

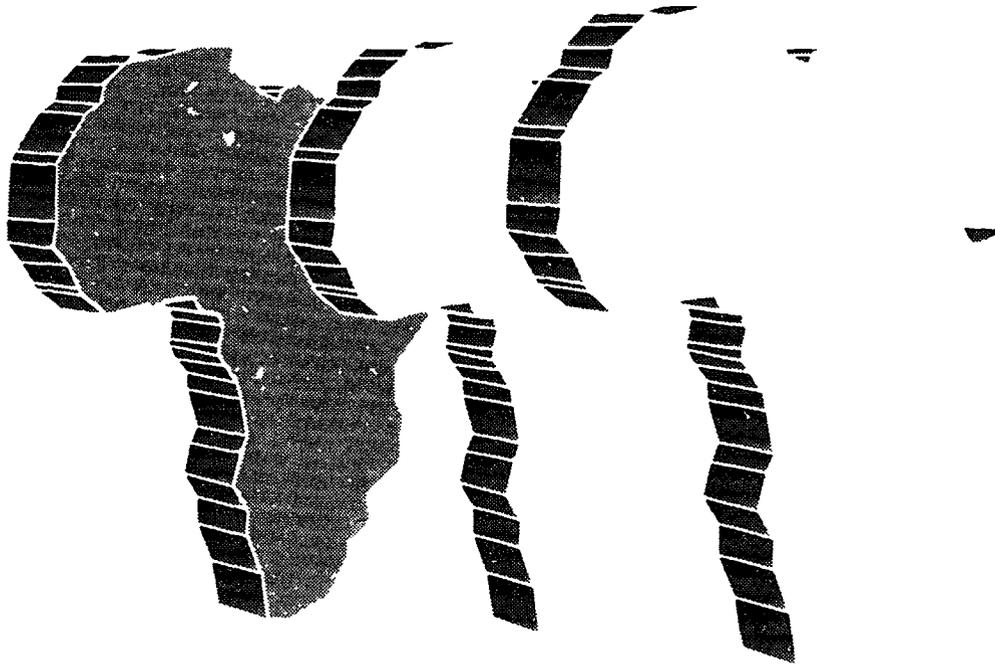
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ABBREVIATIONS

ADP	-	Agricultural Development Project
AFTAG	-	Agriculture Division of the Africa Region Technical Department of the World Bank
ASI	-	Agricultural Services Initiative
BAT	-	British American Tobacco
CAR	-	Central African Republic
CFDT	-	Compagnie Francais pour le Développement de Fibres Textiles
CGIAR	-	Consultative Group on International Agricultural Research
FEW	-	Frontline Extension Worker
FSR	-	Farming Systems Research
IARC	-	International Agricultural Research Centers
ICRISAT	-	International Crops Research Institute for Semi-Arid Tropics
IITA	-	International Institute for Tropical Agriculture
IPM	-	Integrated Pest Management
ISNAR	-	International Service for National Agricultural Research
KARI	-	Kenya Agricultural Research Institute
KTDA	-	Kenya Tea Development Authority
LTPS	-	Long-term Perspective Study
M&E	-	Monitoring and Evaluation
MOA	-	Ministry of Agriculture
NARS	-	National Agricultural Research Systems
NGO	-	Non-governmental Organization
NRC	-	National Research Center
OFAR	-	On-farm Adaptive Research
REL	-	Research Extension Linkage
RRC	-	Regional Research Center
SMS	-	Subject Matter Specialist
SAR	-	Staff Appraisal Report
SSA	-	Sub-Saharan Africa
TA	-	Technical Assistant
T&V	-	Training and Visit System of Extension
WID	-	Women in Development

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The Government of Malawi very kindly agreed to host the workshop, and the Honorable F.M. Kangaude, M.P., Deputy Minister of Agriculture, inaugurated it.

Preface

This monograph is a report based on the proceedings of the World Bank Workshop on the Bank's Agricultural Services Initiative in Sub-Saharan Africa held at Lilongwe, Malawi, over the period February 4 - 8, 1991. A major objective of the workshop was to identify the issues to be discussed at the Africa Extension Workshops planned for 1992/93, at which the main participants would be the implementors of extension projects from countries in Sub-Saharan Africa. The workshop provided an excellent opportunity for the Bank's staff, most of whom were from the field, to exchange experiences and distill useful lessons from them. Above all, it brought out the diversity of the extension implementation experience in Sub-Saharan Africa and the many local adaptations to the T&V system made by the Sub-Saharan countries.

Bank-supported extension projects based on the management system of the Training and Visit (T&V) concept started in Asian countries in the early 1970s. Countries in Sub-Saharan Africa started implementation of extension projects based on T&V in the early 1980s. Even though much has been written about T&V in general and as implemented in Asia, this paper is the first World Bank publication to address issues relating to the implementation of T&V in Africa. I hope that this monograph will be useful to the implementors of extension reforms, research scholars and Bank staff responsible for extension projects.

My thanks are due to my predecessor Mr. John Peberdy, who was the Division Chief at the time of the workshop, and who provided the inspiration for it. Bank field staff from the various countries participated enthusiastically and provided the many "stories from the field" which have enriched this report.



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June, 1992**

1. INTRODUCTION

What Is the Agricultural Services Initiative?

1.1 **Extension Reforms in Africa.** Small scale extension initiatives in Africa have been supported by the World Bank since the 1970s when it started financing integrated rural development projects serving agriculture. Following the shift in its emphasis from integrated rural development projects to the development of national institutions, the Bank's support to reforms to national extension systems in Africa began in 1981 in Kenya ¹, with the pilot extension project based on the principles of the Training & Visit (T&V) management system (see Box 1); this was followed by a regular project in 1983 ². Since then, Bank supported extension projects have been started in 30 countries. Basic data on these projects are given in Annex 1.

1.2 **Agricultural Services Initiative.** Following extension reforms, reforms to the research management systems have also been introduced through Bank assisted agricultural research projects in some 20 countries. A major thrust of these projects is the development of national agricultural research systems with strong linkages to extension. The Bank's decision to go beyond extension and research and pay attention to management improvements in other agricultural services, such as seeds, credit, marketing etc., resulted in the World Bank's Agricultural Services Initiative (ASI) in Africa in 1987. However, the Bank's involvement with management reforms in these additional areas is still in its early stages. This paper focusses largely on extension and its links with research.

1.2.1 Recognizing the need to provide implementation assistance to the countries which have undertaken extension reforms through Bank financed extension projects, the Bank has appointed Extension Specialists in the Regional Missions in Abidjan and Nairobi, and in some 19 countries, viz. Cote d'Ivoire, Kenya, Cameroon, the Central African Republic (CAR), Ethiopia, Sudan, Madagascar, Zaire, Ghana, Nigeria, Senegal, Niger, Burkina Faso, Mali, Chad, Tanzania, Malawi, Benin and Zimbabwe. These specialists are collectively referred to in this report as "ASI field staff".

1.2.2 The transformation of traditional extension systems to T&V with very little training of extension staff, without a fixed work schedule, and little periodic interaction between research and extension, has not been easy. Despite initial difficulties, most countries have understood the essentials of the system. Regular training sessions are held and the extension agents' visits to farmers follow a fixed schedule. Wherever the system has been understood and implemented well, the results have been very encouraging. In Kenya, for example, farmers have adopted simple low cost recommendations (row planting, plant population, etc.) and increased their yields

¹ Small scale T&V initiatives in Africa started earlier; the first national project based on T&V was "Somalia - Agricultural Extension and Farm Management Training Project" which became effective in 1980. But largely due to lack of agreement among donors on the extension approach to be adopted under the project, there were serious delays in extension start-up.

² For the sake of brevity and convenience, such projects are called T&V extension projects in this report.

considerably. In Burkina Faso and Nigeria, the extension recommendations are tailored to the complex farming systems in these countries and have therefore been well received by farmers who have benefitted by their adoption; they now get far higher yields with less labor input. Nevertheless, there are some major issues facing Bank supported extension projects in Africa, which should be addressed if the initial successes of extension are to be reinforced and made self-sustaining. These issues were identified by Bank field staff on the basis of their field experience and discussed at a workshop held in Lilongwe, Malawi, from February 4 through 8, 1991.

The Lilongwe Workshop

1.3 The workshop discussed the experience of the Sub-Saharan African countries with the implementation of agricultural extension. The participants included the Bank's agricultural field staff³, some of whom were local staff with an extensive knowledge of their countries and field conditions, and staff from the Bank's headquarters (HQ). The workshop was conceived of as a prelude to the extension workshops planned for 1992/93, in which the primary participants would be the African project implementors⁴.

1.4 According to the World Bank's Long-Term Perspective Study⁵, the annual growth rate of Sub-Saharan Africa should reach a minimum of 4% per annum to ensure food security to the inhabitants of the countries in the region, and to contribute significantly to overall economic growth. Agriculture directly contributes 40% of the GDP on average in Africa, and most industries in Africa depend considerably upon the agricultural sector for their raw materials. There are therefore few alternatives to substantially increasing agricultural growth. The magnitude of the challenge can be gauged by the fact that the present rate of agricultural growth in Africa is 2 % per annum. To attain the target growth rate, many services in the agriculture sector in the region need to be upgraded and streamlined. A beginning was made by the Bank with extension reforms. The ongoing initiative of the Special Program for African Agricultural Research (SPAAR) undertaken by a consortium of donors and African countries is developing significant reforms to the National Agricultural Research Systems (NARS) to enable

³ The Bank's agricultural field staff comprise the Agricultural Extension Specialists positioned in the various countries in Africa mentioned previously, and other agricultural staff.

⁴ The Bank organized similar workshops in Thailand and Indonesia for the Asian countries, in 1981 and 1983 respectively. The proceedings of these workshops have been published by the Bank. See Cernea, Michael, et al (eds.), *Agricultural Extension by Training and Visit: The Asian Experience* (Washington, DC.:World Bank, 1983); and Cernea, Michael, et al (eds.), *Research, Extension, Farmer: A Two-Way Continuum for Agricultural Development* (Washington, DC.:World Bank, 1985).

⁵ This refers to the Bank study whose main objective was to gain a long-term perspective of Africa's developmental problems and prospects. The study was undertaken by the Bank, which has built on many similar studies undertaken by the U.N. and African agencies, as well as by other scholars. It was published by the Bank in 1989 under the title: "Sub-Saharan Africa: From Crisis to Sustainable Growth" (World Bank, 1989).

"In Sub-Saharan Africa, more than 100 million people -- one person in four -- do not get enough to eat. Dramatic food emergencies are an all too frequent reminder of the tragedy of poverty. To fight hunger, African countries need economic growth, especially in agriculture." World Bank President Barber Conable pointed out in his address to the Board of Governors at the annual meeting in the fall of 1988.

Recognizing that food production in Africa will have to grow by at least 4 percent a year from 1990 to 2020 to meet the growing demands of its people, the World Bank in 1988 launched "The African Agricultural Services Initiative" to improve agricultural performance through the development and dissemination of new technology and the better use of existing technology. Its main thrust will be on the establishment of national T&V-type extension services, a parallel strengthening of research, and the provision of credit, input supplies, and infrastructure to back them up. Policy-level improvements in national macroeconomic frameworks will be designed to support the agricultural growth.

The initiative provides substantial foreign exchange resources and will station technical staff in African countries in nonexecutive positions to assist with implementation.

The initiative differs from past interventions in several important respects:

- * It encompasses the whole range of agricultural services, including inputs, credit, and marketing.
- * It focuses on national rather than project levels, builds on national institutions, and channels funds to national programs with the aim of promoting greater national commitment.
- * All agricultural services will focus on direct contact with farmers;
- * Donor commitments are designed with long-term perspectives; and
- * Aid coordination is an objective of the program.

(Agricultural Extension - The Next Step, The World Bank, Washington DC, p. 21.)

Box 1: Agricultural services initiative

them to respond to the technology challenges facing Sub-Saharan Africa. Studies of the appropriate management processes in other services such as forestry, livestock, credit and seeds have been initiated by the Technical Department of the Africa Region of the Bank. The Lilongwe workshop focussing on the extension implementation experience was therefore timely, and fits in with the development objectives of the region.

1.5 The objectives of the workshop were to:

- * Facilitate exchange of information between the participants on the experiences of the countries regarding the implementation of extension reforms and distill useful lessons from them;

1. **PROFESSIONALISM.** Appropriate advice to and support of farmers to enable them to increase their incomes can only come from an extension service that is professional at all levels.
2. **SINGLE LINE OF COMMAND.** The extension service must be under a single line of technical and administrative command The department within which the service is located should be solely accountable for the operation of the extension system.
3. **CONCENTRATION OF EFFORT.** Only by concentrating on the tasks at hand can the impact of extension become visible and can progress be sustained All extension staff work only on agricultural extension ... Non-extension activities ... undermine the professionalism of extension and its credibility among farmers.
4. **TIME-BOUND WORK.** Messages and skills must be taught to farmers in a regular, timely fashion The village extension worker must visit farmers regularly on a fixed day Any break in this time-bound system of training and visits makes effective extension difficult.
5. **FIELD AND FARMER ORIENTATION.** Contact must be on a regular basis, per a schedule known to farmers, and with a large number of farmers representing all major farming and socio-economic groups [All extension workers] spend a large part of their time in farmers' fields.
6. **REGULAR AND CONTINUOUS TRAINING.** Regular and continuous training of extension staff is required both to teach and discuss with them the specific production recommendations required by farmers ... and to update their professional skills.
7. **LINKAGES WITH RESEARCH.** Effective extension depends on close linkages with research. Linkages are two-way Research's awareness of and reaction to actual farm conditions is increased through responding to problems that have been put forward by extension workers.

(* Agricultural Extension - The Next Step, The World Bank, Washington DC, p. 19.)

Box 2: Principles of T&V management system

- * Identify the critical issues in extension and research management and discuss how to address them;
- * Consider how the lessons learnt from extension could be applied to other agricultural services;
- * Indicate the issues to be addressed in future extension projects; and
- * Identify the issues which could be focussed on at the proposed Pan-African workshop.

1.6 The papers presented at the workshop focussed on important issues relating to extension projects in Sub-Saharan Africa, such as research and development, training and extension management; and "country experience papers" ⁶ presented by the ASI field staff describing the experiences of their respective countries with the implementation of extension.

⁶ These are summarized in Annex 3.

Three working groups were constituted at the workshop to discuss the important second generation extension issues, namely: (i) extension's potential contribution to achieving the objectives of the Bank's Long Term Perspective Study (LTPS) ; (ii) training; and (iii) strategies for the development of support services and broader issues. The terms of reference of the working groups are given in Annex 4.

1.7 In the light of the papers presented at the workshop and the reports of the working groups, the following themes were distilled for detailed discussion in the plenary sessions.

- * Technology
- * Training
- * Extension management
- * Extension pre-conditions
- * Extension start-up
- * Organization of agricultural services
- * Farmers' groups
- * Private sector extension
- * Use of mass media in extension
- * New extension responsibilities
- * The role of the Bank's extension field staff

The discussions at the workshop reached beyond extension and its linkages with research, and touched upon important issues impacting on extension such as macro-economic policy and the supply of farm inputs and implements.

1.8 The discussions brought out clearly that extension projects in Africa generally follow the "Guidelines for Effective Extension" contained in a recent World Bank publication on extension ⁷, despite great diversity among countries in the details of extension implementation, and that the Bank's approach to extension has evolved considerably since the early phase of the implementation of T&V ⁸. For example, extension is working more closely with farmers' groups, particularly, women's groups, than had been earlier envisaged, and depends more upon such groups than upon contact farmers for diffusion of extension information.

1.9 The primary objective of the workshop was to discuss the Sub-Saharan African countries' experience with the implementation of Bank-supported extension projects. These projects are generally confined to the introduction of T&V management principles to public sector extension services. The workshop was not specifically focussed on and could not address some of the relevant issues relating to extension in general and T&V in particular, which are

⁷ Agricultural and Rural Development Department, (1990), "Agricultural Extension - The Next Step", The World Bank, Washington, DC, USA.

⁸ Benor, Daniel and Baxter, Michael, (1984), "Training and Visit Extension", The World Bank, Washington DC, USA.

currently being debated within the Bank and outside, such as the long-term viability of extension by government departments and parastatals, accountability of research and extension to users, and cost recovery. The workshop did discuss the scope for innovation in on-going and future extension projects, such as research and extension undertaken by the private sector/NGOs.

About This Report

1.10 This report is based on the deliberations at the workshop. The organization of the chapters broadly follows the sequence indicated in para 1.7. The contents of each chapter have been extracted from the papers presented at the workshop, working group reports and the discussions. This arrangement of chapters provides readers with a clear idea of the workshop's deliberations on each topic. Since this subject has generated considerable interest outside the Bank, the editors of the report have sometimes gone beyond what was discussed at the workshop, where it was felt necessary, in order to illustrate or clarify some of the issues. It does not, however, claim to provide a comprehensive coverage of all the relevant issues relating to extension in Sub-Saharan Africa. At many places the report refers to "countries", or "African countries"; obviously, these are references to countries in Sub-Saharan Africa.

1.11 It is difficult to capture, in a report of this kind, the enthusiasm, energy and excitement displayed by the ASI field staff at the workshop, and their keenness to share their experiences with others, to discuss factors which blunt the effectiveness of extension, and ways to overcome these factors. Their contributions at the workshop provided the source material for many of the boxes contained in the report.

1.12 The editors visualize three main types of readers of the report. The first is the African implementors of extension who may be interested in the issues discussed at the workshop, and may particularly welcome the examples from the field contained in the report. The report would provide them with useful background material for the planned Pan-African workshop. The second is the extension research scholars and the academia, who may be interested in the extension implementation issues faced by countries. The third is the Bank staff, particularly those in operations, who may find the material contained in the report useful for their work.

1.13 The report also outlines the developments relating to extension since the workshop. First, the basic data on extension projects (Annex 1) have been updated to include projects approved by the Bank since the workshop. Second, the preliminary results of the studies on the performance of extension in Kenya and Burkina Faso carried out under the guidance of Professor Robert Evenson of Yale University have been incorporated.

1.14 The drafting of the report is so done that whenever the discussions at the workshop revealed a consensus on any issue, it is apparent in the discussion of the issue in the report, and reference to participants is avoided. Wherever the report relies on any of the thematic papers presented at the workshop, this fact is mentioned. Where the opinion of the house was more or less equally divided between two or more points of view, those of the different groups of

participants are given, along with the conclusions which emerged. Editorial comments are provided wherever felt necessary.

