement of linkages;
- the development of an action plan for linkages in the Northern Zone (a pilot plan), with the cooperation of extension, farmers, and research. It included budget estimates for the mechanisms/actions identified and agreements on cost sharing among partners.

Major project achievements in Tanzania were identified by participants during the April 1997 progress meetings and during the final workshop in July 1997. They include

- venues and opportunities for representatives from research, extension, and farmers' organizations to meet and reach agreement on linkage plans and actions, such as the project workshops and meetings;
- improved communications between key organizational actors;
- refocused and reemphasized attention to the importance of linkages;
- stimulating national action on linkages;
- high-level decision and policy maker support for linkage planning procedures that will be used in future projects;
- Ministry support for the inclusion of line items in project budgets to cover the expenses of linkage planning and implementation.

Problems and challenges — Tanzania

As with all applied and adaptive research, there were unanticipated factors and conditions that affected linkage planning during the project's lifetime. The most important of these in Tanzania were

- The complexity of the linkages context and the effects of the activities of other AKIS actors (e.g., donor agencies, NGOs) on linkage planning were underestimated as factors in designing and implementing linkage plans.
- Insufficient time was allowed for the institutionalization of linkage improvements. Realistically, this would take much more time (5-8 more years) because of institutional change implications for the policies, mandates, structures, and organization of the principal partners (research, extension, and farmers' organizations).
- No source of funds for implementation of the linkage action plan for the Northern Zone was identified; hence a delay in the implementation of the action plan occurred.
- The effectiveness of the steering committee was influenced by personnel changes and imperfect communications between partners about the project activities.
- There was limited awareness of the initiative beyond the national linkage team, and limited commitment by the government in terms of funds and "push" by decision makers during the first two years of the project. This resulted in lack of agreement on linkage planning procedures among various actors, especially in national-scale donor projects.
- The need for facilitation and guidance from ISNAR was underestimated.

The following actions were subsequently taken to resolve some of the impediments:

- proposals were prepared for funding the implementation of the Northern Zone action plan;
- partner institutions agreed to improve communications by exchanging progress reports on meetings and actions related to linkages;
- a workshop on the linkage planning initiative was undertaken in August 1997 that greatly improved linkage awareness within the AKIS and established decision-maker support at the highest levels for linkage planning and its coordination among actors.

The priority linkage challenges for the future in Tanzania are to

- follow-through on agreements between government and donors to coordinate linkage planning and funding;
- develop action plans for each zone in Tanzania, in cooperation with donors, research, extension, and farmers' organizations;
- create capacity for linkage monitoring and evaluation.

Zimbabwe

The agricultural sector in Zimbabwe contributes about 14% to GDP, employs around 65% of the economically-active population, and provides over 40% of the country's total exports (Roseboom et al. 1995). Recent trends in the realm of the AKIS include the reorganization of research and extension to provide representation of commercial and small-scale farmers' organizations at national, regional, and local levels; declining investments by government and donors in research and extension; and rapid change related to the reform of government research and extension institutions to make them producer-demand driven. The formulation of a World Bank agricultural investment program in 1996 and 1997 stimulated the reorganization of public research by strengthening the authority of the Agricultural Research Council (ARC), and by placing representatives of farmers' organizations, extension, and other AKIS stakeholders on decision-making bodies at national, regional, and local levels.

The linkages project was initiated in this context of diminishing resources, institutional reform, and the need to improve cooperation and communications between producer organizations and other actors in the AKIS.

The process

The project started in Zimbabwe in February 1995 with a meeting between ISNAR and the director of the Department of Research and Specialist Services (DR&SS) of the Ministry of Agriculture to agree on the department's involvement and to initiate the process. Procedures for coordinating project activities with other AKIS stakeholders were discussed. A representative of an on-going ISNAR/ODA linkage project focusing on research-farmers' organization linkages related to farming systems and on-farm research was also present to establish coordination between the two projects. DR&SS agreed to participate in the project and to assist in organizing the first workshop.

First workshop: The first linkage planning workshop was held in August 1995. It was attended by representatives of the core actors in the AKIS: DR&SS; the Department of Agricultural, Technical, and Extension Services (AGRITEX); the Zimbabwe Farmers Union; and the Indigenous Commercial Farmers Union. The workshop objectives were to

- familiarize participants with the procedures and methods of linkage planning developed by ISNAR;
- analyze the existing linkage situation and discuss linkage issues;
- get the linkage perspectives and recommendations of participating representatives from research, extension, and farmers' organizations;
- establish an institutional framework and institutional responsibilities for linkage planning;
- develop an implementation plan for the linkages initiative.

The major outcomes of the workshop were

- a proposed institutional framework for linkage planning;
- the formation of a linkage task force and its terms of reference;
- a preliminary action plan for national linkage planning activities;
- a preliminary analysis of the linkages situation and identification of linkage issues.