2. TECHNOLOGY ISSUES

2.1 The main technology-related issue is the generation of technology which farmers would find relevant and useful. In order that this objective should be achieved, many pre-conditions have to be met by research and extension systems, such as: recognition of farmer-focus in research, the association of farmers in research planning, proper development of research-extension linkages and the accountability of research and extension systems to the clients, namely, farmers. Many of these issues were discussed at the workshop, as well as the extent to which research and extension could meet the above pre-conditions in African countries.

Research Planning and Prioritization⁹

2.2 **Importance of Farmer-Focus in Research.** Research, extension and development are parts of the same continuum. It is important for the development of technology that there is emphasis not only on the research end of the continuum, comprising basic and applied on-station research, but also on on-farm research and participative research with the farmers.

2.2.1 The failure of the NARSs in Africa in the past to produce sufficiently relevant technologies for African farmers has been blamed on a number of factors, namely, poor transfer of technology to farmers, lack of inputs, poor prices and lack of credit. Various remedies have been attempted, such as training of scientists, strengthening and improving the research-extension linkage (REL), and improving extension and farming systems research (FSR), but they were not sufficient to sharpen the relevance of technology available to farmers in many African countries. The principal reason for the poor performance in the development of appropriate technology and in its adoption is the absence of the farmer at the forefront of action. Research can only be effective if the results are used by farmers. Therefore, the fullest involvement of farmers in research, development and extension is vital. Research organizations should therefore design incentive systems which give higher rewards for developing or contributing to technology which is adopted by farmers rather than for publishing results in refereed journals. This type of farmer-focused research requires patience and diligence, apart from a re-orientation of the attitude of scientists.

2.3 **The Farmer Decision-Making Framework.** It is necessary for researchers to appreciate the factors which influence farmers' decisions. Farms are holistic entities in which no part of the farm or household is independent of the rest of the farm, or household, or the larger community. Farmers think in terms of their total enterprise which is a complex and dynamic system. Due to the complex social and physical relationships operating within the farm household, within the farming system and within the larger community, it is nearly impossible to develop a package of technology for a single part of it without affecting other parts of the operation. When farm resources are low, food security is the primary objective, risks cannot be taken, and expensive procedures are not adopted. Farmers take small steps at a time, try out innovations on small areas, and adopt only those aspects of the technology that can be adapted

⁹ This section is adapted from Mr. Spurling's presentation at the workshop, and the discussions.

Successful examples of the association of farmers with research planning were cited at the workshop. Farmers were involved right at the beginning of the technology development process in Ghana in the maize project assisted by the Canadian International Development Agency (CIDA). They were invited to specify what their problems were so that they could help in defining the agenda for the research program in the following season. This was done by confidential balloting and then by counting the tickets on each problems and addressing the most important ones in the following agenda. It was necessary to ballot them because otherwise those who are most vocal would control the meeting. The Bank suggested that such an approach be tried in Togo by the extension system, which the Togolese did most enthusiastically in the first year with interesting results. They probably started on the wrong foot; they had more extension staff than farmers in the first meeting, mainly because they met in the extension headquarters instead of under a tree! It was suggested that to ensure a more informal atmosphere, they change the venue of the meeting so that there was a majority of farmers and this was done. At the end of the meeting the manager of the research and development unit in the extension project said that it was amazing that the farmers listed as their priorities things which were quite different from what the research system had arrived at. Such an exercise is very important so that the priorities for research are not conceived by the researchers or extension staff but at the local level by the farmers. This process of farmer involvement in the identification of priorities can be easily fitted into the normal rhythm of a T&V meeting.

The process followed in Togo is also followed in the northern Cote d'Ivoire, and in both places there has been a development of beneficial interaction between research, extension and the farmer over the last 2 or 3 years. Some synergism is now emerging. Farmers are beginning to imitate what they have seen on the research plots adjacent to them, and have even modified practices to suit their conditions; this is a very exciting development, which should make the donors think not only of technology development on the research stations, but the development of a relationship in which each one has something to give the other which is quite invaluable and in which exchange of information takes place in an informal working relationship.

(Extracted from Mr. Spurling's presentation at the workshop)

Box 3: Farmers' participation in research planning

to fit the specific on-farm circumstance. Some technologies may be hindered or prescribed by relationships within the household or within the community. For instance, in Swaziland, as well as in other African countries, livestock graze all lands after harvest. Therefore, it is unrealistic to recommend to individual farmers that the crop remains should be turned under after harvest.

2.3.1 In deciding whether to adopt, adapt, reject, or partially adopt technology, farmers take into account many things other than financial benefits and costs. For example, weeding to increase crop yields appears to be a simple and straightforward technology. However, new weeding practices must be measured against the opportunity cost of the labor required, in terms of time for other crops, or for gathering water and fuel wood. For example, if the farm family lacks money to hire labor for additional weeding, it will have reduced food availability at weeding time. An additional reason why new weeding practices may be rejected is that some weeds are an important component of the family diet. Women have an incentive to maintain a certain weed population in their cereal fields which they use as an essential ingredient in the

feeding of their family. Thus, an option for research is to work on developing food crop varieties that are tolerant of a certain amount of weed competition.

2.3.2 The so-called "packages of recommendation", especially complex packages of varieties, fertilizers, sprays and clean cultivation are not always adoptable as a total package. The extent of adoption depends on the priorities of and the problems facing the individual farmer. The objective of research and development is to provide the farmer with the information which he or she needs in order to make decisions from among the available technical options. The means to achieve this objective is a three-pronged partnership between research, extension and the farmer, with the farmer as a full partner and not in the role of a guinea pig.

2.4 Value of Farmers as Researchers. The trial and error research carried out daily by farmers is as valid to the farmer as the classical, statistical, analyzable, randomized experiments carried out by scientists. This is illustrated by an example from Malawi, where a system of cropping for maize and beans was developed by farmers into sequential inter-cropping of beans under maize. Research took the technology and adapted it for slightly higher yields by varying the planting dates, the densities and the crop arrangements. But the people who conceived the idea, who developed it by trial and error over many years were the farmers. However, it took nearly 20 years for the Department of Agriculture and Extension Service to accept the recommendation of research that inter-cropping of beans with maize was in fact a good husbandry technique, and led to higher total yields than cropping maize in one field and beans in the next.

2.4.1 Work done in Bangladesh illustrates the value of farmer participation in the technology generation and adaptation process. The Bangladesh farmers had developed a technology of harvesting potatoes over a period of time and inter-cropping of vegetable crops amongst the potatoes. The extension staff spent time with four farmers, helping them develop and present papers at a joint workshop. The workshop was a great success in terms of the understanding and building of relationships between all participants. Such a dynamic training operation would not have been possible if the farmers had merely listened, without actively participating through their presentations. This kind of exercise can be replicated by identifying innovative farmers, and helping them develop a paper and/or presentation for a workshop attended by research, university and/or extension staff and other farmers.

2.5 Farming Systems Research. There has been an evolution from "classical" research to FSR, and now, because of the increasing realization that socio-economics is just as important as agro-ecology, there is a whole range of different research processes. Unfortunately, even FSR, as it was started and as it is still done in many places, is largely regarded as an "end-in-itself" exercise, and does not feed into the research planning and programming process. In many countries it has become a theoretical operation of testing different arrangements, and publishing the results, but is not built on farmers' needs.

2.5.1 Participative research is a relatively "dirty" operation, as it involves on-farm research in participation with the farmer. Even though it is not much more expensive to do research off

rather than on the research station, it is not considered as part of the scientists' responsibilities, and in fact is regarded as being outside the normal scientists' "culture". One of the challenges before the Bank is to ensure that researchers and extensionists work together on the farmers' fields.

2.6 Evolution of the Research Culture. One of the constraints to improving research-extension-farmer linkages is the view common among researchers that research is something which can only be done by highly qualified people (e.g., Ph.Ds). Researchers tend to look down upon extension staff and farmers who, according to them, would be unable to understand anything complicated. There is a need to put more energy into trying to thaw out these relationships. Researchers must realize that the identification of the critical problems should be done in the farmers' fields. This requires a change in the research culture which is not something that can be ordained or mandated, or achieved through a conditionality in a project. Such a change can only be brought about gradually, by encouraging "participative research", i.e. research on farmers' fields with their active participation. Due to a lack of budgetary resources to meet the recurrent costs, efforts to encourage participative research would require funds from the extension service to provide incentives to research, because in many research projects this is not identified as a component at appraisal ¹⁰.

Research-Extension Linkage (REL)

2.7 Overview of Issues. Research and extension systems should not be regarded as separate components which need "linking", but integral parts of one system, and the barriers between extension and research should be broken down. But historically, in all African countries these have evolved as separate organizations, and a discussion of REL is inevitable. Many countries have not realized that REL is much more than researchers training extension subject matter specialists (SMS) and assisting them in the implementation of field trial programs. As seen in the earlier section, the linkage involves continuous collaboration between researchers, extensionists and farmers in the development of "steps in technology" viz. the different stages of refinement of technology to suit local conditions, risk factors and farmers' resource endowments. Many problems have arisen in the various countries in the implementation of this concept. First, there has been a lack of proper understanding of the fundamental principles of the linkage, and consequently a lack of appreciation of its importance, thus resulting in poor implementation. Second, in many countries there have been institutional problems arising out of a lack of coordination between extension departments and research organizations. Third, most projects failed to provide adequate funds for implementing the various aspects of an effective REL such as facilities at the research stations for holding SMS workshops and recurrent cost support to the National Agricultural Research Systems (NARS); as a result, financial support to the various components REL has fallen between two stools, namely research and extension projects as many extension projects assume that the research projects would provide for them and vice-versa. Fourth, some countries have been under the mistaken impression that

¹⁰ These issues are discussed in greater detail in para 2.10.

the best way to strengthen REL is to create a separate unit to handle it. As the discussion on this topic in para 2.9 shows, this has weakened rather than strengthened it.

2.8 Stages of Technology Generation. Wherever extension is effective, one can see its strong linkage with farmer-oriented research. The most important aspect of the linkage is the participation of farmers in research and extension and technology generation. The following distinct stages of technology generation are generally recognized.

- * On-station research undertaken at the research stations;
- * Multi-location experiments, mostly researcher-managed, but sometimes managed by the SMSs, undertaken at the sub-stations, or testing sites or sometimes on farmers' fields, with the number of treatments restricted to those relevant to the specific agro-ecological situation; and
- * On-farm adaptive research or OFAR, which is always taken up on farmers' fields (also called "farm trials"), whose objective is to test the tentative research findings under farmer's management and within their resource endowments; these are obviously farmer-managed. They constitute the last stage of technology generation, before extension recommendations are formulated.

2.8.1 Even though the multi-location experiments are conducted on farmers' fields, what are being tested at this stage are purely technical parameters, and farmers' fields are regarded as temporary additions to the testing sites owned by the research system, chosen to represent specific agro-ecological conditions. They are sometimes designated as "on-farm applied research", and should not be confused with "on-farm adaptive research", as both of them have the same acronym "OFAR". It is preferable to use OFAR to denote the latter. In many countries, there is generally a lack of understanding of the purpose of these experiments on farmers' fields. They are regarded as an extension tool, which they are not intended to be. They are essentially to assist the researchers in testing their tentative on-station findings under different agro-ecological conditions.

2.8.2 There is often a lack of clarity of purpose regarding the on-farm adaptive research (OFAR). In many countries, as stated earlier, this stage is often mixed up with the earlier one, and farmers are "advised" to adopt all the research recommendations; sometimes inducements are offered in the shape of subsidized inputs, particularly fertilizers. Such efforts render these experiments meaningless. They neither convey any new message to the researcher, nor serve as an extension tool. This confusion is not confined to the research and extension staff in the countries. Some of the Bank Staff Appraisal Reports of research and extension projects are also not very clear on this issue. Such trials are often called "demonstrations", which really is an extension tool, and when inputs are subsidized, a very ineffective one ¹¹.

¹¹ See Benor, Daniel and Baxter, Michael, (1984), "Training and Visit Extension", The World Bank, Washington DC, USA. Chapter 14.

2.8.3 It is generally agreed that the first stage is to be managed by the researchers and the last stage by the farmers, with extension monitoring the practices adopted by them. As regards the second stage, the practice is not uniform. In some countries, (e.g., Kenya) the management function is with research, and in some other countries (e.g., Mali) the management function is with extension. In Nigeria, for example, both the models are in vogue; in the Agricultural Development Projects (ADP) of the northern states the second stage is managed by the ADPs (i.e., extension), whereas in the ADPs in the south-east, this is managed by research.

There are many examples of Ministries of Agriculture undertaking research on their own, without having any linkage with either extension or the national research system. The most glaring example is Ethiopia, where the Agricultural Development Department (ADD) plans and implements a large scale "On-farm Trials" program, taken up on fenced, department-owned trial sites. To a large extent they duplicate the research program of the Institute of Agricultural Research (IAR). Though ADD trials have been supported under Bank-assisted projects, viz. The Fourth Livestock Project and PADEP-I, they have not been fully integrated with the research-extension linkage mechanism. Their trials are not jointly planned by research and extension, nor are their results evaluated by them and discussed at the SMS workshops. The way they are structured and carried out makes it very unlikely that the resources spent on such trials would result in benefits to farmers.

2.8.4 Whichever model is adopted, it is very necessary to ensure that:

Box 4: Research-extension linkage

- (i) Extension SMSs are involved in the planning of research;
- (ii) OFAR is planned jointly by the researchers and the SMSs;
- (iii) Where the researchers play a major role in implementation, SMSs should back-stop them and vice versa;
- (iv) The results of OFAR are discussed by the researchers and the SMSs at the monthly workshops; and
- (v) Extension SMSs refrain from undertaking research on their own, unrelated to what are being tested at the different stages described in para 2.8.

2.9 Research-Extension Liaison Units¹². As stated in para 2.7 the issue here relates to the need for special units to bring about "linkage" between research and extension. The consensus at the workshop was that these units are more often than not counter-productive, and that it is therefore surprising that many Bank projects support their creation. There is considerable evidence that the strongest linkage between research and extension is established

¹² The nomenclature of such units vary from country to country. In Malawi, they are called 'Adaptive Research Teams'; in Ghana the Crops Services Department of the MOA seeks to liaise between research and extension.

when both are undertaken by the same person, as is done in the U.S.A. In Africa, however, it is difficult to escape from the historical fact that extension is the traditional responsibility of the Ministries of Agriculture and research is generally with a parastatal; hence the need to forge "linkage". But the creation of a liaison unit is no way to strengthen the linkage, because such a unit acts as a communication barrier between research and extension, and between research and farmers. Those who are not very good at research generally get posted to such units; the result is an ineffective unit sitting between research and extension.

2.9.1 The arguments in favor of such units are: the "blanket" or "general" recommendations emanating from the research centers of the NARS need to be "refined" to suit the various agro-ecological zones and it is the function of these units to do so; and that once such area-specific recommendations are evolved, they would be given to extension for carrying out what are considered purely extension functions, such as demonstrations and on-farm trials. But such an argument misses the crucial issue mentioned in para 2.2 that research and extension are parts of the same continuum and that the same set of people, viz, researchers, SMSs and farmers should be involved at the different stages of this process ¹³.

2.10 Funding of Adaptive Research. As regards the funding of the various stages of technology generation, the participants felt that OFAR should be funded by extension. While it was agreed that the first two stages (para 2.8) could be funded by research, some participants felt that there should be some built-in funding mechanism which would make researchers focus on the very complex farming systems and crop mixtures which are prevalent in most African countries. Left to themselves, the chances are that the research system would spend a disproportionate amount of resources on research on sole crops. The participants cited the most obvious example of pasture research in Kenya. Many Kenyan highland farmers maintain grade cattle and grow pastures, which form an important element in their farming system. But still, research stations seldom undertake research experiments on crop combinations which farmers practice, namely: maize, beans and pasture. It was argued that the only way to "force" the researchers to focus on research relevant to farmers would be for extension to fund such research. But such an arrangement might result in an undesirable dichotomy, namely: sole crops research, funded by the research system, and research on farming systems ¹⁴ and crop mixtures

¹³ The term "transfer of technology" does not correctly convey the underlying theme of this discussion. It suggests a "transfer" of the "technology" developed by research to farmers, with knowledge at one end and ignorance at the other; and extension as the "agent" of research to effect this transfer. In view of its wrong connotation it is best to avoid this term, and stay with the time-honored word "extension". (Ed.)

¹⁴ The term "research on farming systems" is used here deliberately, instead of the better known term, "Farming Systems Research" (FSR) as the latter has, in recent literature, been used to include the diagnostic survey as well. In other words, FSR is now understood to mean, "research into how farmers have integrated research recommendations on different individual crops into their farming systems". (Ed.)

funded by extension. It was then agreed that: (i) the Bank-assisted research projects should discourage research which is unrelated to farmers' needs; (ii) in a situation of limited resources, research which is of immediate relevance to farmers' needs should get priority; and (iii) extension projects should contain funding for research on farming systems, but this should be used by extension to match the funds from the research system so as to secure the commitment of the latter.

Organizational Issues

2.11 Most Bank-assisted research projects in Africa emphasize the need for both commodity/factor research and inter-disciplinary research focussing on the farming systems of the area. The former is carried out in what are called the National Research Centers (NRC)¹⁵ and the latter in the Regional Research Centers (RRC). The research carried out in the RRCs is generally closer to what happens on farmers' fields and therefore the identification of the field constraints and opportunities in partnership with extension should be their responsibility. But the RRC concept has not been satisfactorily implemented in many African countries due mainly to the following reasons:

In some countries there is too much centralization of decisions affecting research priorities and finalization of research programs. Ethiopia, Sudan, Kenya, Cameroon and Cote d'Ivoire were cited as examples of too much centralization constraining the responsiveness of the RRC's to farmers' needs. On the other hand, the strong linkages between research and extension in Nigeria were attributed to freedom enjoyed by the RRC's to formulate their research programs, particularly when they relate to research on crop mixtures.

Box 5: Research planning

- * The concept of RRC is new to many NARSs in Africa, whose strengths, historically, have been in commodity research (e.g., maize, cotton, cocoa, coffee), particularly plant breeding, which is the responsibility of the National Research Centers (NRC). The RRC concept and the associated concept of farming systems research (FSR), have therefore been slow in getting established; and
- * In the first generation research projects, the managerial resources of the African research systems have been fully stretched by the task of putting the

¹⁵ The nomenclatures vary from one country to another, but the concepts are essentially the same. The terms used here are followed by the International Service for National Agricultural Research (ISNAR), which is one of the international research centers of the CGIAR, located at The Hague, The Netherlands.

hardware in place and overcoming the initial hurdles of project implementation, at the expense of giving shape to the RRC concept.

2.11.1 The implementation so far of national research projects indicates that implementation of the RRC concept will take time. Many NARSs tend to continue their earlier emphasis on sole crops, while a majority of farmers grow a combination of many crops. If this situation continues, and if the research recommendations continue to be out of alignment with what happens on farmers' fields, both extension and research might lose credibility with policy-makers and farmers. In order to generate useful technological recommendations quickly, it might be useful to adopt a "bottom-up" approach in future research projects, starting with the RRCs and focussing on diagnostic surveys and linkages between research and extension, leading to the generation of extension recommendations relevant to the local farming situation. If necessary, such an operation could be funded through the extension projects. This measure is not intended to be a substitute for the long term goal of setting up effective NARSs, but could be a useful "bridging operation".

2.12 **Research Organization.** Of importance to the generation of relevant technology is the process of identification of areas of research and priority-setting rather than the structure. The former is the substance and the latter only the scaffolding. Many projects, however, tend to focus more on the structure than on the process. It has been tacitly assumed that by transferring research activities from a Ministry to a parastatal (e.g. Kenya Agricultural Research Institute), the right process would somehow fall into place. But experience ¹⁶ shows that this has not always been so. On the other hand, the setting up of a structure (the preferred structure in many countries being a parastatal) might delay the establishment of the right process.

2.12.1 As regards the parent Ministries of research and extension, it was felt that this aspect is really not a critical factor. What is important is to ensure that horizontal linkages between the RRCs and extension are stronger than the vertical linkages between them and the national research headquarters. The RRCs should have the freedom to spell out their research priorities and formulate their research programs. Some participants went to the extent of saying that the Bank has not adequately used the research projects as effective instruments to make the NARSs decentralize research planning and prioritization.

2.12.2 On a different but related key, it was suggested at the workshop that the agricultural research system has been predominantly top-down due mostly to the influence of the colonial agricultural research structure and the attitudes engendered by it. Growth in the size of the NARSs has resulted in large bureaucracies, where the vertical linkages have tended to be re-

¹⁶ The country experiences outlined in Annex 3 would substantiate this.

enforced ¹⁷. Thus, research and extension have both grown into large vertically-oriented bureaucratic systems, and the challenge before the Bank in the recent past has been how best to forge horizontal linkages between these two systems at various levels.

2.12.3 In many countries, national agricultural research is the responsibility of a parastatal ¹⁸. Such parastatals have been set up under Bank-assisted projects, which have provided financial support to them. These were established with a variety of objectives, such as: (i) securing better conditions of service for the scientists, including pay and allowances, than would be available for them under government; (ii) more speedy decision-making, leading to better project implementation; (iii) ensuring more flexibility in day-to-day working; and (iv) the possibility of cooperating with the private sector in specific areas of research. In actual practice, many of these objectives could not be fulfilled, as discussed earlier. First, the Ministries of Finance were not willing to give to these parastatals the envisioned degree of autonomy. Second, the parastatal headquarters grew in size and many of the new positions were filled by transferring some of the best scientists from the field to headquarters. Third, these parastatal headquarters, chiefly the Director's office, has been very reluctant to decentralize decision-making, and give to the research centers the degree of autonomy needed to quickly respond to field problems. This last factor has resulted in impeding the satisfactory development of REL.

2.12.4 On the other hand, in Nigeria for example, where no such parastatal has been set up, the control of the Ministry over the different research centers is very loose and confined to policy. This has enabled the development of stronger horizontal linkages between the research centers and the extension system. The main lesson one can learn from the experience so far is that the mere establishment of a parastatal is no answer to all the problems afflicting the research-extension management system. What is important is to ensure that strong horizontal linkages develop between the various research centers and extension, and that the parastatal headquarters bureaucracy is kept "paper thin". In future Bank projects, it might be useful to stipulate in the constitution of the parastatal that research programs would be approved at the appropriate levels, either by national research coordinators or the center directors as the case may be, and that the role of the headquarters would be confined to policy and review.

2.12.5 Research carried out at the universities is very often divorced from reality and has little regular contact either with the NARS or with extension. The main reason for this is the fact that in most countries, universities come under the administrative jurisdiction of the Ministry of Education while the NARSs come under other Ministry. These latter are different in different countries; in some, the NARSs come under the Ministries of Agriculture (e.g., Malawi, Cote

¹⁷ For example, the Mali research system has approximately 600 researchers as against about 100 some years ago; there are about 700 researchers in Kenya and 800 in Nigeria.

¹⁸ For example, the Kenya Agricultural Research Institute (KARI).

D'Ivoire); in some others they come under the ministry responsible for technology (e.g., Kenya, Ghana). Policy towards Bank support to university research is not uniform; some Bank-assisted National Agricultural Research Projects include such support (e.g., Ethiopia), while others (e.g., Kenya) do not, even though the need to support university-based agricultural research is felt both by the country and by the Bank. Giving university research a role within the mainstream of the NARS would help link such research with extension and farmers, and would result in greater relevance of agricultural education to farmers' needs.

Private Sector in Research

2.13 The role of private sector research ¹⁹ is severely limited at present in what it can achieve for the resource-poor farmers in Africa. Trends in other developing countries show that private sector research generally starts with evolving new crop varieties; the incentive for such research lies in the prospects for the sale of seeds of promising varieties. In Africa, private seed companies do not have enough incentive to undertake research in composites or self-pollinating varieties of foodcrops. There is evidence of private sector research on maize hybrids in some countries. It is very doubtful if this would lead to private sector research on any significant scale in Africa. The way to go would appear to be towards increasing encouragement to farmer-based seed development (including planting material of vegetatively propagated crops, such as cassava, yam) and encouraging the development of indigenous technology by farmers. The NARS could assist in this effort. Some NGOs in Africa have done useful work in this area. The example of on-farm seed production projects in Senegal and The Gambia was mentioned at the workshop. Many participants felt that the Bank should focus the attention of the NARSs and the national extension systems on increasing farmer participation in research; involving them increasingly in seed development is one way to stimulate such research.

In Cameroon there was a cassava project which focused on overcoming the countries' lack of a system for vegetative propagation of crops. The program took about eight years to complete the cycle - research/ training/ handing over to the NARS. Once the program was capable of running on government input, the donor pulled out and the project continued. Farmers borrow money through a fund set up under the project to buy and transport their planting material. They then pay back with the revenue from their crop, creating a revolving fund with a view to improving access to technology.

Box 6: Cassava research in Cameroon

2.13.1 The challenge is to extend to the foodcrops sector those factors which have made private sector research in high value cash crops in some countries successful, viz. the participation of farmers in research planning and the accountability of research to the users. It is easier to incorporate participation and accountability into research on perennial or expensive cash crops than on food crops because larger farmers tend to be better educated and organized, are able to articulate their needs, and are therefore better able to hold the researchers

¹⁹ The reference is to the organized private sector, and does not include farmers (see para 3.9.1).

There are many successful examples of privately-funded research in Africa. ART Research Farm in Zambia is one such, and provides a model of private research owned and managed by commercial farmers and commodity organizations, the largest and the most powerful of which are the Oilseed Producers, Grain Producers (maize, sorghum) and the Cereals Association (wheat and barley). The farm (700 ha), established in 1980 and legalized in 1981, has been developed from empty land over the last 9 years to what is now a most impressive and active research farm. The Commodity Associations (CA) financing the ART influence the research program through the Research-Extension Committee, whose membership comprises executive officers of the 3 large CAs, the Director of ART (Chairman), a member of the Board of Management, one farmer and the professional staff of ART.

The second model is that of the very successful Tea Research Foundation (TRF) of the Southern African countries based in Malawi. TRF is funded through a cess and is autonomous. It pioneered the development of vegetative propagation techniques for tea which made possible the rapid multiplication and distribution of selected high-yielding clonal material with good processing characteristics for the region. This, together with other innovations, has put the TRF in the forefront of international tea research. Tobacco Research in SADC countries is another example of this model. Private sector research funded by the tobacco industries of Zimbabwe, Malawi and Zambia have enabled these SADC member states to maintain their comparative advantage in the production of flue-cured and burley tobacco. This has involved the development of both appropriate varieties and cultural and curing practices.

The third model is that of the Seed Cooperative in Zimbabwe which is essentially engaged in seed multiplication and also undertakes research in breeding. The Seed Coop was established in 1982/83 by the amalgamation of the Seed Maize Association and the Crop Seeds Association. It is fully funded by its seed producer members (currently 21) with 1.5% to 1.75% of turnover being invested in research (for comparison, some private firms in Zimbabwe invest 5-6% of turnover in R&D). It has a superbly managed research station (the Arnold Ratray Research Farm - named after the architect of SR52 who still works in the maize fields) about 50 km north-east of Harare staffed by 14 graduate/diploma senior staff and 40 permanent hands (+40 casuals) and managed by the retired head of the departmental Crop Breeding Institute (CBI). The Seed Coop is closely linked to CBI by a formal agreement (established in the 1960s) that binds the Seed Coop to multiply all the CBI's newly-registered varieties for which they receive breeders' seed.

The Seed Coop also has its own breeding programme with 4 breeders. The majority of work is focused on maize with supporting breeding programmes on wheat and soyabean. Despite being in a position to obtain germ plasm from the CBI, the Seed Coop has started its own R&D as a risk-aversion tactic; besides it would like to be able to service its own needs from a business-like operation. In fact, the CBI and the Seed Coop are in an excellent complementary partnership.

Box 7: Examples of private sector research in Africa

accountable. For example, in Malawi the grower community of the more valuable cash crops (tobacco and tea) are involved in the financing of research. Regular field days are held in the field, not in the office. Farmers participate in setting the research agenda which is consequently focused on their field problems and research is accountable to the clientele.

2.13.2 The contracting out of research by the private sector to universities and research institutes is largely unknown in Africa, except to a limited extent in Kenya and Zimbabwe. It was felt by all participants that the Bank should encourage such research sponsorship, and wherever necessary, the budgetary procedures should be modified to provide incentives to these institutions to actively canvass for such sponsorship.

Research on Farm Implements

2.14 It was cited that research on appropriate farm implements - hand-operated or animal drawn - in Africa is falling behind. Lack of farm implements is acting as a major constraint to farmers' adoption of technology. Many examples were cited by participants.

- * In Ethiopia, many farmers use a seed rate of almost 250 kg of wheat per ha, i.e., 2-1/2 times the recommendation, because of poor germination which again is due to poor land preparation. The availability of an animal-drawn disc harrow would be very useful.
- * In Uganda, farmers are unable to sow millet in line due to the lack of a seeder.
- * In Nigeria and Ghana, farmers demand better weeders, and hoes.
- * "Gari"-making equipment (useful for cassava) is demanded in almost all West African countries.
- * In Somalia, farmers still use an old Italian tool bar which is very heavy; an indication that research has not emerged with a better alternative in 50 years.
- * In almost all countries there is need for a hand-operated maize sheller and weeder.

2.14.1 It was unanimously felt by all participants that mechanization, i.e., tractors is not the answer. It is therefore surprising that many donors give tractors to African countries as part of their aid package, instead of assisting these countries to develop low-cost options.

International Agricultural Research Centers

2.15 The key role which IARCs should play in focussing the attention of the NARSs on national priorities can be illustrated by the example of cassava. Cassava is a staple food for many communities in Africa, but maize still receives more attention from the researchers²⁰.

²⁰ The example of Ghana could be cited to support this viewpoint; the research focus on roots and tubers in Ghana has historically been poor. The Bank-assisted National Agricultural Research Project will hopefully correct this trend. (Ed.)

If the International Institute of Tropical Agriculture (IITA) operates only through the NARSs, it might not get very far in focussing the attention of researchers and policy-makers on the need for greater emphasis on cassava research. If, on the other hand, it creates a network with the African research institutes, whose demand for funds to support cassava research might be ignored by their respective NARSs in their enthusiasm for giving greater emphasis to more "fashionable" crops such as maize or wheat, then the NARSs cannot for long ignore the importance of cassava. Such networks would "persuade" the NARSs to pay due attention to research on crops which are relevant to farmers and which meet a major portion of the nutritional requirements of the rural population. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) could similarly form a sorghum and millet network with those research stations in the countries where these crops are relevant, e.g., the Sudan - Savannah and Sahelian regions of West Africa. Such networks cutting across NARSs would be very beneficial from the point of view of ensuring national research priorities.

2.15.1 Such "networking" would pre-suppose some attitudinal change on the part of the IARCs. They should forge "horizontal" linkages with the relevant research stations in the various countries, instead of with the NARSs, as, in many cases, the latter act as stumbling blocks to the evolution of a rational set of research priorities. The formation of such networks could be the beginning of a regional, i.e., trans-national research system.

Relative Importance of Different Kinds of Research

2.16 Donors and academic and development institutions are placing increasing emphasis on practical research, particularly on farmers' participation in technology development in Africa. The recommendation is to push researchers downstream, i.e., away from science, towards farming systems research, and research closer to farmers. Such research depends very much upon REL, OFAR and on-farm trials. This is an understandable response to the realization that substantial investments in agricultural research in Africa have not yielded the desired results, and is reminiscent of the familiar debate in the agricultural research history of the U.S. and other countries between practical and scientific researchers. Effective research-extension systems have a "portfolio" of activities, comprising science-based experimental research, field-based research, on-farm research, and farmer experimentation. The presentations and the discussions at the workshop stressed the implicit weaknesses in this portfolio as one moves upstream from the farmer-end. The linkages between the various activities in the portfolio are not strong and visible. The discussions at the workshop focused on strengthening the linkages at the farmer-end of the portfolio. But history tells us that this is not enough and that reform in the upstream science-based specialization is required for major advances in technology. This requires a management system for research with the discipline that T&V brings to extension.

3. TRAINING ²¹

3.1 Training under T&V comprises two kinds of training. The first is the periodic training which is a part of the dynamics of the system, e.g. "fortnightly" training of the frontline extension staff and the SMS workshop ²². The second is the short term ad-hoc training in specific subject matter areas (e.g., maize agronomy) either in-country or abroad.

3.2 Training Which is Part of the Dynamics of T&V. The proper functioning of T&V depends on effective training of the frontline extension staff, aimed at raising the level of their diagnostic and communication skills, and SMS workshops which provide a continual feedback to research from the field and help research to focus on farmers' problems. Despite their importance, many extension projects do not provide adequately for such periodic training and workshops, which are the key elements of the dynamics of the system. Further, there is no uniformity among projects regarding the extent of reimbursement by the Bank of the expenditures incurred on them by the concerned countries. In some cases, very low percentage of reimbursement has resulted in inadequate budget allocation by the governments for this important component.

3.2.1 In some countries SMSs still constitute the weak link in the chain. One way to rectify this situation is to improve the quality of SMS workshops. But researchers, who have the primary responsibility to run these workshops, look upon them as routine training sessions, rather than as fora for stimulating a two-way flow of ideas. Since, prior to the introduction of professional extension, their work had been confined to the research stations, they have great difficulty in understanding field problems; they are often not able to demonstrate "how" to practice their recommendations. The SMSs do not always state what they feel about the value of the monthly workshops due to hierarchical problems. As a result the SMS workshops tend to be too theoretical, and there is little active participation of farmers during the field day of these workshops.

3.2.2 Even though many researchers participate actively in extension workshops and take considerable interest in the relevance of their recommendations to farmers, research systems have been slow in responding to the demands of extension. Researchers' career development does not depend upon their field visits and their contribution to training extension staff, a point

21 This chapter is based on the presentation of Mr. Fremy at the workshop, and the report of Working Group 2.

22 In many countries, these do not take place fortnightly and monthly respectively; countries have, in consultation with the Bank, made adaptations to the periodicity of these sessions. For the sake of convenience these are referred to as "fortnightly" training sessions and "monthly" workshops. Sometimes the terms "frontline extension staff training sessions" and "SMS workshops" are also used. (Ed.)

made earlier (para 2.2.1); participating in the technical training of extension staff is not therefore really attractive to them ²³.

3.2.3 The quality of the workshops tend to be reflected in the fortnightly training sessions for the Frontline Extension Workers (FEWs) conducted by the SMSs. These sessions do not adequately discuss the results of the FEWs' visits to the farmers' fields; nor do they discuss the common successes, failures and difficulties.

3.2.4 Periodic diagnostic workshops for the SMSs and researchers with emphasis on case studies would improve their diagnostic skills. Increased farmer participation in fortnightly training sessions and monthly SMS workshops would introduce realism in these training sessions and make them more practical.

3.3 **Technical Themes.** After the first or second year, the same themes tend to recur in the fortnightly training sessions and SMS workshops. This is mainly due to the fact that field problems, which provide fresh researchable themes, are not discussed often enough. Besides this, there are other reasons as well which are:

- * Insufficient attention is paid to the relevance of the innovation recommended, whether the recommended innovations have been adopted, how, by whom and why, or if they have been rejected, by whom, and why?
- * Monthly workshops do not discuss the many low cost technologies to improve yields, reduce costs, improve soil fertility, protect the environment, reduce storage losses, etc.
- * Field staff often do not know how to "read the field", tend to report the problems mentioned by farmers as they seem, and do not dig deep enough to find out what the underlying problems are, an indication that "diagnostic skills" is the area of highest priority in training.
- * Those staff who lack curiosity and diagnostic skills do not forge strong farmers, as they have nothing to offer which the latter would appreciate; they tend to look for expensive inputs like improved seeds, pesticides and fertilizers.

3.4 **Field Visits.** The diagnostic skills of the field staff need to be improved. They often try to get the answers to their questions from the farmers, instead of observing the field,

discussing with the farmers their practices and results, and focussing on the priority objectives of their visit. Field visits and communicating with farmers should be included as a special area of focus in the fortnightly training or monthly workshops.

3.5 Pre-Service Training. A wide variety of agricultural schools and vocational training centers, public and private, offer agricultural courses. These courses are often too theoretical, too long, and not well-adjusted to the needs of extension and farmers. Since the students of these schools often expect to be placed automatically in government service, they do not make the best efforts to be competitive in the job market. Employers are seldom involved in improving these schools. To meet the needs of most agricultural services, both private and public, technical secondary level vocational training centers offering 2 to 3 years hands-on training should provide adequate general education and in-depth agricultural knowledge and skills to suit field positions. If this objective is to be achieved, teachers should have field experience, and the school should have appropriate farming facilities relevant to the local area.