The workshop participants also agreed that the Zimbabwe Farmers Union would develop a proposal for altering the Committee for On-Farm Research and Extension (COFRE) to be the locus for linkage planning.

Because of changes in the organization and responsibilities of the Agricultural Research Council (ARC) which shifted linkage planning responsibilities to the ARC, no second workshop was held. The ARC established an institutional framework related to multiple tasks, including linkage planning in 1997. As a result the institutional framework for linkages (an adaptation of COFRE) was not adopted.

Other meetings and activities: During 1997, the ARC proposed and endorsed the establishment of committees at the national and provincial levels that would, among other responsibilities, address linkage matters. These meetings did not involve the project task force. The linkage initiatives and proposals of the project were considered, but not used by ARC.

ARC established its own Linkages Task Force in 1997. Meetings were held between members of a secretariat for the ARC Linkages Task Force and ISNAR staff to bring the linkage project into line with ARC actions on linkages. It was decided at this meeting that provincial level committees, established by the ARC and representing the major actors in research-user linkages, would be responsible for developing linkage action plans for each province by the end of 1997.

Linkage planning achievements — Zimbabwe

The project made less progress in Zimbabwe than in the other participating countries. In general, awareness of linkage planning procedures and methods is less developed within the Zimbabwean AKIS.

Project outputs: The specific outputs of the project in Zimbabwe during its first year are identified below. Many were ineffective due to subsequent reorganization efforts in the Ministry of Agriculture, although the project influenced changes in the ARC in a broad sense. The lack of opportunities and occasions for the project task force to coordinate with the re-organized ARC was the principal reason why project outputs were set aside.

- A preliminary analysis and diagnosis of the existing linkage situation was carried out.
- A national linkages task force was established, and its TOR and composition were defined (however, it never met due to subsequent changes in the Ministry and different linkage initiatives by the ARC).

- A proposal to redefine COFRE as the committee responsible for defining the linkage strategy and approach for the country was developed (later rejected by the ARC).
- An implementation plan for the linkages planning initiative was prepared (later supplanted by other government initiatives).
- A second implementation plan for developing linkage action plans at the provincial and district levels was agreed upon with the ARC; it was agreed that these would be developed by provincial committees in 1998.
- A pilot case of technology linkages with producers was implemented in one district to test linkage coordination mechanisms. Farmers' organizations, research, and extension were jointly involved in identifying some specific farmer needs, including technology for water conservation. The partnership continued with developing, testing, and disseminating technology for water conservation on a trial basis. The costs of the pilot case were shared by research and the Zimbabwe Farmers Union.

Broad achievements: Although the achievements of the linkage project in Zimbabwe were modest, some good results were obtained:

- Awareness of the importance of linkages and linkage planning methods was re-emphasized and renewed by the project, and linkage planning procedures and methods were introduced to participating national staff from research, extension, and farmers' organizations.
- Opportunities and venues for these actors to discuss and coordinate linkage planning procedures and issues were provided by the project and its resources.
- Joint discussions between national partners were carried out on their initiative using their own resources.
- ARC created an institutional framework with committees for linkage planning at the national and provincial levels. These steps were stimulated by and influenced in part by the linkages project.
- Subsequent planning by and re-engineering of the ARC was also influenced by project perspectives and activities.

As noted above, an institutional framework that addresses linkage issues was established by the ARC in 1997. It was restructured and decentralized to make research more responsive to producers. The Council assumed, among other tasks, responsibility for linkages and opted for solutions that focused on structure. The process and procedures suggested in the project were to all intents and purposes set aside, although they influenced the changes.

The ARC established three levels in its new structure:

- a policy level consisting of the Council and its executive committee;
- a strategy formulation level, composed of three committees (crops, livestock, and engineering/technical committees);
- a problem identification level consisting of eight provincial committees.

Perhaps most importantly, producers were made predominate members at all levels of the ARC in order to improve the relevance of technology generation

and transfer activities. It was decided that linkage action plans would be the responsibility of the provincial committees, to be chaired by farmer representatives.

Problems and challenges — Zimbabwe

As mentioned, the ISNAR linkages project encountered more difficulties and delays in Zimbabwe than in other participating countries. These were caused primarily by reorganization in the Ministry of Agriculture stimulated by a multilateral investment program formulation effort during 1996-97. Analyses of these problems and delays were carried out by national and ISNAR staff during April and August 1997. The results are summarized here:

- The complexity of the linkages context and the effects of other actors in linkage planning were underestimated as factors in project implementation.
- The Ministry of Agriculture formed a task force to re-engineer the ARC, and included among its responsibilities the establishment of effective linkages. This effectively ended the linkages task force initiative begun in 1995, and removed the institutional locus of interaction for ISNAR.
- The role of ISNAR and the linkage project approach, procedures, and objectives were not successfully communicated or transferred to the ARC task force for linkages until August 1997. Doing so would have required additional facilitation and guidance by ISNAR in the form of working sessions and visits not covered in the project design or budget.
- Due to the broad institutional and linkage responsibility changes in the Ministry of Agriculture, the coordination of key AKIS actors involved in linkage planning and implementation became the responsibility of the ARC. New agreements with the ARC regarding the project needed to be reached, but insufficient time remained to interact with it and other partner organizations. As a result, the time frame for achieving the project objectives became unrealistic, and reestablishing the linkage project procedures was only partially successful.
- No linkage strategy or action plan was fully developed or implemented at any level due to reorganization initiatives related to the multilateral loan program formulation occurring during the project's lifetime.

Because of reform measures being undertaken by government, the ARC assumes zero government budgeting for linkage expenditures in the future. Sustainability of any linkage action plans will therefore be an issue, since their funding will be left to donor projects and farmers' organizations.

The major actions being taken in Zimbabwe to address some of the difficulties and delays include the establishment of provincial level committees and the development of provincial action plans by the institutional partners (research, extension, and farmers' organizations are represented on the committees). The institutional framework established by the ARC allows for the implementation of various governing body responsibilities including addressing these aspects of linkage planning.

Future actions to advance linkage planning in Zimbabwe were discussed at an August 1997 linkages workshop. These include

- capacity building in the farmers' unions related to farmer empowerment and the understanding and use of linkage concepts;
- taking steps to ensure future government investment in linkages;
- developing the means to involve donors in supporting linkage initiatives and action plans through their projects;
- harmonizing donor project funds for linkages through the Agricultural Research Council;
- establishing a regularly-scheduled consultative forum for stakeholders.

The extent of project disruption in Zimbabwe indicates that introducing the new cast of ARC actors to the linkage planning methods established by the project would be highly desirable. Since the reorganization of the ARC, different national staff have been assigned responsibilities for linkage planning and management who were not involved at the beginning of the project. Given the substantial changes occurring in the system, the timing for linkage planning during the project's lifetime was, in retrospect, inappropriate. The basic lesson from this experience is that linkage planning should not be initiated during periods of extreme system change.

Box 3. Project Similarities and Differences between Participating Anglophone Countries

Similarities between Tanzania and Zimbabwe:

- The establishment of good linkages was seen as important in both countries, and there was awareness that linkage problems had not been solved in the past.
- In both countries major changes in the AKIS were coming into play because of sector investment planning.
- Farmers' organizations fully and effectively participated in linkage discussions and planning with research and extension.
- In both countries, effective linkage planning at the local levels, in addition to that at national and regional levels, were identified as essential.

Differences between Tanzania and Zimbabwe:

- Policy and decision makers in Tanzania were aware of the linkage initiative and promoted the ISNAR approach with donors.
- There was less awareness, commitment, and support by decision-makers for linkage planning and analysis in Zimbabwe.
- Tanzania initiated local/district level action planning on a pilot basis, after recognizing that implementation of joint actions at production level would not occur without detailed planning based on farmer-identified technology and information needs.
- No linkage action plans were developed in Zimbabwe because the linkages task force established under the project in Zimbabwe was displaced by changes in the Ministry during the second year of the project.
- Leadership and responsibility for linkage planning in Zimbabwe shifted from a task force associated with DR&SS at project initiation to the apex body (ARC) for research.
- Future linkage action planning in Zimbabwe was decentralized to provincial committees chaired by farmer representatives in a structural attempt to solve problems of farmer feedback.

4. Project Outcomes

Four primary objectives (see also chapter 1) were established at the outset of the project: (1) to assist the four participating countries—Mali, Senegal, Tanzania, and Zimbabwe—in addressing the linkage problems of their agricultural knowledge and information systems; (2) to increase capacity within selected NARS and their partner organizations to diagnose and resolve linkage problems; (3) to improve methods and guidelines for linkage analysis and planning; and (4) to disseminate linkage knowledge, lessons, and experiences through participatory application in the countries, and through the development of training materials. The objectives have been realized, and additional significant results have also been achieved.

Project Results

The project has had significant impact in each country and from the perspective of all the stakeholders has been a successful initiative, despite differences and varying degrees of progress in the countries. Furthermore, the project initiatives will continue to influence linkage planning in the participating countries for some time to come.

Box 4. Examples of Far-Reaching Effects from Linkage Planning in Participating Countries

Tanzania: The linkage planning approach and methods were supported by high-level decision makers in the Ministry of Agriculture and Department of Research and Training. As a result, the procedures will be incorporated into component donor projects of an agricultural sector investment program formulated by the government and the World Bank, and linkage planning and implementation costs will be included in government and project budgets.

Zimbabwe: Preliminary linkage planning activities that were part of the project influenced the reorganization of the Agricultural Research Council, including its assumption of linkage planning responsibilities. The ARC established a series of committees from national to provincial level that will carry out linkage planning (among other tasks) in the future.