3.6 In-Service Training. The in-service training institutions suffer from many deficiencies. Some of these are:

- * The divisions/directorates in the development agencies or agricultural ministries responsible for in-service training are often inadequately staffed and do not have the means required to provide in-service training at the national and regional levels.
- * Training plans seldom result from well structured preparatory work to assess training needs by identifying skills requirements for specific jobs and assessing existing skills so as to determine skills gaps.

3.7 Short-Term Training. Considering that prior to the introduction of T&V, extension staff did not receive much training, it was necessary to identify the areas, both technical and managerial, where short-term training was needed for each category of staff, and to prepare a training plan for each country. Such detailed guidance could not be given by the Bank to the countries. As a result, it was not possible for the project managers in most countries to make the best use of the project funds for training²⁴.

3.8 Training Abroad. It is desirable to build into the extension projects a component of foreign training (as long as it is not degree-related), but some innovation in the management of this component is needed. It is necessary that the countries and the Bank keep the following in mind:

- * The staff from the ministries and institutions concerned should not be away for long periods during the life of a project which they should be managing and implementing.²⁵
- * More attention should also be paid to the content of the foreign training so that the staff are able to increase the effectiveness of their work in their own countries.
- * There should be more emphasis on informal study tours than on formal training, particularly between African countries.²⁶
- * Regional training institutions like IPD (Cameroon), IAB (Bouake), ARMTI (Nigeria), CESAG (Senegal) and a few similar institutions should be strengthened further through assistance from EDI, ILO and UNDP.

3.9 Training of Senior-Level Extension Managers. The training of managers should receive top priority and should not be confined to extension managers but should include all national and regional managers in the different areas of agricultural services, viz. extension, training, research, M&E, personnel, disbursement and procurement.

3.9.1 The training should include:

- * Orientation workshops on the T&V system so that the managers fully understand the objectives, methodology, and tools of the system;
- * Specific training on the conduct of monthly workshops;
- * Intensive three month-management skills training to impart skills and adequate knowledge and attitudes to manage human, material and financial resources in their respective fields; and
- * Training on supervision tasks.

3.10 Training of Trainers. Trainers themselves generally lack the needed communication skills. Poor field orientation often results in their teaching from books and focussing on theory, instead of on practical field work. The following are generally the shortcomings in the training

25 One of the participants referred to the practice of some bilateral donors providing for degree-related foreign training (leading to M.Sc or Ph.d degrees) in their projects and enticing away good extension managers for prolonged periods. (Ed.)

26 There is an increasing trend among African countries, particularly among the West African Francophone countries, to exchange extension implementation experience with each other.

capability of the SMSs and the researchers: (i) they do not have time to prepare practical lesson plans, materials to be delivered or teaching aids; (ii) researchers as resource persons generally lecture and do not use creative teaching techniques and are not practically oriented; (iii) they are uncomfortable when confronted with how to address field problems which they do not comprehend; confidence comes out of familiarity with the field conditions and they do not go to the field, and therein lies the root of the problem; and (iv) lack of proficiency in transforming research results into recommendations for use under farmers' conditions.

3.10.1 Training Institutions. There are a range of institutions that can undertake training of extension staff. The following matrix describes the present status and the remedial steps needed.

<u>Type of training</u>	<u>Institution</u>	<u>Current status and steps needed</u>
Induction	Agricultural schools; Farmers' training centers; Vocational schools.	Generally neglected; Bank projects do not generally support their upgrading. A study should be undertaken for each country outlining the measures to upgrade them.
Periodic training for SMSs	Few countries have institutions specializing in such training.	Future Bank projects should contain provision for improving the facilities in the agricultural colleges and other academic and research institutions for providing such training.
Training of extension managers	No training institutions specialize in such training; curricula are not developed.	Considering the importance of this training, it is desirable to develop facilities at a regional Pan-African training center. EDI could take a lead in the matter.
M&E	No systematic training.	It is necessary to prepare a regional plan for M&E training for a group of African countries, and arrange the training at one institution, either in Africa or outside. In the long term, facilities should be developed in Africa for this training.

3.10.2 Training Material. There is a dearth of training material of good quality, particularly in areas related to extension management and training, such as: how to recommend better practices to farmers, how to conduct the training programs for frontline extension staff, how to conduct SMS workshops, what is meant by farmer-led technology development and good

examples of the same, and how to plan and conduct on-farm trials. It is necessary to prepare slide stories and videos on various relevant topics. It would be futile to provide the extension agencies with audio-visual equipment (TV, VCR, etc.) if the needed training software is not available. It should not be difficult for the countries to get the training materials prepared by utilizing the project funds; it would be more economical if a group of African countries could come together and fund the preparation of such material.

3.11 Specific Measures By The Bank. The following specific steps could be taken by the Bank to improve the quality of training in extension projects: strengthening the ASI network; continual review of extension programs; more frequent thematic supervision of the extension component; study tours of the Bank staff handling extension projects to observe and document good examples of the functioning of extension in the field; training of senior national extension staff; and organizing regional workshops (e.g., the workshops arranged at Bouake, Cote d'Ivoire and Kisumu, Kenya in 1991) once each year.

4. EXTENSION MANAGEMENT²⁷

Preparation of Strategic Extension Programs

4.1 **Introduction.** A key message of chapter 2 is that the role of extension is much wider than merely passing on messages received from research to farmers, and includes working actively with them in identifying constraints and opportunities. In fact, wherever extension is effective in the field, it reflects the latter, and the first objective of extension management is to increase such instances and strengthen the flow of information from farmers to researchers. But in the initial phase of implementation of T & V, much of the time and energy of extension managers in Africa were spent on putting the structure in place and grappling with staff and mobility problems. It has been difficult for them to train their field staff to identify the problems of farmers and to focus the attention of the research system on these problems. During this phase, the extension system tended to pass on to farmers what was received from the research system, namely, a standard "package" of recommendations, generally for sole crops, for each major agro-climatic zone. As a result, in many cases extension found it difficult to identify relevant recommendations for farmers. This situation could be avoided if future extension projects undertake detailed preparatory work as part of the introduction of T & V. Such work should include a careful analysis of the available technological options in the light of prevailing farming conditions, and, with the active participation of farmers, identification of a set of relevant recommendations for each major agro-climatic zone.

4.2 **Extension Management.** Bank-assisted extension projects should emphasize the preparation of such a strategic extension program for each major agro-climatic region as part of T & V preparatory work. Its necessity and importance increase in the second-generation projects, with the increase in farmers' understanding and knowledge of their technological options. The preparation of such a program would include:

- * Taking into account the prevailing farming systems²⁸, field problems, technology available with research and its relevance to the farmers in the prevailing environment²⁹, and the present constraints resulting from the shortcomings in the delivery of other services;

27 This chapter is based on the paper presented by Mr. V. Venkatesan at the workshop and the report of Working Group 1.

28 One of the operational principles which have emerged out of FSR has been the need to assemble technological options on the basis of an understanding of the existing farming system. (Ed.)

29 For instance, a technology advocating weeding when farmers face labor constraints would not be of much help. See also para 2.3.1.

- * Stratification of the farmers into homogeneous groups based on factors such as their level of farming and resource endowments, so that different technological options could be given to each of the groups ³⁰.
- * Identification of extension recommendations appropriate to each category of farmers in the various agro-climatic zones.

Obviously, such a strategic program should be prepared by extension managers after discussion with farmers, extension field staff and researchers.

4.2.1 However, the mere preparation of such a program is not enough. Extension managers should follow it up with a management plan to translate the program into action, and to supervise and monitor its implementation. For this purpose, they should prepare a plan of action for their administrative units translating the program into goals for extension staff to reach ³¹. For instance, if the extension program envisions that in the first year at least 50% of the farmers would be persuaded to adopt row planting over small portions of their fields (called "adoption plots"), this overall goal should be disaggregated by agro-climatic zone, farmer category and extension agent, such that the manager would be able to supervise and monitor the implementation of the plan.

4.3 The second objective of extension management is to improve communication with the policy-makers and donors who would like to see the connection between the extension program and production. The extension managers should make the linkages of the extension program with agricultural production explicit and convincing. Such a step would earn for extension the confidence of the policy-makers and would also reveal the existing gaps in technology and other services, and policy weaknesses. For instance, it should be possible to say, on the basis of the extension program, that given the technical and policy constraints it would be realistic to assume that maize production in the Sudano-Sahelian zone of Nigeria would grow at about 2% per annum³² in the long term, even though there might be dramatic short-term increases in production. The strategic extension programs mentioned previously should enable the preparation of such estimates, which in turn would help identify the boundaries of agricultural growth under the prevailing set of conditions, and the gaps which need to be bridged to enable farmers to produce more with increased efficiency. Working Group 1 analyzed the possible growth rates for a few selected crops in some countries. The exercise was a rough one but nevertheless provided a methodological framework for the preparation of strategic extension programs.

30 This was elaborated by Working Group 3. See Chapter 5.

31 These goals should be spelt out in extension terms, such as rates of adoption of extension recommendations by a certain percentage of farmers.

32 The figure of 2% given here is only for illustrative purposes.

nevertheless provided a methodological framework for the preparation of strategic extension programs.

4.3.1 Extension managers seldom work out the linkages between extension and production. This makes it difficult for them to convince the policy-makers of the role of extension in increasing production. Well-established and strong M&E systems would be helpful, but in most countries, these are very weak. As a result, when extension has been very effective and has contributed to production increase, credit is given to other factors such as fertilizer subsidies and credit availability. Where extension is not effective, it is blamed as being a drain on the budget. This partly explains why, despite its successes in the field, national-level extension managers find it difficult to convince policy-makers of the contributions and potential of extension.

4.3.2 Extension management would thus include: (i) a strategic extension program (para 4.2); (ii) an extension implementation plan (para 4.2.1); and (iii) an extension management plan (para 4.3). The Bank should assist the countries in preparing these for selected areas as otherwise, it might be too much for a newly-established professional extension system to carry out. There is also the danger that the preparation of such programs come to be considered as an "art-for-art's sake" theoretical exercise. It is therefore essential that they are prepared initially in promising areas where extension is strong, and are not cast in concrete but used as a practical and flexible tool.

Role of Extension in Operationalizing LTPS Targets

4.4 **Operationalizing the LTPS targets.** Extension management is thus essentially a process which starts from the field and is built on what would make socio-economic sense to farmers in a given environment. The production forecasts (or estimates) are the end result of this exercise. The LTPS, on the other hand, starts at the macro-level, and concludes that the production of foodgrain in Sub-Saharan Africa "should" be 4% in order to sustain the anticipated population increase. The difference between what is possible and what "should" be achieved is the gap which could be bridged by a combination of policy and agricultural services initiatives. So the issue really boils down to decreasing the gap. Since the ultimate decision-makers are the farmers, the skill of the extension manager lies in identifying those measures which would result in farmers choosing to increase their level of technology adoption, such that the "gap" could be narrowed.

4.4.1 The result of such an exercise is shown in the following diagram.

LTPS targets

Gap to be bridged through long-term agricultural strategies,
including research, investment in infrastructure, etc.

Realistic medium-term targets

Extension, services and
policy gap

Current level

4.5 Overview. Working Group 1 clarified at the outset what is meant by "targets" in the context of agricultural development. The term "target" has a meaning only when the person who defines the "target" controls the means to attain it. Therefore the term, when applied to agriculture is likely to evoke the specter of central planning, with farmers at the end of the long arm of the state planning system. But, in agriculture, the decision-makers are the farmers and the "targets" represent nothing more than the policy-makers' goal. There are many instruments available with the policy-makers to make farmers increase their production and incomes. One such instrument is better extension, another is a better research system, the third is a better policy environment and so on. Operationalizing the LTPS targets really means preparation of the strategic extension programs and quantifying the gap mentioned in para 4.4.1. Further downstream work consists of identifying the means to reduce this gap. One of the reasons for many African countries not attaining the production targets was that the policy-makers did not realize that a number of steps are necessary to translate global production targets into appropriate policy reforms and management action plans for the various institutions connected with agriculture. The objective of the Working Group was to illustrate the methodology for translating global targets into such reforms and action plans.

4.5.1 The LTPS indicates that the target for the agricultural growth rate should be 4%; 1% through area expansion and 3% through productivity increase. This is a global growth rate requirement for the whole of Sub-Saharan Africa. In order to attain this target, productivity must increase at least three times its current rate. Therefore, there is a need to: organize services to farmers such that the technology adoption by farmers would increase, take steps to raise soil fertility, introduce higher value crops, design better farm implements to intensify the use of animal power on- and off-farm and reduce post-harvest losses. The group considered extension's role in realizing these objectives and the operational steps needed to realize the production goals set forth in the LTPS.

4.5.2 It is likely that in some zones, e.g., Humid Tropics and the Sahel, the sources of future growth, in the short term, lie in area expansion rather than in productivity increase³³. In some other zones e.g. the Kenyan Highlands, the short- and medium-term possibilities would lie in productivity increase, and in the long term, in diversification into high-value crops. There is also diversity between crops. For instance, the group noted that for food

33 .

In the example of Niger studied by the group, the sources of growth in the short term, lie in area expansion.

crops, the growth tends to be higher in the medium term and lower in the long term, whereas for cash crops, it would appear to be the opposite.

4.6 Methodology. The first step is to disaggregate the overall agricultural growth rate targets into targets for the various important crops and livestock as well as agro-climatic zones based on their potential. Extension managers should thus translate the overall growth targets (set by policy-makers) into growth targets disaggregated by crop and agro-climatic region and compare these targets with the realistic estimates of their growth. An analysis of such disaggregated targets would reveal the gaps in the policy framework or in the delivery of agricultural services, gaps which would need to be filled if the postulated growth targets are to be attained. Such a step would also demonstrate the causal linkages between extension and productivity increase.

4.6.1 The methodology evolved by the working group comprises the following steps:

- * Disaggregation of global targets into targets for the various constituent agro-climatic regions, such as: the Sahel, Sudano-Guinean, Sudano-Sahelian, Highlands and Humid Tropics.
- * Special attention to factors which influence farmers' adoption of technology, such as: low-rainfall areas which require risk-minimizing agriculture for which there are limited technological options; humid-tropical zones with technology constraints on annual crops due to poor soil fertility and soil conservation problems; land-locked countries with high transport costs and high production costs for all crops; and the CFA Franc zones which presently have a difficult macro-policy environment.
- * Analysis of the current farming system, the status of technology adoption by farmers, yield levels, availability of inputs and the policy environment.
- * Assessment of the availability of new technology from a variety of sources, (including farmers) that would be relevant to the farmers; and an estimate of the extent to which these technologies would be adopted by them.
- * Estimation of the percentage increase of productivity that can be brought about by farmers' adoption of the available technology.
- * Identification of the measures to be taken to enable farmers to adopt extension recommendations, such as better availability of inputs, credit, prices etc.

4.6.2 This methodology would enable extension managers to identify the boundaries of agricultural growth under a given set of parameters which define the environment in which farmers take production decisions.

4.7 Application of the Methodology. The group illustrated the methodology by working out 4 examples:

- * Maize in the Sudano-Guinean zone of Niger
- * Rainfed rice in Cote d'Ivoire
- * Cotton in Zimbabwe
- * Maize in the Kenyan highlands

The following tables summarize the group's calculations. It must be stated here that these calculations are indicative and might not accurately reflect field conditions. Growth rate calculations are approximate. An explanation of the tables is given in paras 4.7.1 - 4.7.3.

Table 4.1

Example #1: Maize in Sudano-Guinean Zone			
	1990	1995	2010
Yield	600	660	1200
Growth rate		1.6	3.8
Adoption plot yield	900	900	2000
Adoption rate (%)	40	60	60

Main message content

Timely planting; weeding; variety; fertilizer; and rotation/system.

Technological constraints

Research

- (a) Varieties
(c) Weed control(Striga)

- (b) Plant protection
(d) Soil management

Extension

- (a) Management

- (b) Training

Other constraints

- (a) Market/exchange rate
(c) Credit
(e) Civil Service

- (b) Fertilizer distribution
(d) Infrastructure

Table 4.2

Example #2: Rainfed rice in Cote d'Ivoire			
	1990	1995	2010
Yield	1500	1600	2215
Growth rate		1.2	2.1
Adoption plot yield	2000	2000	3000
Adoption rate (%)	10	30	50

Main message content

Density; timely seeding; improved seeds; weeding; thinning frequencies; seeds; and fertilization.

Technological constraints**Research**

(a) Varieties (b) Fertilizer dosage
(c) Weed management (d) Farming system

Extension

(a) Management (b) M&E
(c) Training (d) Limited messages

Other constraints

(a) Exchange rate (international price)

Table 4.3

Example #3: Cotton in Zimbabwe			
	1990	1995	2010
Yield	800	840	1160
Growth rate		0.7	2.0
Adoption yield	1200	1200	1500
Adoption rate (%)	50	60	80

Main message content

Seed; pest control; planting date; and fertilizers.

Technological constraints**Research**

(a) Pest control (b) Cost reduction
(c) Varieties (d) Fertilizer timing
(e) Limited smallholder focus

Extension

(a) Messages for smallholder (b) Training

Other constraints

(a) International price (b) Domestic Market/Prices
(c) High Transport cost

Table 4.4

Example #4: Maize in Kenya (Highlands)			
	1990	1995	2010
Yield	2000	2350	2800
Growth rate		3.2	1.0
Adoption yield	3000	3500	4000
Adoption rate %	40	50	60

Main message content

Timely planting; spacing; fertilizer; pest control; improved seeds; and soil conservation.

Technological constraints**Research**

(a) Varieties/seed
(c) Plant protection

(b) Management
(d) Low-income focus (agro-forestry, nutrition, resource)

Extension

(a) Management

(b) Training

Other constraints

(a) Market restrictions
(c) Budget problems caused by wrong emphasis, e.g., subsidies

(b) Input availability and distribution
(d) Disparities (including know-how)

4.7.1 Explanation of the Tables. In Table 4.1, which relates to maize in the Sudano-Guinean zone of Niger, the estimate of the current average maize yield is 600 kg/ha, and this is estimated to increase by 1995 to 660 kg/ha (i.e., 10% increase), with the expected better delivery of agricultural services. The yields on the adoption plots³⁴ are assumed to remain unchanged till 1955, as no major breakthroughs are expected before then on the technology front. But the adoption rate, i.e., the percentage of farmers who adopt all the recommendations is expected to increase from 40 to 60% due to the expected policy improvements and better extension. The present constraints are indicated below the table and if these are overcome, which would be a long-term process, yields on the adoption plots could increase from 900 kg/ha in 1955 to 2000 kg/ha in 2010. The adoption rate is expected to remain constant at 60 percent. The estimated average yield by the year 2010 is 1200 kg/ha. Table 4.1 suggests the methodology for the preparation of extension programs, indicating what is feasible in the medium term under the prevailing environment, which includes technology, support services and policy, and the boundaries of possibility in the long term if the indicated constraints are overcome.

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Adoption plots are small parts of the farmers' fields on which they practice the extension recommendations with their own resources. If farmers are convinced of the usefulness of the recommendations, they enlarge the area of adoption gradually. The yields on these plots indicate what is achievable on farmers' fields with the existing technology, farmers' resources, the level of other supporting services (e.g., markets) and the policy environment.

4.7.2 Table 4.2 relates to the estimates of growth rates in rainfed rice in Cote d'Ivoire. The present adoption plot yield is 2000 kg/ha and the adoption rate is a low 10 percent. As in the earlier example, the production increase in the medium term would be entirely attributable to an expected increase in the adoption rate. In the long term, the yield on the adoption plots is expected to increase from 2000 kg/ha to 3000 kg/ha, due to the availability of better varieties and other factors, and the adoption rate from 30 to 50 percent.

4.7.3 Table 4.3 relates to the estimates of the growth rates of cotton in Zimbabwe. It will be seen that mainly due to technological and marketing constraints, the yield on adoption plots is not expected to increase by more than 25% even in the long term, as against the higher increases anticipated in the earlier two examples. The main thrust of research should be on cost reduction through Integrated Pest Management (IPM) and the timing of fertilizer application. If useful recommendations are available on these, then it would be possible to increase both the adoption plot yield and the adoption rates.

4.7.4 Table 4.4 gives the production increase feasible in respect of maize in the Kenyan highlands. Unlike in the earlier cases, the adoption plot yield is expected to increase from 3000 kg/ha in 1990 to 3500 kg/ha in 1995, with the adoption rate increases from 40 to 50 percent. In all the four examples provided by the working group, the calculations are based on field experience, on what farmers can be expected to do under a given set of constraints and opportunities. As observed at the outset, the figures are purely indicative and are given here to illustrate the methodology suggested by the group.

4.7.5 The report of the Working Group suggests that it would be unrealistic to expect extension programs to close the gap between what is needed, in other words, the "targets", and what is feasible; indeed, even a combination of effective research and extension is unlikely to close the current gap in Sub-Saharan Africa or even to narrow it significantly. Improved infrastructure, institutions and markets, and a demographic transition to lower population growth rates will all be required to close the gap. In this connection, it is worthwhile to remember that few countries have managed a 3% growth in productivity over a very long period.

4.8 **Recommendations.** The main thrust of the working group report was that extension should be goal-oriented, with perceived linkages to production and productivity increases. This would pre-suppose that extension should not be content only with the predominantly technical job of identifying better technologies which would increase farmers' incomes, but should assume a developmental role, thus contributing to the larger national perspective.

4.8.1 The T&V system gives a work schedule to each extension staff. Extension managers should go further and prepare performance goals for each extension staff spelt out in extension terms (not production increases). For example, such goals can be: about 40% of farmers adopt the recommendation regarding spacing in the first year; about 25% adopt inter-cropping recommendations and so on. The manager should then prepare estimates of increases in production which could be brought about if these goals are reached. Thus, the contribution of

each extension agent to the overall production increase can be assessed. This would instil among the field extension staff a spirit of competition and goal-orientation.

4.8.2 Extension should be pro-active in anticipating constraints and advising policy-makers about advance actions needed, either in the policy arena or in services, and spearhead improvements in these ³⁵. For example, in some parts of Nigeria, extension has gone as far as it can without the active support of other services, particularly credit. The study on the performance of T&V extension in Kenya ³⁶ mentions the reasons for non-adoption of recommendations relating to fertilizer application. Out of the sample farmers, 46.5% (in the post-T&V period) apply basal dressing of fertilizers, and out of the remaining 53.5% of non-adopters, 33.5% could not adopt due to high costs (indicating lack of credit), and 12.7% due to non-availability. The corresponding figures for top dressing are: 17.1, 82.9, 36.9 and 6.2% respectively.

Other Extension Management Issues

4.9 **Environment.** The potential of an effective extension system to contribute positively to environmental protection is not easily perceived and it is often not understood that in Africa, managing the environment is largely a question of the responsible management of agriculture. The fault also lies in the way government bureaucracies are organized; in many countries only projects implemented by the Ministries/Departments responsible for environment are considered to be environmentally friendly. The fault lies partly with extension; in many areas extension has no specific agenda for environmental improvements and where they have (e.g., Ethiopia Pilot Watershed Project), their contribution is neither widely known nor understood. M & E systems of extension projects do not include specific parameters related to environmental improvement, such as messages relating to Integrated Pest Management(IPM), their adoption and impact in terms of reduction of pesticides usage, and messages regarding agro-forestry and their adoption. Future extension projects should spell out the role of extension in improving the environment in more specific terms, and M & E systems should be able to monitor extension's contribution to environment.

4.10 **Extension Focus on Women and Youth.** Here again it is necessary to spell out clearly the parameters to be monitored in order to assess the contribution of extension to increasing the incomes and welfare of women farmers and agricultural laborers and youth. In some countries (e.g., Kenya), the extension system is doing very useful work by carrying out extension activities in schools, including teaching the students how to grow vegetables. This should be made a regular feature in all the Bank-assisted extension projects. Subjects covered may include nutrition, growing seedlings and agro-forestry.

35 The role envisioned for extension in para 2.10 would be difficult if a pro-active role is not assumed by extension.

36 See para 1.13.

Burkina Faso was cited in the workshop as a good example of extension's contribution to environment. Diguettes, which are soil conservation structures, have been constructed in northern Burkina Faso for many years. Till 1985, these were constructed mainly by government or parastatal bodies. Since 1985, farmers are increasingly constructing them on their own, thanks to extension advice. They have also started constructing stone diguettes instead of earthen ones. The statistics regarding the average annual area treated through diguettes are as follows:

Year	1975-85	1985-88	1989-90	1990-91
Area (ha)	2,100	22,000	72,276	78,341

Box 8: Extension's contribution to environment in Burkina Faso

4.11 Personnel Management and Civil Service Salaries. It is generally accepted that the conditions of service of government staff in most African countries requires improvement. But so far no tangible steps have been taken in this direction either by the Bank or by the countries. The commonly-held view both within the Bank and outside is that while this is a critical issue, the solution lies in eventual privatization of extension and other agricultural services rather than in tackling the issue of civil service incentives. It is doubtful if privatization of research and extension on any significant scale would be achieved in the near future in Africa, particularly for food crops. It would therefore be realistic to expect research and extension in Africa to continue to be dispensed by the public sector, though some activities of a potentially commercial nature, such as input supply or credit, could be transferred to the private or cooperative sector in the near future. It is therefore necessary to come to grips with the issue of civil service incentives. Increasing the professional pride of the staff through improvement in their working conditions and provision of a better management framework for their functioning, would certainly improve their morale as it has done in many countries where T&V has been introduced, but in the long run, a satisfactory monetary and professional incentive system is required. However, any "special" allowances only for extension staff should be discouraged; extension staff should not receive any special monetary benefits not available to staff in other Ministries such as health, education etc.

5. ORGANIZATION OF SUPPORT SERVICES ³⁷

5.1 Overview. Many factors external to extension influence farmers' production decisions, such as prices, policies, markets, credit and input supply. Working Group 3 discussed these and other major elements constituting the farmers' environment, including the institutional environment. Some of the questions addressed by this group are: What are the various services which farmers need? Who provides them, and what are the most efficient ways in which they can be provided? How are these institutions supported by the donors?

5.2 Services to farmers in Africa are provided by various agencies. These can be categorized into: (i) extension and research agencies, most of which are in the public sector; (ii) community groups and cooperatives, which are not yet well-developed in SSA; (iii) private sector agencies, including farmers and NGOs; and (iv) government agencies which would include government departments and parastatals. Unlike in developed countries where most of the services to farmers are provided by farmers' organizations, cooperatives or private sector, in Africa the public sector is still the dominant provider of most of the agricultural services. Unfortunately, many policies tend to be oriented towards the perpetuation of this dominance and the dependence of farmers on public sector agencies.

5.2.1 Governments in Sub-Saharan Africa are more keen to rush in and do things themselves rather than creating conditions for the growth of the private sector. In agricultural development it is necessary to clearly recognize that government has a role which it should play and that it should conserve its resources such that it is able to play this role properly, such as creating the proper conditions for the development of the private sector, particularly in inputs, credit and marketing. The government's role should generally be confined to the provision of basic services, such as research, extension, irrigation and infrastructure. But it is common to see governments not finding enough resources to do the job which they should do as these are drained by the efforts of the governments to provide support services, which they are not equipped to carry out efficiently.

5.2.2 The group listed the areas in which services are provided by the existing agencies. These are shown in Table 4.5. These agencies are supported by a number of donors and international institution which are also listed in the table. This is the general picture of activities focussed on by different organizational types. In reality, in some countries, there is a large amount of overlap between categories.

5.2.3 The challenge which the Bank and other donors face is how to move away from the dominance of the public sector agencies towards greater empowerment of the farmers, and the increased involvement of cooperatives, NGOs and the private sector. The response to this challenge should be in terms of strengthening those processes at the grassroots level which increase the demand for inputs and services and eventually lead to the growth of private enterprise.

5.2.4 The Working Group noted that the structural reforms initiated by the Bank in many African countries are resulting in a gradual liberalization of the grain marketing trade which would provide a better deal to farmers. These reforms are also gradually leading to the induction of the private sector in the fertilizer trade. In other areas, particularly seeds and farm implements, the process of transformation is not conspicuous.

5.2.5 During the discussion of the Working Group report, many interesting observations were made by the participants. These are summarized below:

- * The Bank's initiatives relating to inputs have so far been confined to fertilizers. Without improved seeds, fertilizers are not of much use. But the strategy towards seed development is still unclear.
- * Some Bank and donor-assisted projects have supported the growth of seed parastatals, rather than the growth of seed production and marketing by farmers.
- * The working capital needs of the private sector fertilizer trade are not being adequately met by the commercial banks.
- * The rural financial sector in general and farm credit in particular are not adequately developed, and this would tend to stifle farmers' initiatives in seed production and marketing, and their diversification into non-traditional crops.

5.2.6 The Working Group recommended that following extension reforms, appropriate strategies should be formulated for other agricultural services, with an emphasis on increasing reliance on farmers' groups.

5.2.7 The summary of recommendations of the Working Group is given in Table 4.6. The group classified the farmers into two major groups: the resource-poor, and the medium-scale and large farmers, and indicated the requirements of each group, in the main areas where "technologies" or policy changes are needed. Such areas are: cultural practices, tools, seeds, fertilizer, water, fuel wood, savings and credit, marketing, land tenure, soil conservation, livestock and nutrition, were then listed. A diverse range of organizations were suggested by the group for carrying out these recommendations including: public extension and research, farmer training centers, private traders, processors and banks, consulting services, NGOs, artisans, saving societies, cooperatives, government regulatory bodies such as seed certification and land use agencies, and international donors.

Table 4.5

Providers of various services to farmers and institutions supporting them				
Providers of services	Public Extension/ Research	Community Groups and Cooperatives	Private	Government
Areas where intervention is needed or services provided	<ul style="list-style-type: none"> • Cultural Practices • Fertilizer (chemical and biological) • Plant Protection • Livestock • Nutrition • Soil Conservation • Land Use Planning (focus on the environment) • Plant breeding 	<ul style="list-style-type: none"> • Water • Fuel wood • Savings • Credit • Marketing • Land Use • Management of the environment, prevention of deforestation • Farmer seed production 	<ul style="list-style-type: none"> • Tools (artisans and NGOs) • Seeds (farmers and seed companies) sector • Credit • Marketing (input and output) • Processing • Specialized technical information 	<ul style="list-style-type: none"> • Macro-policies (credit, market, land) • Investment in Infrastructure • Legislation (especially land tenure) • International Commodity Agreements • Inputs
Donor agencies	<ul style="list-style-type: none"> • Agricultural Services Initiative • SPAAR • ISNAR • FAO • University Research • IARCs • NGOs 	<ul style="list-style-type: none"> • Agricultural Services Initiative • WCCU/ACOSCA • FAO • Bilateral agencies • USAID • ILO • IFAD • NGOs 	<ul style="list-style-type: none"> • Credit lines for private enterprises • Seed companies • Investment code • IFC (and project preparation facility) • Other U.N. agencies such as UNIDO • NGOs 	<ul style="list-style-type: none"> • World Bank (Structural Adjustment Loans) • Government and Donor investment

Table 4.6

Elements	Strategies	
	Resource-poor Farmers	Medium-scale and Large Farmers
Cultural Practices	<ul style="list-style-type: none"> * Need to tailor extension approaches and messages to meet their needs. * Establish special days for resource-poor farmers and hold alternative demonstrations by and for this group. * Avoid elitism in mixed farmer groups and try to ensure participation of resource-poor. * Establish training centers with demonstrations on-site targeted at resource-poor. * Focus on assessing and meeting the needs of women farmers who comprise 80% of this group. * Identify appropriate cash crops for resource-poor farmers (e.g., Malawi: Burley tobacco) 	<ul style="list-style-type: none"> * Need to consider evolving groups stratified needs and interests. * Efforts should be directed at adding value to livestock output. Oxen and machinery training are needed. * Need to improve the quality of advice and delivery. * Develop FITs.
Production Factors: Hand-tools, Oxen, Mechanization	<ul style="list-style-type: none"> * Support to and training of artisans. * Material and grants, subsidies, or credit are needed. 	<ul style="list-style-type: none"> * Support and training of artisans * Credit to farmers * Transfer ideas * Promote engineering companies * Adjust macro-policy affecting access to production factors * Adjust micro-policy concerning credit.
Seeds	<ul style="list-style-type: none"> * Need to develop new varieties * Work to alleviate seed production and supply problems: quality, transfer, and storage. * Need lower cost seed production, through farmer seedsmen. 	<ul style="list-style-type: none"> * Same as resource-poor except more emphasis on private sector involvement.
Fertilizer	<ul style="list-style-type: none"> * Encourage stock-keeping * Increase awareness and knowledge of soil fertility * Seek appropriate technology for carts required for collecting organic fertilizer 	<ul style="list-style-type: none"> * Same as resource-poor except more emphasis on the private sector.
Agro-Chemicals	<ul style="list-style-type: none"> * Make more use of local remedies and transfer them between regions * Develop controls for locusts, grasshoppers, and birds - all serious pests which have not been adequately controlled. * Work on developing varietal resistant to pests and on integrated pest management programs 	<ul style="list-style-type: none"> * Same as resource-poor plus: - Promote use of chemicals and equipment; - Focus on better, faster diagnosis, and scouting.
Water	<ul style="list-style-type: none"> * Promote more water investment. * Encourage farmers' groups to get more involved with source protection and dam construction * Food for work on communal water projects 	<ul style="list-style-type: none"> * Same as resource-poor plus: - Encourage private ownership; - Some credit and subsidies for farm development.
Fuel-wood	<ul style="list-style-type: none"> * Promote tree-planting campaigns * Individual enterprises * Improve availability of seed nurseries and involve women in the effort * Look for fast-growing varieties 	<ul style="list-style-type: none"> * Promote individual tree-planting for commercial and individual use. * Involve young farmers and schools in commercial nursery projects. * Remove policy constraints on wood production. * For large farmers: promote wood lots and commercial production

Savings and Credit	<ul style="list-style-type: none"> * Same as average 	<ul style="list-style-type: none"> * Remove macro-economic distortions * Management training * Promote savings groups and group credit * Provide advice on the use of credit. * For large farmers, develop crop and livestock insurance.
Marketing	<ul style="list-style-type: none"> * Same as average and large 	<ul style="list-style-type: none"> * Selective liberalization of some import levies through macro-policy manipulations (support prices only for major cereals for food security). * Invest in rural roads, river, rail, ports using food for work payment. * Private provision of credit for transportation and storage. * Make price information more readily available through extension and radio * Extension and research should develop information and advice on processing, preservation storage and grading. * Add value through private agro-processing activities * Promote marketing associations where appropriate.
Land Tenure	<ul style="list-style-type: none"> * Same as average 	<ul style="list-style-type: none"> * Examine land tenure problems and involve local people and leaders. * Revise legislation where appropriate. * Use intensification techniques to overcome scarcity of land problems * Redistribution of government land.
Soil Fertility		<ul style="list-style-type: none"> * Have land-use groups and extension work on development of individual and community responsibility for land use and conservation through use of demonstrations. * Have NGOs and extension work together on on-farm adaptive research addressing soil fertility. * Community working in cooperation with extension on catchment planning * Encourage tree/vetiver planting, nurseries * agro-forestry trees * For large farmers focus on farm planning * Develop government enforcement mechanisms, such as a soil conservation and land service.
Livestock	<ul style="list-style-type: none"> * Promote intensive production through advice and improved availability of stock, medicines and veterinary support. Supporting agencies should be public extension and research, farmer groups, and NGOs. * Bring private sector and government together to develop livestock macro-policy. 	<ul style="list-style-type: none"> * Same as resource-poor

6. OTHER ISSUES

New Extension Responsibilities.

6.1 The debate on this theme centered around the question of whether the existing agricultural extension systems should be used as a channel for disseminating messages on a wider range of topics, such as forestry, fisheries, family planning, rural hygiene and AIDS, or whether they should focus only on agriculture and closely-related topics such as environment and forestry. How narrow or broad should extension messages be? The debate was not on whether to substitute the present professional agricultural extension system with a multi-purpose extension system but whether agricultural extension messages should be woven around messages in the areas mentioned above, and whether this would make it easier for extension to earn the commitment of country leaders and the confidence of the farming community.