Mali: Discussions between research, extension, and farmers' organizations during the linkage analysis and planning sessions contributed to the restructuring of rural institutions by raising relevant issues.

Senegal: The participating federation of farmers' organizations (CNCR) is willing to contribute some linkage financing as a result of involvement in discussions carried out under the project.

Project achievements were discussed by ISNAR and national counterpart staff from participating countries during the 1997 country visits, and at regional assessment workshops that took place that same year in Tanzania (August 27-29) and Senegal (September 15-17). Participating country staff identified the most significant results, including unanticipated achievements, which are summarized below:

- Linkage problems have been addressed in each participating country, and progress has been made in resolving them.
- National capacity to manage linkages has been improved through exposure to linkage planning concepts, and through the practical experiences of national staff in developing linkage plans in their own country.
- Improvements to guide linkage planning methods have been identified.
- Effective dissemination of linkage knowledge, lessons, experiences, and awareness of the importance of linkages and linkage planning have taken place in each country through the participation of national staff.
- Improved interaction, communication, and cooperation between research, extension, and farmers' organizations was achieved.
- Linkage action plans with sufficient detail for actual implementation and inclusion in program/project budgets were produced. These constituted agreements among the actors on resource cost-sharing, target groups and locations for implementation, and specific actions to be undertaken.
- A linkage planning approach that emphasizes farmer input and is adapted to country needs and conditions is being implemented in each country.
- Linkage planning procedures and processes embodied in the project have been recognized and incorporated into new investment projects by government and donors in some participating countries. Linkage action plans and implementation costs will be included in national and donor project budgets in these countries.

The impact of the project has been considerable and is ongoing. Some of the reasons are indicated in box 5.

Limiting Factors and Challenges

Limiting factors: Certain factors that limited or delayed progress in linkage planning during the project were "recurrent" in the sense that they were encountered in more than one of the countries participating in the project. These need special vigilance for linkage planning in any country's AKIS, and are indicated below.

Insufficient guidance and facilitation time from ISNAR emerged as a factor that affected the progress of the project in some countries. National managers and staff have heavy demands on their time and "institutional attention" can be limited in practice. There is a need for experienced external facilitation and monitoring to keep linkage planning initiatives on track during the initial phases.

Changes in personnel assigned to the linkages task forces, and a related lack of linkage concept awareness over time were common problems. The country linkage task force can lose its direction and impetus if it goes through excessive personnel changes, or if the concepts and methods of linkage planning are not understood.

**Box 5. Linkages between Research, Technology Transfer, and Farmers:
Major Reasons for Success**

This action-oriented project was particularly successful, though the achievements and degree of impact was different in each of the participating countries. The probable reasons for these successes include

- *appropriateness of ISNAR research*: A useful approach and procedures for linkage planning had been developed prior to the project, by building on ISNAR's past research efforts and experience with linkages.
- *relevance*: The subject area is a problematic one for many national systems, and both national managers and donors are looking for solutions to linkage problems.
- *timeliness*: The participating countries were involved in the formulation of large-scale national investment programs in research and extension designed to strengthen producer participation in technology generation and dissemination, and it was an appropriate time for the NARS to address the details of linkages.
- *ownership and leadership*: The project established national teams for linkage planning, effectively transferring ownership and leadership of the initiatives to national staff of key institutions.
- *consensus and agreement*: The process was designed to facilitate the development of consensus among national partners on the linkage strategy, plans, and actions. In all countries this had a positive effect, but to varying degrees.
- *funds to enable planning*: The project provided funds to cover the costs of meetings for joint linkage planning by linkage partners. Such funds are rarely included in government or donor budgets and their availability enabled participating countries to hold essential joint meetings.

Limited awareness among some stakeholders of the linkage planning approach was a serious problem in more than one country. The result was little coherence or agreement in some cases between government organizations, farmers' organizations, and donor actors on linkage planning procedures and linkage plans.

Insufficient time to carry out linkage planning at national, regional, and district levels during the project's lifetime was identified as a problem. There was also insufficient time to achieve the institutional changes necessary to reach full agreement and approval among institutional partners.

Imperfect communication among the representatives of the core institutions was recognized as a problem in all countries that participated. It affected implementation of the actions agreed upon in the planning meetings, as well as information flows to stakeholders.

Challenges: The principal linkage challenges to confront and resolve in the future for each of the participating countries are indicated below. These have been drawn from the experiences of this project and could be of use in any country's linkage planning efforts. They will almost certainly be confronted by any AKIS undertaking linkage planning.

The need to ensure *sustained effort and funding* for the linkage planning approach became obvious during the project.

The development of linkage *action plans at the district/local level* is needed to reach producers with practical technology on a broad coverage basis, but has received little coordinated attention in the past. If linkage planning partners fail to give attention to local needs, national or regional strategies will have little effect.

The improvement of the *coherence and coordination of linkage planning efforts* among the major investors and other stakeholders remains a primary challenge. Without basic agreement on approaches and methods, linkage planning efforts will be characterized by fragmentation and lack of coherence. These agreements are especially important between high-level policy makers and managers of key donors, public sector research and extension, and farmers' organizations. The establishment of adequate communication and information mechanisms will play an essential role in meeting this challenge.

The planning methods for improving research-technology user linkages developed and adapted by ISNAR and participating countries during the course of this project are quite effective. For this reason perhaps the overriding challenge for ISNAR and the participating countries is the communication of this approach or some of the elements for success to key institutional actors and stakeholders in other countries and regions. In this way, the errors commonly encountered can be avoided, and the basic lessons that have been learned through this project can be used.

5. Conclusions

As noted in previous chapters, linkage planning evolved differently in the four countries committed to the project, and in ways that reflected substantial differences between the countries. In each, the progress made in planning and implementing linkages reflected different degrees of success, and different obstacles were encountered. Nonetheless, there were lessons that emerged from the project experience that will be useful for linkages initiatives in other countries. These lessons have shown that there are some fundamental conditions for success in linkage planning and implementation.

Principal Lessons for Linkage Planning

A synthesis of the foremost lessons for linkage planning learned from the project indicates these to be the most important, and the most difficult to master.

Awareness, consensus and commitment: The linkages domain is exceedingly complex and is a large arena, with many actors and stakeholders potentially involved in planning and implementation at different levels. Any lack of awareness, lack of agreement on linkage planning procedures, or lack of commitment to sustained linkage planning and implementation by actors involved in such initiatives may undermine national efforts to coordinate linkage activities.

Approval and support: If linkage planning procedures, plans, and activities are to be successfully included in government and donor budgets, decision makers and leaders within the AKIS must give their support and endorsement.

Participation of policy makers and other high-level decision makers: The involvement of policy and donor actors in the linkage planning process is ultimately necessary for a successful and sustainable effort. Unless these actors are involved in a meaningful way, the likelihood of their support in funding and cooperation for linkages activities is limited.

Time factors: The establishment and implementation of linkage plans has numerous institutional implications for participating organizations, and falls into the category of institutional change. Such changes often require considerable time and consistent attention, due to the need for approval at various levels in each organization. For these reasons, progress in building sustainable linkage initiatives can be expected to take considerably longer than three years.

Adequate funding: Sufficient funding from reliable sources for the linkage planning process must be available on a sustained basis. This implies the need for government investment in linkage planning and implementation.

Monitoring and adjustment: Improving linkages is a continuous process. Linkage strategies and action plans need to be regularly assessed and adjusted to changes in farmer needs and funding availability.

Responsibility: Maintenance of a linkage task force or committees responsible for linkage planning, implementation, and adjustments are needed to sustain good linkage planning over time.

Stakeholder acceptance: Other stakeholders, especially donors, are more likely to accept national government alternatives to linkage planning when they are the result of an organized effort and produce sound solutions based on careful analysis of linkage constraints.

Multiple levels: Linkage planning must be addressed at multiple levels to have practical results; the national, regional, and local/district levels appear appropriate for most countries. This implies a substantial effort with associated costs, but one that is necessary, both to reach actor agreement on the plans and their implementation, and to actually ensure that budgeting and scheduling are carried out. Unless linkage planning and implementation occur at local levels, such initiatives will have little impact on the existing situation. The implications of linkage planning at multiple levels are indicated in table 3.

Table 3. Multiple-Level Linkage Planning

Level	Actors	Actions	Results
National	<ul style="list-style-type: none"> Linkage task force (research, extension, and farmers' organizations) Policy and decision makers Government and donor investors 	<ul style="list-style-type: none"> Agree on linkage planning procedures Establish government policy and support for linkages Acquire funding commitments from government and donors Examine necessary changes in partner organization bylaws and mandates Prepare national strategy that identifies essential linkages and mechanisms 	<ul style="list-style-type: none"> Shared procedures that strengthen sustainability and coordination of linkage planning over time Linkage policies developed by Ministry of Agriculture and actor organizations Funding agreements and commitments Mandate and bylaw adjustments Coherent national linkage strategy
Regional	<ul style="list-style-type: none"> National steering committee Regional planning committee Donor representatives 	<ul style="list-style-type: none"> Adjust strategy to agro-ecological and administrative zones Define roles of major linkage actors at regional level 	<ul style="list-style-type: none"> National strategy adjusted to each region Regional linkage planning body responsibilities defined
Local / District	<ul style="list-style-type: none"> Local-level linkage planning teams Donor project managers 	<ul style="list-style-type: none"> Determination of producer conditions and needs at local level Development of field level action plans and schedules Budget and resource cost sharing agreements 	<ul style="list-style-type: none"> Producer-driven technology/information needs identified Jointly planned and coordinated action plans Detailed field-level event, actor, and resource allocation plans and schedules Coordinated, coherent linkage actions at field level Effective resource cost sharing More relevant and appropriate technology/information delivered at local level