6.1.1 It was argued by the proponents of broadening the scope of extension that in some countries there are overriding concerns that must be addressed, if extension should be effective; some of these are family planning, AIDS, health and nutrition. For example, in Burkina Faso, the most immediate development priority is to reduce the number of children in an average family from twelve to three, and this priority should be addressed by the agricultural extension system, which is the only functioning government agency in the rural areas with the necessary reach and spread, mobility and resources, as is the case in many countries.

6.1.2 The first reason mentioned in favor of extension adhering to its present agenda instead of venturing into new areas, was the lack of expertise in the new areas. It was felt that the current extension systems are qualified to deliver messages directly relating only to agriculture and that extension should therefore stick to its professional field instead of losing the sharpness of its edge through expansion of its scope. On the other hand, it was argued by those who wanted extension to have a much broader-based approach, that some years ago, the very same reasons which are now given for extension not venturing into other areas, particularly lack of expertise, were cited as reasons for not expanding the range of extension messages to include home economics and the special problems of women; but these latter are now accepted as part of the normal responsibilities of the extension service. They however felt that it is understandable that there is considerable hesitation to expand the scope of extension to include some of the priority areas mentioned in para 6.1.1.

6.1.3 The other major reason advanced in favor of extension not expanding its scope in the near future related to organizational issues. It was felt that there are already organizational problems with having messages relating to livestock and crops delivered by the same extension agent, and that the problems would increase if more disciplines were added. While an agricultural extension service could supplement other government efforts in areas such as population or AIDS, it should not take over the primary extension responsibility in these areas.

6.1.4 In many countries, agricultural extension staff constitute the strongest government presence in the rural areas, and certainly, thanks to the Bank projects, the best-endowed in terms of vehicles and operating budgets. These factors could lead to a temptation to overload the extension service by entrusting to it a variety of tasks. Sometimes the very success of the

extension service has led to the dilution of its focus, due to governments giving to the extension system responsibilities in areas other than agriculture. Such moves need to be resisted in order to retain the professionalism of the extension service. The example of India was cited to show how extension focus could be blurred by entrusting a variety of tasks to it. When the Community Development Program was started in India in the early 1950s, the primary responsibility of extension in India was agriculture. In course of time, the extension service was entrusted with responsibilities for family planning, credit administration, input supply and small savings collection. Apart from the dilution of its professionalism, the extension agent came to be perceived as someone to be avoided, as credit recovery, small savings collection and family planning were not particularly popular with the villagers. The example of Malawi was also cited to show how entrusting credit recovery to extension staff adversely affects extension.

6.1.5 The recommendation that the responsibilities of the agricultural extension system be expanded by the addition of new areas is based on the view of extension as a giver of messages. It is therefore argued that if the system includes "messages" in other areas, the additional areas would be adequately served by the extension service. As the discussion in paras 2.3 - 2.6 would show, the main objective of the extension system is far from merely delivering "messages"; it is to work actively with the farmers and the research system to generate relevant recommendations. Demonstration of the recommended practices is also an essential part of extension. It is very doubtful if the present agricultural extension systems could handle these new areas competently. If it is merely a question of delivering "messages," the extension system might be able to cover them, but that would not represent any substantial contribution to these new areas.

6.1.6 The general conclusion which emerged at the workshop was that despite the strong arguments in favor of its taking on additional responsibilities, extension should avoid entering areas outside agriculture. It was felt that many of these other areas could be more competently handled by sociologists and educators. Mass media could be an effective tool to sharpen the awareness of the people regarding the seriousness of these issues. Instead of taking on new responsibilities outside agriculture, extension could focus more on covering many areas allied to agriculture, such as, agro-forestry, water management in small irrigation schemes and vegetative methods of soil and water conservation.

6.1.7 Some alternative ideas were offered for addressing AIDS and population. First, the principles of T & V could be used to extend the coverage of the existing health services. Second, the use of mass media could be expanded. Third, the educational network of primary and secondary schools, could deal with these issues and teachers at the secondary school level could be trained to work on them with the participation of their students. Fourth, the results of situation analysis, problem identification and diagnosis done by extension could be shared with other sectors.

Extension Pre-Conditions

6.2 The main issue discussed was whether there are pre-conditions to be met prior to the introduction of a professional extension system, such as the efficiency of supporting services (e.g., credit, inputs), rural infrastructure, policy framework and prices for farm produce. The view held in some quarters, which was advocated at the workshop, is that extension cannot do much unless the various supporting services are in place along with an enabling policy environment and the commitment of governments; and that consideration must be given to the relative importance in agricultural production of elements such as security of land tenure, availability of credit, input supply and markets.

6.2.1 The consensus at the workshop was that the introduction of professional extension should not be postponed until all the factors mentioned in para 6.2 were in place; and that a minimum of political support is all that is needed to start extension. Once farmers see the results of improved extension they would demand better support services, and it would then be difficult for the political and administrative leadership not to respond to these demands. The evidence from many countries shows that extension can focus the attention of policy-makers on the needed improvements in policies and services. Extension can also assess whether the existing institutions are meeting farmers' needs and, if not, how they can be improved, and it can also identify the support services needed.

In Zaire, before the commencement of the pilot extension project, input supply and other services were not functioning. After the introduction of extension, numerous services, such as input supply companies and cooperatives linked themselves to the extension initiative. A coordination committee has been proposed at the regional level to address the "support services" issue. This is a good example of how extension can be an instrument to bring about improvements in support services. In Madagascar, extension initiatives have given impetus to a whole series of projects, such as rural feeder roads, seed supply, etc. The Senegal ASI staff reported that as extension grew stronger it tended to strengthen other services, as farmers became convinced of the benefits of adoption of extension recommendations.

Box 9: Development of support services

6.3 **Availability of Technology.** The initial extension recommendations are generally simple ones, relating to cultural practices such as land preparation, row planting and weeding, requiring no additional purchased inputs. The basic premise of extension is that by teaching farmers how to make better use of the available resources, substantial production increases could be achieved²⁰. In most African countries, sufficient relevant technological recommendations are available to support extension in the initial stages. Even where they are not available, "good farmer practices" can always be propagated by extension, until the research system catches up. Researchers and extensionists often overlook these "good farmer practices" or the vast reservoir

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Field experience has shown that substantial productivity increase is possible through better agronomic practices. See Chapter 7 for a summary of the results of Kenya study.

The case study on "Farmer Innovations and Communication in Niger" discusses the interesting question of farmer-to-farmer spread of technology²¹. The subject of research-extension linkage is widely discussed, but not much is said about farmer-to-farmer extension as a mode of dissemination. That sounds too simple, too uninformed, too unscientific. Perhaps, the problem lies in the kind of "science" being used for measurement - natural or social.

The studies in the villages of Niger show that farmers have a rich body of local technical knowledge in agriculture that could be useful to farmers throughout Sahel. They also have active communication networks linked by groups and individuals. Both the content and the mode of communication are thus present - what we consider to be the essentials of extension - and these are widely used to adopt technologies which farmers believe are affordable and readily available, reduce risk, generate income, save labor, and fit into their farming practices. Learning from other farmers is more common than learning from researchers and extensionists because very few technologies coming from these latter sources "are deemed appropriate by farmers".

A multiplier effect is achieved through the group process - peer opinion, testimony, and demonstration through networks like coops, women's groups and youth associations. In contrast the study questions whether a "network actually exists" among farmer, research and extension, "other than on paper".

The Niger farmer has a thirst for agricultural information and is perpetually involved in research validation with his/her own "on-farm trials ... as ... done long before there were universities,". This argues for putting the farmer in the feedback loops with research and extension, and allowing participation in trials of new technologies and in more experimentation for self-help.

The major recommendation calls for strengthening farmer-to-farmer communication of indigenous agricultural knowledge, with the mobilization of participation of women's and youth associations.

The major message of this study is that both research and extension must start with farmers' practices, which would provide them with an insight into what "would fly".

"Constance M. McCorkle and others: A Case Study on Farmer Innovations and Communication in Niger", Academy for Educational Development, Washington, D.C., 1988.

Box 10: Farmer-to-farmer extension in Niger

of indigenous technologies evolved by farmers themselves²¹. It is, however, important to enhance the capacity of the research system so that, when extension eventually generates demand for more technology, the research system is ready to continually respond to the needs of farmers.

6.4 Farm Inputs. Once farmers adopt the recommended low-cost cultural practices, extension could proceed to introduce recommendations based on purchased inputs, mainly seeds

²¹ Farmer participation in extension, a factor which was always assumed to be an integral part of any good extension practice, is of late developing into a separate field of study (see footnote 32).

and fertilizers. This would upgrade farmers' adoption of technology in gradual stages. Extension could thus play a key role in increasing the demand for purchased inputs. It could, however, erode its credibility with farmers if it recommends the use of purchased inputs when these are not easily available. Therefore, when farmers reach the limit of the productivity improvements that are possible through the use of low-cost technologies alone, input and credit services should develop in order to be able to meet the demand.²² Thus, extension can make input supply operations viable by increasing the demand for inputs, but at the same time its effectiveness would be blunted if inputs are not easily available to farmers. This does not mean that these services should be started in the public sector. It is the responsibility of the Ministry of Agriculture to ensure that policies are adopted which favor the development of these services in the most efficient manner possible.

6.4.1 The generally accepted criteria for the efficacy of the input system are: timely availability, quality, affordability and suitability. If the system does not meet the above criteria, the effectiveness of extension will be blunted. For example, if the seeds arrive late, extension recommendation regarding timely planting is of no avail. If the quality of seeds is poor, it would be difficult for farmers to maintain adequate plant population. Fertilizers should be suitable for the soil type and the crops which farmers want to grow. The extent to which a country's input system satisfies the above criteria depends critically upon its policies and strategies relating to the production and distribution of inputs.

Efficient mechanisms for supplying farm inputs, equipment, and livestock are crucial, but they have largely been lacking. As a rule these are best handled by the private sector. The role of government should be to provide adequate foreign exchange, to undertake research, and to pass the results on to farmers. Government research and extension services, along with private voluntary organizations, should be developing inputs and investment goods (such as new hand-tools, animal-drawn equipment, crossbred cows, grain storage facilities, and energy-efficient stoves) that can then be produced and distributed by the private sector (LTFS, p.100).

Box 11: Organization of inputs

6.4.2 Seeds. Many countries in Africa²³ have set up parastatals for the production and positioning of seeds of modern crop varieties. For a variety of reasons, these parastatals have not been able to meet the criteria of timeliness. The reasons vary from country to country; some of these are: lack of working capital with private wholesalers and retailers; inability to set up a marketing network; transport system subject to strict government controls which act as a dis-

²² In almost every country, different farmers are at different levels of development, and while some are likely to need purchased inputs, others do not. Inputs and credit are therefore necessary to some degree in every country (Ed.).

²³ Prominent exceptions to this are Kenya, Zimbabwe and Malawi. The seed systems of Kenya and Zimbabwe are uniquely structured with considerable involvement of the users, and have been providing good service to farmers for a long time. The National Seed Company in Malawi is jointly owned by a multinational and the Government of Malawi.

The following table gives the fertilizer consumption (NPK) of some countries in Sub-Saharan Africa from 1987-88 to 1989-90.

	(1000 MT)		
	1987-88	1988-89	1989-90
Nigeria	293	313	378
Kenya	102	125	17
Zimbabwe	140	166	170
Zambia	95	85	87
Burkina Faso	18	15	21
Sub-Saharan Africa	1118	1182	1298
India			11610
China			25428
World	139579	145681	143283

	Fertilizer Consumption (100 grams per ha) 1987-88	Percentage Irrigated Land
Sub-Saharan Africa	85	n/a
India	577	26
China	2361	44

Source: World Bank and FAO data.

Box 12: Statistics of fertilizer consumption in Sub-Saharan Africa

incentive to private transport operators; and a poor rural road network making it difficult to transport seeds over long distances. In the initial stages, the preferred seed development strategy should therefore be to stay away from parastatals and to encourage "seedsmen", who are farmer-seed entrepreneurs, and who would multiply the breeder seeds obtained from the research centers, and sell "true-to-type" treated seeds to other farmers, with a minimum outlay on

machinery ²⁴. Such a strategy would make good quality seeds available to farmers in time for planting, at affordable prices, and reduce the burden of a parastatal subsidy on the government budget.

6.4.3 Fertilizers. In more than 85% of African countries, fertilizer nutrient use is still below 10 kg/ha of agricultural area. This is due to a number of factors, including inadequate financial resources to import fertilizers and disincentives to their use, such as unfavorable crop-fertilizer price relationships, particularly for food crops ²⁵. The policies relating to the import and distribution of fertilizers are often governed by policies relating to exchange rates and the allocation of foreign exchange for imports. As in the case of seeds, the policies and strategies relating to fertilizer import and distribution affect the timely availability of fertilizers of the right type. The experience of the Bank's field staff shows that where fertilizer import and/or distribution is the monopoly of parastatals or a private sector monopsony, farmers seldom get it in time. When fertilizers are supplied by donors they are not necessarily suitable to the soil type and crops ²⁶. Since most countries of the region have a combination of both, namely, donor-supplied fertilizers and parastatal import and distribution, there could be a real possibility of the fertilizer distribution system not meeting the criteria set out in para 6.4.1. Whenever fertilizers are not consumed because of their late arrival or due to other reasons ²⁷, they are invariably carried over to the next season, often under poor storage conditions. Many countries do not have fertilizer-testing laboratories to test the fertilizer before sale to farmers in the following season.

6.4.4 Parastatals. The approach to the task of organizing input supply in Africa has largely been from the supply side. The problem is perceived as one of organizing the availability of seeds or fertilizers to farmers at "affordable" prices. When the demand is low and thinly spread, this task becomes administratively difficult and expensive. The first step is to increase the demand for inputs, to be followed by an appropriate strategy for each sub-sector to encourage the evolution of the private or cooperative sector. But, in many situations, the initial demand might not be adequate to attract the private sector. Instead of encouraging the development of the private sector through appropriate strategies, governments often feel tempted to argue that since the private sector is wary, they should themselves step in; and very often they do, and organize input supply and credit through parastatals. Such a step has often resulted in:

24 It has been estimated that the overhead costs of cleaning, packing, tagging and transport, which are normally incurred by parastatals come to about 50% of the selling price.

25 FAO. Atlas of African Agriculture. 1986. FAO, Rome.

26 Malawi is a good example. Smallholder foodcrop farmers were supplied CAN (a variety of fertilizer), not because that was what they wanted, or what was needed, but because one donor decided to supply it to Malawi.

27 If rains arrive late or play truant, farmers do not purchase fertilizers.

Africa's average use of chemical fertilizer is less than 10 kilograms per hectare, compared with about 90 kilograms per hectare in China and India. Demand is low because traditionally, farmers have used only limited amounts of organic nutrient, such as decayed vegetation, ash from burning, and manure, and because traditional crops often show little response. At the same time fertilizer has been in short supply because of ineffective government agencies, poor transport systems, limited foreign exchange, and restrictions on private sector fertilizer marketing.

Chemical fertilizers will be in demand as farming systems change and new agricultural technologies and crop varieties are introduced. However, there is generally no justification for subsidizing fertilizer use, that only encourages waste. The key is to ensure that reliable supplies are readily available at full cost. In many African countries, shortages prevent existing demand from being met. Public enterprises typically manage fertilizer distribution inefficiently. To reduce supply bottlenecks, private traders and enterprises should be allowed to import, produce, and distribute fertilizers themselves. Controls on fertilizer prices and marketing margin merely discourage private enterprise. Finally, foreign exchange should be available to pay for fertilizer imports as demanded (preferably through the exchange rate management reforms outlined in Chapter 2), and fertilizer distribution should be considered in planning transport networks (LTSP, p.95).

Box 13: Fertilizers in Sub-Saharan Africa

(i) the input system not meeting the criteria set out in para 6.4.1; (ii) scarce government resources being spent on subsidizing the operations of parastatals; and (iii) forestalling the development of the private sector.

6.4.5 Subsidies. Many countries adopt input production and distribution policies which do not favor efficiency and try to make up for loss of efficiency through subsidies. The policies in many countries favor subsidies on seeds and fertilizers, despite their burden on the government budgets, and even at the expense of depriving the agriculture knowledge systems, which include research and extension, of adequate recurrent budgets. A portion of the amount spent on subsidies could, if made available to the research and extension systems, improve their performance. Extension could, for example, teach farmers when and how to apply fertilizers, leading to an increase in fertilizer use efficiency and facilitating a reduction and eventual elimination of subsidies ²⁸.

6.4.6 The key question is whether the Bank should support extension projects in countries where parastatals handle input supply. The rationale for not doing so arises from the fact that the parastatals would eventually soak up the resources at the expense of extension (and research). On the other hand, research and extension are needed to increase the demand for and the effective use of inputs. The balance of advantages would lie in favor of supporting research and extension projects, and to deal with the issue of parastatals through other instruments available, particularly Bank support to the countries' structural adjustment programs. But when not only inputs but all services are controlled by government, as in the Sudan, the Bank has to be very

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In Malawi, for example, the fertilizer subsidy in 1990-91 was MK 26 million, which was roughly 1.8% of government expenditure.

cautious in supporting the introduction of a professional extension system.

6.4.7 Extension can be introduced on a pilot scale without pre-conditions, to demonstrate that all other things being equal, extension alone could bring about a betterment of farmers' incomes. The Bank should however, place more emphasis on the importance of some crucial complementary measures, namely, adequate prices, elimination of policies such as over-valued exchange rates which discriminate in favor of agricultural imports, restrictions on local marketing through regulation (including licensing) which hinders the development of local markets, and the abolition of compulsory purchase from farmers. Where these measures do not exist at all, there should not be a general "green signal" for starting extension (and certainly not on a national scale straightaway).

Extension Start-Up

6.5 The main issue discussed here was: "What are the elements needed to facilitate a successful extension project start-up?" Some of the key elements mentioned were: starting small, good management, proper choice of implementing agency (e.g., civil service, parastatal, NGO), government commitment and finance (e.g., making sure that the operating costs of extension are fully financed) and the availability of useful and relevant technology which the extension service can recommend to farmers.

6.5.1 Pilots. It was generally felt that starting on a small scale was desirable. Pilot projects organized on a small scale and financed well, would provide useful lessons, particularly when they are not confined to high potential areas, but are spread over areas with varying risk situations. When governments see successful pilot projects they are generally willing to provide finance for expansion ²⁹.