Conditions for Success in Linkage Planning and Implementation

Some conditions for success in using the approach developed by ISNAR have been presented by Eponou (1996). During the project further development of the approach and concepts by ISNAR and national staff from participating countries occurred, and other conditions for success were identified. Some of these are derived from the lessons discussed in the previous section: i.e., an awareness of the importance of linkages, consensus among key actors involved and their commitment to linkage planning and implementation efforts at all levels, adequate funding for the linkage planning process, and involvement of key donors and policy makers. Additional conditions for success are listed below:

- National leadership over the linkage planning is essential. ISNAR can facilitate and other stakeholders can be involved, but ownership and leadership by nationals from the core AKIS institutes are necessary for linkage initiatives to be successful.

- Top-level managers and decision makers from the key AKIS institutions must play an active role in the linkages task force and any related steering committee.
- A minimal level of stability must be characteristic of the AKIS and of the key partner organizations involved in linkage planning. If an AKIS or its key organizations are undergoing major changes, linkage planning should be delayed until there is more stability because the approach, procedures, and results can be seriously affected.
- There is a need for broad agreement among stakeholders on the procedures and methods. Without acceptance of basic approaches and procedures, linkage planning efforts will lack coherence and direction among different actors in the AKIS. Official government endorsement of the methods and goals through formal recognition and approval is a step that may be necessary.
- The benefits of linkages between partner organizations must be greater than the costs. Establishing and maintaining effective linkages is expensive, and good judgment must be exercised in building strategies and action plans that are realistic.
- The analysis of the existing linkage situation should be critical, objective, and thorough.

Recommended Improvements in Linkage Planning Methods

An action-oriented participatory approach to stimulate and enable linkage planning was used in the four participating countries. The project emphasized leadership by the national project staff and minimized intervention by external organizations, including ISNAR. Concepts and some recommendations for organizing the process were provided, but the course of events was determined within each country by national staff, and adaptations of the concepts and suggested process were expected.

Project experiences, analyzed by national and ISNAR staff, indicate that some areas of improvement in the linkage planning approach and methods, in terms both of the process and the procedures, are needed. The most important suggestions, drawn from discussions and comments during visits and working sessions, are summarized in this section.

Process improvements

In planning of any sort, the process equals or exceeds the output (a plan) in importance. This is particularly true of linkage planning, which should bring together the principal AKIS actors, provide opportunities for discussion and consensus, and firmly place leadership and decision making in their hands.

A framework table was developed during the early stages of the project (see table 2) suggesting how to organize the process and indicating the objectives, outputs, inputs, and actors for the process sequence. This was used as a guide

by the national teams of each participating country, but the process itself was adapted to the situation in each country. For example, a first workshop was not held in Senegal since a linkage committee already existed in that country which was able to carry out the objectives of such a workshop.

The primary suggestions from national and ISNAR staff for improving the linkage planning process are listed below:

- More guidance and facilitation from ISNAR or experienced national staff appears to be needed to keep the process on track and the objectives in sight in the countries embarking on linkage planning.
- Regular exposure to linkage planning concepts and methods by national task force members and other stakeholders is needed. This will counter the effects of task force turnover, and provide regular update briefings for other staff and stakeholders.
- Communications should be improved between the major institutional partners in linkage planning. Regular exchange of information within the linkage team and between organizations regarding actions and progress are necessary to keep any linkage planning initiative on track.
- Guidance in organizing the planning process should be improved, drawing upon the country experiences. Among the improvements suggested are revisions/additions to the sets of objectives, and the addition of information on implementation.
- A modified framework was developed that focuses on linkage planning *phases* rather than *events* (workshops). A framework expressed in phases provides more flexibility to carry out the tasks involved in the linkage planning process. These phases are presented below in table 4 and the related objectives, inputs, outputs, and actors are indicated.

Table 4. Recommended Framework to Guide the Linkage Planning Process

	Phase 1: Set up and Analysis	Phase 2: Planning and Consensus	Phase 3: Implementation	Phase 4: Monitoring and Adjustment
Objectives	<ul style="list-style-type: none"> • Agree on the need for linkage improvement • Identify linkage constraints and issues • Set up institutional framework for linkages (e.g., linkage steering committee, analysis team, multi-level planning teams) 	<ul style="list-style-type: none"> • Analysis of issues and constraints • Agree on linkage strategy (partners and actions) • Recommend solutions and prepare action plans • Identify linkage task responsibilities • Define monitoring and oversight mechanisms 	<ul style="list-style-type: none"> • Develop policy and decision maker support • Ensure investment commitments • Establish implementation schedules • Implement action plans • Allocate resources 	<ul style="list-style-type: none"> • Monitor implementation of action plans • Adjust strategy • Adjust action plans
Inputs	<ul style="list-style-type: none"> • Concept paper by facilitator • Experience and position paper by each institutional actor 	<ul style="list-style-type: none"> • Results of field interviews on linkage experiences • Reports on past linkage strategy 	<ul style="list-style-type: none"> • Producer needs • Meetings with policy and decision makers • Funding agreements with investors • Linkage strategy and action plans 	<ul style="list-style-type: none"> • Implementation reports • Analysis of problems
Outputs	<ul style="list-style-type: none"> • Commitment to improve linkage situation • Linkage issues and constraints identified • Appointment of teams and committees 	<ul style="list-style-type: none"> • Consensus on planning procedures and target constraints • Consensus on linkage strategy and solutions • Multi-level linkage action plans • Monitoring/adjustment team established 	<ul style="list-style-type: none"> • Stakeholder agreements on process and procedures • Agreements on budgets and resource cost sharing • Implementation schedule 	<ul style="list-style-type: none"> • Identification of implementation problems • Modified strategy • Modified action plans
Actors	<ul style="list-style-type: none"> • Research • Extension • Producer organizations • AKIS investors/decision makers • Facilitator 	<ul style="list-style-type: none"> • Steering committee • Analysis team • Facilitator 	<ul style="list-style-type: none"> • Steering committee • Analysis team • Investors • Local teams 	<ul style="list-style-type: none"> • Steering committee • Analysis team • Monitoring team

Procedure improvements

As discussed earlier, suggestions for organizing the linkage process, together with linkage concepts, were provided by ISNAR staff to national participants in each country at the outset of the project. However, the assessment workshops held at the end of the project and experiences in some countries during the project underlined the need for a broader perspective on linkage planning. Linkage processes of the type undertaken in this project need to be understood in relation to the overall cycle that comprises linkage planning. This cycle (see figure 2) consists of a series of steps done repeatedly which are seen as necessary to plan, implement, and adjust linkage strategies and actions. These steps in fundamental linkage planning procedures, outlined below, are suggested for future use in other countries. Each step embodies a series of actions for linkage planning that can be used at different levels.

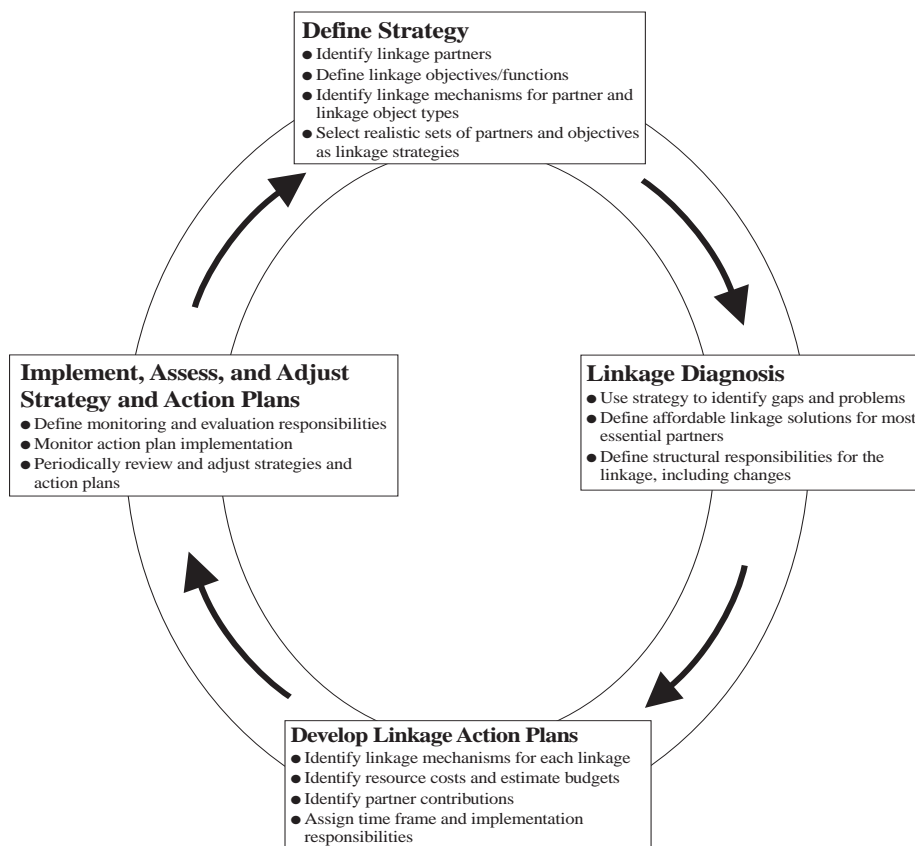


Figure 2: Linkage planning cycle

Step 1: Define research-technology user linkage strategies at different levels for the country's agricultural knowledge and information system by

- identifying the potential linkage partners;
- defining the linkage objectives and/or functions for the most important partners at each level;
- identifying an array of potential linkage mechanisms by type of partner and linkage functions/objectives;
- preparing linkage strategies that specify the partners, the linkage functions/objectives, and the linkage mechanisms.