One participant in the workshop cautioned against starting a professional extension system in an environment in which all services are controlled by either the government or a parastatal. The example of the Sudan was given. In the irrigated areas of the Sudan, e.g., Gezira, Rahad and New Halfa, all key services such as land preparation, harvesting, irrigation water delivery and pesticide application are handled by a parastatal, and the farmers' decision-making sphere is very limited. It was generally agreed that an "inspectorial" system such as in the Sudan could not function alongside a professional extension system, if the latter is to work. An "inspectorial" approach which regards farmers as the implementers of what the planners decide is antithetical to a professional extension service, whose main objective is to present the farmers with a menu of feasible options rather than a set of prescriptions.

Box 14: Agricultural production system in the irrigation commands of Sudan

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There have been instances of full scale projects being started without pilot projects to precede them, e.g., the Sudan, Somalia, Zambia. Sometimes there has been a very short time gap between the starting of the pilot operation and that of the full scale national project, e.g., Tanzania. Sometimes, governments themselves do not want pilot projects and a feeling was expressed that there have been too many Bank-funded pilots; they want full scale national projects straightaway. (Ed.)

6.5.2 Pilot extension projects could provide useful insights if their performance is carefully monitored, and a separate study regarding the feasibility of introducing T & V would then not be necessary. But pilot operations would themselves serve the purposes of a study only if during the implementation of the pilot activity, valuable lessons are drawn which are applied while preparing and appraising national projects ³⁰.

6.5.3 Involving Other Organizations. While the Ministry of Agriculture (MOA) should take the lead role in implementing extension projects, it should also involve organizations at the field level (farmers' organizations and NGOs) with the implementation of extension. Exclusive dependence upon the civil service in implementation should be avoided if possible, even though a multiplicity of implementing agencies would bring its own problems. The experience of Mali in introducing a professional extension system illustrates the problems inherent in multiple organizations involved in extension. In such cases coordination between organizations is the key to ensuring that the diverse efforts coalesce into a national extension program, and that the commitment of the Ministries concerned and the national level policy-makers is secured.

6.5.4 Staffing. Most Ministries of Agriculture in Africa have large numbers of staff, many of them often not well-qualified; they have also not received training in the various technical aspects of agriculture. Under Bank-assisted extension projects, the main strategy has been to put them to better use, by training them, providing them with mobility and incentives to do field extension work, and above all by assisting the governments in implementing a professional extension system with strong linkages to research. Even though this strategy is open to the criticism that the Bank is supporting the perpetuation of government bureaucracies, given the circumstances, there are few viable alternatives which have proven effective in the field on a large scale.

6.5.5 Government and Farmers' Commitment. Government commitment is a key factor in the successful start-up of extension projects. While pilot projects could be started with minimal commitment, the national phase should not be started without evidence of strong government commitment. Some indicators of poor government commitment are: lack of continuity in leadership within the MOA due to frequent transfers of senior staff and observers on overseas travel, and poor financial support to the projects. In addition to government commitment, farmers' commitment is critical. The pilot project would show if farmers find extension useful to them and are committed to extension, and full-scale national projects should not be started unless there is evidence of such commitment.

6.5.6 It would be desirable if at the time of introduction of the project, an appropriately senior staff member of the Bank holds discussions with the government at a high level to ensure

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A recent analysis of the Staff Appraisal Reports (SAR's) on extension has shown that this has not always been the case. There have been instances of inadequate analysis of the performance of the pilots and the lessons thrown up by them before the launching of national projects. (Ed.)

commitment. This should be followed up immediately with a series of start-up seminars for the field staff. Quick results on the ground are important to ensure sustained government commitment. "Get results in the field and obtain commitment at the top" would be an appropriate strategy. Commitment at the top is crucial to ensure the timely release of adequate funds. It is important that the country staff and ASI field staff follow-up on initial government commitment to ensure results on the ground, so that initial success can help to generate enthusiasm at the policy-making level.

6.5.7 The availability of relevant technology ready for dissemination immediately following the start-up, and an enabling policy environment (including policy relating to land tenure) are useful to "jump-start" projects. For example, the existence of simple, low cost recommendations for soil and water conservation in Burkina Faso based on terracing, enabled extension to develop quickly.

Private Sector Extension

6.6 The main issue addressed here was the private sector's role in extension and its relationship to Bank-supported projects. It was also noted that the issue is one of increasing private sector extension and not "privatization." It was agreed that more intensive effort should be made to encourage private sector extension in Africa and that governments should create the necessary political and economic climate for its growth. Private sector extension is more visible in large-scale estate farming but successful private sector initiatives in smallholder agriculture are not very common.

6.6.1 Some successful examples of private sector extension were cited, such as the Kenya Tea Development Authority (KTDA)³¹, British American Tobacco (BAT), East African Industries, and cotton companies financed by the Compagnie Francais pour le Developpement de Fibres Textiles (CFDT) (which are gradually moving to the private sector), and some companies which produce specialty goods such as beer, sunflower oil and vegetables

In the early stages of the organization of a National Extension Service (NES) in Zaire, it became very quickly apparent that a single national service would be difficult to manage due to administrative and logistical reasons. The NES invited local NGOs and private cotton companies to provide extension services in their areas. Where no private executing agencies could be found, the regional agricultural inspectorate assumed responsibility for extension. The NES provides the executing agencies with training, equipment and funds to meet incremental recurrent costs, and supervises their operation. The executing agencies provide extension services to farmers following the T&V approach. This collaboration proved to be very successful. Within two years, nearly 1.5 million farm families could have access to technical messages through the network of extension services, operated by the government and the private executing agencies. The management capacities of the executing agencies improved due to regular training and links with research.

Box 15: Government, private sector and NGO collaboration in Zaire

(mainly for export) having their own extension services. In some countries, input dealers provide information to farmers regarding the use of their products. For example, some private sector chemical companies in Kenya are very active in providing information to farmers about different pesticides and herbicides.

6.6.2 The private sector has a comparative advantage in areas where farmers demand a level of specialized service, generally for cash crops, not provided by public sector extension. Such high quality extension service for cash crops could have a positive spill-over effect on other crops because farmers improve their general farming skills, and apply their knowledge to their whole enterprise. But the fact that the private sector is providing extension service in some specialty areas (mainly in single commodities), is no argument for not retaining extension as a public service, particularly for crops and farmers who might not be touched by private sector extension.

Public policy should therefore encourage private sector extension wherever such initiatives are forthcoming. Public sector extension should continue side by side, focussing on farming systems (which the private sector is prone to ignore), extension for women and youth, and resource-poor regions and farmers, and generally for commodities neglected by the private sector.

6.6.3 The public extension service should keep a watchful eye on private sector extension, particularly when such extension is provided by fertilizer or pesticide companies, to ensure that the extension advice given is not harmful to the environment. This is especially so when it involves the distribution of inputs at subsidized prices. It is also necessary to ensure that NGOs and other organizations engaged in extension do not offer extension recommendations which conflict with each other.

6.6.4 There is a real danger of the currently high level of credibility of the NGOs with farmers being eroded by their close association with a government, or the Bank. This would increase if they receive funds from Bank projects and are perceived as beneficiaries of the governments. The NGOs however, are very aware of this risk.

6.7 **Seed Entrepreneurs as Instruments of Private Extension.** If the eventual goal is to hive off as much extension work as feasible to the private sector, the strategies in many

In the U.S., extension in the private sector is provided by a number of agencies, such as input dealers, manufacturers of and dealers in farm equipment, and private consultants (private arborists, for example). These agencies also prepare very informative booklets and videos. Extension in the public sector exists alongside these private sector extension initiatives, and is provided by the counties, supported by the cooperative extension service of the universities. Farmers increasingly look upon public sector extension as a referral service, and turn to it for professional advice, when they are confused by the conflicting recommendations of the private sector. Public sector extension also provides some very useful services, such as soil analysis, pest and disease identification, and alerting farmers when an outbreak of disease or pest attack is anticipated. The expectations of the American farmers from the cooperative extension service are changing. They increasingly expect the service to provide them with more global information, such as the emerging markets in the world for many commodities and the opportunities which these would provide to them.

Box 16: Public sector extension in the U.S.

In Madagascar, extension advice on the growing and storing of seed potatoes is a highly specialized function, especially in an outgrower system, and demands more discipline than could be achieved in the public sector. The current government-controlled potato seed production system in Madagascar inevitably therefore results in seeds of very poor quality and is one of the main obstacles for the further development of potatoes in Madagascar. On the other hand, Bangladesh provides an example of how a high-quality vegetable seed business can be developed by the private sector, which provides its own extension. Some examples of good cooperation between public and private extension services were also cited by the workshop participants. In Senegal, the private sector is reportedly working closely with public research in testing and disseminating research results. In Zaire, a private cotton organization is providing extension also for other crops. Burkina Faso historically has had cotton companies which were public sector parastatals, set up as autonomous commercial enterprises but obligated to assist in food production. In Bangladesh, the public sector extension staff in fisheries have trained some six thousand private traders to provide extension service to the farmers they trade with.

Box 17: Examples of private sector extension

areas should be oriented towards this goal. Private seed companies would undertake extension work in order to popularize new seed varieties, and this is often the pathway to private sector extension. A seed development strategy which favors, for example, the setting up of a seed parastatal, is not likely to be conducive to the growth of private sector extension.

6.7.1 There are many options available to countries for encouraging private extension through seed companies. The first is to encourage the establishment of private sector seed companies owned, wholly or partly by farmers. Kenya and Zimbabwe offer examples of such enterprises in Africa. The second option is to encourage multinational seed companies to set themselves up in the country. In Malawi, the National Seed Company is jointly owned by a seed multinational (Cargill), and the Government of Malawi. Another multinational (Lever Brothers) has also now been permitted by the government to start operations in the country. Ethiopia has plans to establish a joint venture between the state-owned Ethiopian Seed Corporation and another seed multinational (Premier Seeds). There are definite advantages in encouraging a multinational to start operations in the country, as the country will benefit from the worldwide research and management practices of the multinational. The third option is to encourage small-scale seed entrepreneurs; such a strategy has proved successful in some African countries, particularly Senegal. Similar strategies are now being followed in Rwanda and Madagascar

6.7.2 The seed sub-sector is an obvious example where, as seen in para 6.4.7, parastatal seed companies have been set-up, or existing ones strengthened, often with donor (including the Bank) support, instead of the governments encouraging the growth of the private sector in gradual stages, starting with the seedsmen. These seedsmen are really farmer seed entrepreneurs, who would be able to market affordable seeds to farmers, due to their low overhead, as compared to parastatals or big seed companies. As the volume of the demand grows, these seedsmen could grow into seed companies; such an evolution has been the pattern

The On-farm Seed Production Project (OFSP) is being implemented in Senegal and The Gambia by the Ministry of Rural Development of Senegal and the Seed Technology Unit of the Ministry of Agriculture and Natural Resources of the Gambia, respectively. The participating institutions are: Winrock International (lead institution), the Center for PVO/University Collaboration in Development(Center), Mississippi State University(MSU), U.S. Peace Corps, and many NGOs. The project seeks to meet the farmers' needs for better seed by improving their selection, production, storage, and distribution systems. Through training and field demonstrations, farmers learn how to improve their customary production and storage methods. Farmers, local organizations, and OFSP staff work together to determine the best ways to adapt the new varieties and technologies to the indigenous knowledge systems and traditional practices. Through this process, OFSP and collaborating staff continuously review their assumptions and criteria to achieve the goals of the project.

OFSP training and field demonstrations are designed to reach women who have a major responsibility for agricultural production in both countries. In rice production, women often sow, weed, harvest, thresh, and store the crop after men prepare the land. Extension personnel are trained to respond to the gender-specific needs of the farmers. The project covers rice, millet, peanut and cowpea.

Box 18: On-farm seed production in Senegal

in many developed countries.

6.8 Funding Private Sector Extension. An important issue to be addressed in this context is whether Bank projects should include the financing of private sector extension. One view presented at the workshop was that private extension should be left to work on its own, and should not be financed through IDA funds which are available to African governments, as private sector extension is generally linked to agribusinesses which have their own channel of funding. On the other hand, it was argued by some participants that private companies and NGOs should be financed under Bank-funded extension projects to give them an incentive to diversify and provide extension to typically "public sector" crops.

6.8.1 Since IDA funds are made available to governments, the question is really as to whether governments should entice the private sector through financial support to provide extension in foodcrops, which would not be otherwise financially attractive. Such a policy would certainly enable many private companies and NGOs to undertake extension on foodcrops. But this view was contested by many. First, any such policy would amount to subsidizing the activities of private companies and parastatals, and in practice it would be extremely difficult to estimate the costs of food crops extension because farmers generally grow both food crops and cash crops. Second, many companies provide extension service on food crops in their own interest, as it enables them to win the confidence of farmers.

6.8.2 It is necessary to distinguish between private companies who are generally in the profitable business of producing high-value cash crops through contract farmers, with extension on food crops ancillary to their objective, and NGOs who are generally non-profit making. While the former might not need any financial assistance, the latter would certainly benefit from

it. It would be desirable if the Bank could devise ways of channeling funds to support the extension initiatives of NGOs.

6.8.3 Farmer-led Technology Development. Many participants stressed the fact that: (i) farmers constitute the most effective private sector in most countries and their improvisations and innovativeness should be used by the public extension service; and (ii) the technologies developed by the farmers constitute a vast reservoir of proven technologies which could be a very effective starting point for both extension and research³². Extension service provided by farmers to other farmers is assuming importance in Kenya where many veteran plantation owners provide extension to other farmers.

6.8.4 Participants referred to many donor projects and also some Bank projects tending to stifle the growth of private extension by providing subsidized inputs (seeds, fertilizer) or credit. While one set of farmers are trying to make better use of the resources available to them, and are even willing to pay for the extension service, another group get their inputs subsidized. There is need for consistency in the approach of the Bank and other donors.

6.8.5 The Role of Youth in Extension.

The potential of primary schools in the rural areas to involve rural youth in technology transfer should not be overlooked. The experience of Madagascar where the teachers themselves asked to be included in the itinerary of the extension agents and used the school gardens for experimental multiplication of materials, has been very good. Fortunately, school attendance there is very high and it was noticed that school children, when they are well-trained, can have a great influence on the behavior of their parents.

The Bank-supported Zaire Seeds Project sought to set up an elaborate government agency to develop the "Seeds Sector." This effort has not been successful and the main lesson of this project has been to rely more on farmer seed entrepreneurs. The experience in Chad has been similar; the parastatal-owned seed farm has not functioned up to expectations, and the FAO-assisted seed processing plant set up by the seed parastatal has been left with considerable quantities of unsold seed. The experience of the now defunct Ghana Seed Company was similar. The National Seed Company in Malawi sells mostly hybrid maize seed; only about 13% of the smallholder land under maize is planted with hybrids since farmers find the hybrid seeds expensive, despite the fact that these are heavily subsidized by the government. Seed subsidies cost the government about 13 million Malawian kwachas, more than the government's annual spending to meet the recurrent costs of agricultural research. On the other hand, there are successful examples of seed projects based on farmer-seed entrepreneurs. In Senegal, for instance, there is a highly successful "On-farm Seed project", initiated in 1987 through the collaboration of Winrock International and the U.S. Peace Corps, with partial funding by USAID.

Box 19: Bank-supported Seeds Project

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The strategic extension program described in para 4.2 starts with the current status, which includes technologies evolved by farmers themselves. The role of indigenous technology in providing impetus to both research and extension is well-documented in D. Michael Warren: *Using Indigenous Knowledge in Agricultural Development* (World Bank Discussion Paper No. 127, Washington D.C. 1991) (Ed).

Mass Media

6.9 Role of Mass Media. It is necessary to distinguish between mass media and audio-visual support to extension. Extension staff rely on audio-visuals to supplement and complement field extension and audio-visuals are also used for extension training. Simple audio-visual support includes the use of flip charts, overhead and slide projectors and video. Many Bank projects do provide for such equipment, and training in their use³³. "Mass media," on the other hand, includes television, radio, cinema-slide shows, video, newspapers, posters, pamphlets, etc., where the audience is not a "targeted" one such as the contact and neighboring farmers. The main issues addressed were: To what extent can mass media substitute for "face to face" extension? How is it to be made supplementary and complementary to field extension? It was generally agreed that while mass media cannot completely eliminate the need for field extension, there should be increasing reliance on mass media for supporting field extension so as to enhance its effectiveness. The participants felt that: (i) mass media is very effective in creating awareness and farmers can always approach the extension agent for details; (ii) media, such as radio, can efficiently reinforce the convictions of farmers that new technologies are worthwhile; (iii) an environment for adoption can be promoted through mass media; (iv) mass media could be a morale-booster for the farmers, when the extension recommendations confirm what the farmers themselves have been doing; and (v) mass media provides the quickest way of reaching a large number of farmers in a very short time and would therefore be very useful in times of emergencies such as a large-scale pest attack.

A participant from Nigeria recalled asking a farmer whether he would prefer getting information through video and/or television in preference to having a visit by the extension staff. The farmer laughed at his questioner. He asked whether the radio or the television would be able to respond to him if he asked a question. He wanted the extension agent to go to him in person and demonstrate to him what he wished to know.

Box 20: Mass media and extension

6.9.1 Radio. The most common mass media vehicle in many African countries is the radio. Generally, this is controlled by governments and is managed by Ministries other than the Ministry of Agriculture (MOA). Specific time slots are allotted to the MOAs for broadcasting extension messages, at no cost to them. Radio can be a very effective tool for communication with the field staff and farmers. It could be effectively used for: announcing meeting points, training dates, work programs, motivating the farmers and being a channel for information on a wide range of topics of interest to farmers besides technology, such as the latest prices, goods available in the market, changes being made in agricultural policy which will affect them and

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The important question of how to train extension staff to prepare good audio-visual material, such as slides showing the different crop pests, slide stories on common crops, etc., is a separate issue and was not the subject of discussion at the workshop in the context of "mass media". (Ed.)

Christian Service Committee(CSC), which is an NGO located in Zomba, Malawi runs extension activities on a limited scale covering approximately 12,000 people. The staff include 12 persons (2 women) who work with approximately 50 groups each. The groups are existing church groups whom extension staff meet to pass on a limited number of focussed messages, such as: introduction of a new variety of soybean, maize rotation and soil fertility enhancement through planting of acacia albida trees. The extension staff start the cycle of messages with how to roast soybeans for use, either whole or ground as children's food. They then sell beans for planting and teach farmers how to plant. After planting, they teach them about acacia albida and sell them pots for growing seedlings. Besides improving the nutrition of the rural population, the introduction of soybean in the cropping system has also improved the productivity of maize, and has considerably reduced the need for chemical fertilizer. The extension staff are trained and supervised by the CSC staff and they coordinate with the Ministry's agricultural extension staff. Currently there are plans to use some of CSC's group methods to improve the effectiveness of the Ministry's extension work with farmer groups, especially women farmers.