Step 2: Diagnose and analyze the existing linkage situation by

- using the linkage strategy as a basis to identify the linkage gaps/problems at national and regional levels;
- developing affordable solutions (linkages) at each level;
- defining structural and staffing responsibilities for the identified linkages and mechanisms, including any necessary changes.

Step 3: Develop action plans to solve linkage problems by

- identifying the necessary linkage mechanisms required for each linkage channel at national, regional, and district levels;
- identifying the resource costs (funds, staff, equipment) and estimating budgets for plans at each level;
- identifying contributions to be made by each partner organization for the action plans;
- assigning responsibilities and a time frame, and implementing the plans.

Step 4: Periodically monitor and assess the linkage strategy and action plans by

- defining monitoring and assessment responsibilities;
- monitoring action plan implementation;
- periodically reviewing and adjusting strategies and action plans.

Summary Remarks

ISNAR's research (Eponou 1993, 1996) indicates that improved linkages are a key condition for effective AKIS planning and transfer of technology and information. However, the root causes of linkage problems are *complex* (e.g., multiple actors are involved, and horizontal and vertical relationships within the AKIS come into play), *diverse* (e.g., linkages must address constantly changing producer and production system needs at multiple levels in the AKIS), and are often *fundamental* in nature (e.g., they affect the performance of the system and solving them requires policy support, sustained resource inputs, and they affect the performance of the system). This project has demonstrated that the participatory methods and approach developed by ISNAR and its national partners were very effective in addressing linkage needs when implemented under the conditions existing in the four participating countries.

The project has also highlighted the fact that there are no transferable or ready-made solutions, and that AKIS decision makers should accept the necessity for careful and detailed planning on a system-by-system basis. Effective linkage planning and implementation are resource intensive activities and must be supported by government and donor investors to ensure the effectiveness of linkages between research and users over the long term.

The experiences in the four participating countries demonstrate that linkage planning can have far-reaching effects — given sufficient funds to organize and carry out planning, national leadership, and the use of sound concepts. Project experiences with implementing the concepts and methods have also yielded some new insights important for linkage planning in the future. The most important of these are briefly summarized here.

The need to apply *linkage planning methods at several levels* within each AKIS was recognized by national staff in each country. It is important to first reach agreement on plans and actions at a national level, but linkage planning focused on the local level delivers practical results in the form of research relevance and improved technology flow for specific groups of producers. Unless action plans are developed and implemented at this level, the strategies and plans at higher levels will have no practical results.

The *cyclical nature of linkage planning* became more obvious to some country teams. It is a cycle (development of a strategy, linkage diagnosis, action planning, implementation, monitoring and assessment, adjustments to strategies and plans) with steps that should be revisited over time, and not carried out just once.

Adjustments in linkage strategies and plans are required because of varying levels of investment, changes in producer conditions and needs, and because of changing relationships within the AKIS and in its institutional components. The responsibilities and means of monitoring, assessing, and revising should be developed in each system. This implies the establishment of a standing task force with units or committees that oversee and maintain the cycle over time.

Cooperation and agreement on linkage resource costs is an essential aspect of linkage planning. The process of reaching agreement among actors on resource cost sharing improves communications and builds confidence between the partners in linkages. Cost sharing is also the means of ensuring a voice in decision making at the “linkages table.”

Involvement of policy-level decision makers in planning linkages between research, extension, and farmers’ organizations is a requirement for obtaining funding, and for promoting collaboration between donors and government in linkage planning. Without their involvement and support linkage action plans may not be implemented due to lack of funding.

The establishment of effective linkages between research, extension, and farmers’ organizations is a complex process that requires follow-through and adjustment. This process requires time, because it involves elements of institutional change for these organizations.

Some overriding and basic considerations for any AKIS undertaking linkage planning were highlighted by the project. They will be important regardless of the approach being used and include

- developing an approach to linkage planning that is useful and acceptable to the key institutional actors in linkages within the AKIS;
- providing a foundation of concepts, procedures, and processes for linkage planning that promote the coherence and effectiveness of linkage actions;
- improving the sustainability of both linkage planning and the implementation of linkage action plans through adequate and stable funding for linkage activities in government and donor project budgets.

Perhaps the major lessons learned during ISNAR’s research on linkages are that resources must be available for linkage planning and implementation, that detailed budgeting for linkage action plans is necessary for action to occur at the producer level, and that national teams must take the lead in establishing a coherent and consistent linkage planning approach for the situation and conditions in their countries.

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Covers: Chlorine-free paper
Inside pages: Recycled paper

Produced by ISNAR Publications Services

Text editor: Nina Ascoly

Layout: Christine Price

Printer: Rapporten Service Drukkerij B.V., Rijswijk, The Netherlands

ISSN 1021-4429
ISBN 92-9118-???-?

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