Box 21: Church groups in Malawi

so on. It also has the advantage of enabling the Extension Departments to communicate not only with the direct clients of extension (the farmers), but also with the people in towns, so that the latter would be aware of the new developments in agriculture ".

6.9.2 Television. Some participants mentioned the role of television and said that it is possible to demonstrate through this medium how to adopt technological recommendations, such as, for instance, how to take soil samples, etc.

Farmers' Groups

6.10 Efficacy of Farmers' Groups. It is now generally recognized that working with groups rather than with individual farmers would be more conducive to effective extension. In Ethiopia, for example, the experience of both the Ministry of Agriculture and the Ministry of Coffee and Tea Development has been that wherever the extension staff work with groups, the adoption rates have been much higher than when they work with individual farmers. Competition among groups has been a major factor in facilitating the dissemination of extension recommendations. Extension working with farmers' groups is being actively encouraged under Bank-assisted extension projects. Many "country experience" presentations (Annex 3) emphasized the importance of farmers' groups in Africa, particularly women's groups.

6.10.1 The participants endorsed this approach, though there was some reservation about the utility of farmers' groups in technological innovation. It was stated that farmer-led technological

innovations are the result of initiatives by individual farmers, and that if extension works only with farmers' groups, it might miss them, and thereby miss an important source of such innovations. Therefore, while groups are good, extension should look out for innovations by farmers³⁵. Wherever there are traditional groups in rural communities, extension could work with such groups and there is no need to form new ones only for extension purposes³⁶. While extension could work with groups which already exist, it should refrain from being proactive in the creation of such groups.

6.11 Nature of Groups. Farmers form groups or become members of existing ones with a definite objective. There are some factors that pull people together to form groups; groups have developed around credit in Malawi, or marketing and processing of coffee in Kenya, or cotton in many Francophone West African countries. Historically, extension has seldom been the

motivation for the formation of groups; but recent experience shows that once extension starts working with groups, which have realized the value of extension advice, extension acts like a glue which binds the group together. There are many recent instances of groups having been formed around extension messages. Women's groups have almost always developed to adopt extension recommendations. There are also many examples of adoption of extension recommendations being facilitated by the fact that women's groups often do farming jointly. In Nigeria, for example, one women's group has been able to adopt the recommendation of seed and fertilizer placement mainly because the members of the group farm jointly; as soon as one team places the seeds, another follows, placing fertilizers.

6.11.1 One of the main problems facing extension is farmer coverage and groups certainly enable extension to achieve greater farmer coverage, and the quicker spread of technology.

³⁵ To some extent this argument is theoretical. If in a group there is an innovative farmer, he is generally very happy to take the extension agent and other farmers to his field to show them what he has achieved. There is really no danger of extension missing out on farmers' innovations, if the groups include such farmers (Ed).

³⁶ Once extension starts functioning, if the advice is useful, groups tend to get formed around such advice. For example, in Somalia groundnut was introduced as a new crop in many parts of the Baidoa region. Farmers who started growing groundnut for the first time after receiving extension advice, tended to form a group, and exchange information among themselves. (Ed.)

Examples of the use of mass media to support field extension were given. In Malawi, mobile cinema units have been used, but due to the poor quality of films and poor coordination with field extension, the results have not been good. The ASI staff from Malawi suggested that before sending extension messages to the media, the staff should be trained to identify what type of messages should go through these techniques and how to prepare the relevant "software". In Benin, a film was prepared by extension to show the farmers how cotton prices are set, which is quite a complex process. It described why farmers are paid 95 francs per kilo plus 5 francs surplus price, where the price comes from and why it changes annually, and how the cotton credit system works. The film was produced in six local languages and was very popular with cotton farmers.

Box 22: Use of cinema in extension

like a glue which binds the group together. There are many recent instances of groups having been formed around extension messages. Women's groups have almost always developed to adopt extension recommendations. There are also many examples of adoption of extension recommendations being facilitated by the fact that women's groups often do farming jointly. In Nigeria, for example, one women's group has been able to adopt the recommendation of seed and fertilizer placement mainly because the members of the group farm jointly; as soon as one team places the seeds, another follows, placing fertilizers.

6.11.1 One of the main problems facing extension is farmer coverage and groups certainly enable extension to achieve greater farmer coverage, and the quicker spread of technology. They also provide vital feedback to extension regarding the relevance of the recommended technologies to the field situation. Therefore, any kind of group is welcome. In Kenya, the extension system uses school clubs. The early experience in Ethiopia shows that the extension staff used to work with groups and that the adoption rates were very encouraging.

6.11.2 What is important is not group formation but identification of the rationale for, and the purpose behind the existing ones. In Zaire, for example, there are many different groups which evolved for a totally different purpose, namely, transition rites relating to birth, marriage or death. Extension can identify and work with these groups. The ASI staff from Zaire felt that working with self-formed groups has the advantage of the groups being more enduring than those constituted by governmental fiat.

6.11.3 While extension might not actively promote farmers' groups, its work can certainly contribute to farmers coming together on their own. Extension work with contact farmers involves persuading them to try new practices on small portions of their fields and inviting surrounding farmers to participate in the discussion on the adoption of these practices. In due course, if extension works consistently with the same group of farmers who find the recommendations useful, a certain bond is established among the farmers and the next thing they would like is access to fertilizer or seed. In this manner, extension can create a viable size of demand for inputs, a point discussed in para 6.4. The group can then arrange for inputs through a private dealer or a parastatal³⁷.

6.11.4 It was suggested that extension should take care of the needs of farmers with special interests, such as horticulture, oliculture, dairying or calf rearing. These farmers could form groups, which could have special meetings with the extension agents outside the regular schedule of visits.

Bank's Implementation Assistance to the Countries

6.12 Two main questions came up for discussion in this context:

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Parastatal is mentioned here not as a preferred option, but because it is the only option in many African countries.

- * How long should the Bank position ASI staff in the countries?
- * Since the work of the staff is essentially in the nature of Technical Assistance(TA) which should be paid for by the borrowers from out of the credit, why should the Bank spend its resources for the purpose?

6.13 As regards the first question, it was unanimously felt that though the Bank has a responsibility to guide countries in implementing a new management system such as T&V, the implementation assistance should not be indefinite. After a period of 5 years, the countries should be in a position to understand the system and implement it on their own. While many African countries have now reached such a stage, the assistance should be only gradually phased out.

6.14 As regards the second question, there are definite advantages in the present arrangement which the TA option cannot provide. These are:

- * Being Bank staff gives the ASI staff considerable flexibility to work across sub-sectors and projects; in fact, in many countries they are the main link between field crop and tree crop extension, forging institutional links between the two services. The strategy accepted by the participants at the workshop presupposes that the involvement of the ASI staff would widen to include many more sub-sectors. In fact, in due course, the involvement of the country extension staff with the implementation of extension reforms should deepen while that of the ASI staff should broaden. On the other hand, the Technical Assistants (TAs) would be locked into their specific projects and would be constrained by their contracts.

In Kenya, clubs have been formed in schools which are numerous and located almost everywhere. Formation of youth groups (especially for school-leavers) is also encouraged to interest young people in agricultural activities. There are numerous women's groups all over Kenya formed for reasons other than agriculture and extension is working with these groups as much as possible. Farmers congregate for many reasons, such as delivering coffee or pyrethrum to their respective factories, and extension staff meet such groups to get the extension messages across to as many farmers as possible. Other areas for delivering messages on livestock have also been considered like dips where farmers take their cattle. The ASI staff from Kenya argued that extension has played a significant role in both encouraging the formation of groups and in maintaining group cohesion.

Box 24: Farmers' groups in Kenya

- * The Bank's long-term strategy outlined in this monograph would necessitate the ASI staff changing their roles as time passes. Initially, their role is essentially that of trainers. In due course, this role should be taken over by

the country staff, as the ASI staff move on to assist countries in setting up extension training institutions. In the subsequent stage they would be engaged in assisting the establishment and/or the strengthening of regional (i.e. Pan-African) training institutes. It would be difficult to imagine the TAs being able to modify their roles to fulfil broader objectives.

- * The Senior government staff and policy-makers in countries very seldom go to the field, and are quite oblivious of the problems faced by their field staff, much less those faced by the farmers. Very often, the ASI staff bring to their notice the problems of the field staff (e.g., delayed receipt of budgeted funds) and also those of the farmers (e.g., non-arrival of inputs on time). The TAs whose contracts depend upon the senior officials tend to be very diplomatic and are generally not frank in their assessment of the field situation.
- * Bank's role in the selection of the TAs is minimal, and hence its limited ability to ensure quality.

7. POSTSCRIPT

7.1 As observed in para 1.13 the Bank had initiated a study the impact of T&V extension in Kenya and Burkina Faso, under the guidance of Professor Robert Evenson of Yale University. The results of the Kenya study are now available and are summarized in this chapter. The results of the Burkina study will be available by October 1992.

Kenya Study

7.2 The training and visit (T&V) system of extension was first introduced in Kenya on a pilot basis in two districts in 1982, and then expanded on a national scale through the Kenya National Extension Project starting in 1983. The first phase of that project was completed in 1991, and is now being followed by a second phase. Based on data for 676 randomly sampled farmers from seven representative Kenyan districts for the 1989 and 1990 long rains seasons, this study shows that the introduction of T&V significantly increased the effectiveness of extension by expanding the supply of extension services and accelerating the rates of awareness and adoption for improved practices. Thus, it indicates a high payoff to the incremental investments associated with T&V. The extension investments in the seven districts averaged \$5.46 a year per farm family during the first phase of the National Extension Project (in 1991 constant terms), with the increase relative to the period preceding the introduction of T&V being \$1.02. The marginal rate of return computed by the study for these investments in T&V is 316 percent (around the regression estimate for the extension impact on agricultural productivity), compared to 37 percent computed hypothetically for the earlier extension system on the assumption of it continuing. The corresponding lower-limit rates of return, estimated around a 95 percent statistical probability level, are 127 percent for T&V and 12 percent for the earlier system.

7.2.1 Sixty-six percent of the sample farmers deriving their main income from agriculture reported that they had received extension advice at one time or another after the introduction of T&V (1982). Ninety percent of these recipients rated the advice as being applicable, and 88 percent indicated that they had never been advised by extension before T&V was introduced. With 65 percent of all sample farmers who received extension advice doing so in groups, the results emphasize the effectiveness of the group approach in increasing the number of farmers reached directly by extension. While small and medium-sized farmers generally dominated the advice patterns, the proportions of sample farmers from households headed by males (50 percent) and females (45 percent) receiving advice were similar. An adequate number of sample farmers appear to have been receiving extension advice on a regular basis.

7.2.2 Eighty percent of the sample farmers indicated being aware of, and 60-75 percent having adopted, spacing and planting techniques, and improved varieties and fertilizer. Sixty-three percent used maize hybrids. However, only 10-25 percent of the sample farmers were aware of, or had adopted, more complex chemical use and pest-control measures. The main constraint identified by farmers (especially small farmers and farmers from female-headed households) for not adopting extension recommendations related to the costliness of inputs, indicating a role for increased agricultural credit. With 25 percent of the sample farmers ascribing their awareness of technologies directly to extension workers and 41 percent to other

farmers, the results also point to the effective diffusion of messages among farmers, necessary for successful extension.

7.2.3 An econometric analysis of the determinants of advice, awareness and adoption showed that farmers from households headed by females and more educated persons had a higher probability of coming into direct contact with extension agents. These farmers also had higher probabilities of becoming aware of and adopting improved practices. The analysis further showed that the introduction of T&V increased extension activity in areas which had previously had low extension agent : farmer ratios, and farmers in low and medium potential areas were more likely to come into direct contact with extension agents than farmers in high potential areas. The analysis of the impact of T&V indicated that while farmers from male- and female-headed households had similar productivity levels when the extension agent was a male, the productivity of farmers from female-headed households was significantly higher when the extension agent was a female. It also indicated that subject matter specialists with technical training, and the involvement of extension agents and subject matter specialists in on-farm research, enhanced agricultural productivity.

BASIC DATA ON EXTENSION PROJECTS AND PROJECTS WITH EXTENSION COMPONENTS

Country	Name of Project	Date of Effective-ness	Project Closing Date	Total Proj. Costs	BANK/ IDA Lend.	Total Extn. Costs	Bank/ IDA Lend. Extn.
Occidental and Central Africa				(US \$ million)			
Togo	Cotton Sec. Dev. 6/	08/16/89	06/30/93	37.5	15.1	12.06	7.24
Cameroon	Cocoa Rehab. 6/	10/26/88	12/31/94	285.4	103.0	43.25	25.95
Cote D'Iv.	Ag. Extension 1/	12/18/87	06/30/92	58.2	34.0	44.34	26.60
Togo	Agric. Extension 1/	07/25/88	06/30/93	12.6	9.7	7.20	4.32
Benin	Borgou II 4/	12/13/88	12/31/92	60.3	21.0	7.00	5.20
Guinea	Nat. Ag. Res. Ext. 2/	05/26/89	12/31/94	30.9	18.4	7.19	4.31
Cameroon	Livstk Sector Dev. 5/	05/30/89	06/30/95	55.2	34.6	18.10	10.86
Cameroon	Nat. Ag. Ext. Trng. 1/	01/22/91	03/31/97	31.1	21.0	22.24	12.50
Cote D'Iv.	Pilot WID 7/	02/22/91	06/30/93	3.6	2.2	0.66	0.44
Congo	Nat. Ag. Ex&Adap. Res1/	12/31/91	06/30/96	19.7	15.8	10.80	8.66
Eq. Guinea	Crop Div. & Ag Ser 3/	07/10/91	12/31/96	18.0	6.3	3.50	1.20
Benin	Agric. Services 3/	10/15/91	06/30/95	29.6	12.3	10.40	8.40
CAR	Ag. Services Dev. 4/			46.9	25.8	18.60	8.10
Total				689.0	319.2	205.3	123.8
Eastern Africa							
Uganda	Ag. Dev. IFAD II 4/	05/08/86	03/31/93	31.4	10.0	2.81	2.00
Sudan	Extension/Res. 2/	12/10/86	06/30/93	38.0	22.0	10.82	6.49
Somalia	Agric. Ext. II 2/	09/28/87	12/31/93	26.7	12.7	16.86	10.12
Uganda	S. West Ag. Rehab. 4/	08/26/88	06/30/94	27.4	7.6	3.36	2.16
Ethiopia	PADEP I 4/	04/14/89	06/30/95	118.6	85.0	6.99	4.19
Sudan	So. Kassala Agr 4/	07/27/89	09/30/95	35.0	20.0	2.27	1.36
Kenya	Rural Services 3/	09/01/89	12/31/93	35.5	20.8	2.50	1.50
Kenya	Natl Ag Ext - II 1/	08/22/91	03/31/98	47.9	24.9	37.4	19.44
Mauritius	Ag. Services 3/	10/03/91	06/30/99	18.1	10.0	5.10	2.81
Total				378.6	213.0	88.11	50.07
South Central and Indian Ocean							
Burundi	Agric. Services 3/	02/20/90	12/31/96	40.0	33.1	5.96	3.58
Rwanda	Ag. Services II 3/	06/15/90	06/30/95	30.1	19.9	23.48	14.09
Madagascar	Ag. Ext. Pilot 1/	03/22/91	06/30/94	5.4	3.7	3.38	2.32
Zaire	Pilot Extension 1/	11/15/90	12/31/92	10.5	5.9	10.94	6.15
Total				86.0	62.6	43.76	26.13
Western Africa							
Nigeria	Kaduna ADP @ 4/	07/17/85	12/31/93	182.6	122.0	3.16	1.90
Nigeria	Multi-State ADP I 4/	06/15/87	06/30/92	256.4	162.0	19.50	11.70
Ghana	Cocoa Rehab. 6/	11/15/88	06/30/94	128.0	40.0	10.60	6.36
Nigeria	Borno State ADP 4/	03/13/87	07/31/92	39.3	25.0	3.8	2.42
Nigeria	Multi-State ADP II 4/	11/16/89	06/30/93	125.0	85.2	5.35	3.21
Nigeria	Multi-State ADP III 4/	03/29/90	03/31/95	159.4	100.9	15.53	9.32
Ghana	Ag. Serv. Rehab 3/	12/18/87	06/30/93	53.3	17.0	2.20	0.70
Nigeria	Nat. Ig. Tech. Support 2/			60.0	42.5	23.30	16.50
Ghana	National Extn. 1/			41.1	30.4	41.12	30.40
Total				1045.1	625.0	124.56	82.50

BASIC DATA ON EXTENSION PROJECTS AND PROJECTS WITH EXTENSION COMPONENTS

Country	Name of Project	Date of Effectiveness	Project Closing Date	Total Proj. Costs	BANK/IDA Lend.	Total Extn. Costs	Bank/IDA Lend. Extn.
Sahel							
Burk. Faso	Agric. Services 3/	05/26/89	12/31/94	44.9	42.0	21.54	12.92
Senegal	Agric. Services 3/	07/24/90	12/31/94	20.2	17.1	13.59	11.50
Mali	Ag. Services 3/	08/29/91	09/30/95	27.1	18.3	19.10	12.90
Niger	Ag. Services 3/			19.8	18.0	14.70	13.36
Total				112.0	95.4	68.9	50.7
Southern Africa							
Malawi	NRDP IV 4/	08/22/83	04/30/91	12.5	10.6	1.07	0.91
Zimbabwe	Nat.Agr.Ext.& Res. 2/	11/29/83	09/30/91	177.2	13.1	19.82	11.89
Malawi	Ext. Planning 4/	03/20/86	09/01/91	20.2	11.6	5.43	3.12
Zambia	Ag. Res. & Ext. 2/	12/31/91	12/31/95	38.8	13.0	7.65	4.59
Tanzania	Nat.Ag & Livst Ext. 1/	07/06/89	03/31/97	30.4	18.4	27.17	16.30
Mozambique	Ag.Serv.Rehab.&Dev. 4/			40.6	35.0	9.87	4.04
Total				319.7	101.7	71.01	40.849
Grand Total				2630.4	1416.9	601.71	374.02

Notes

- Two Projects, viz. Somalia-Agric. Extn. and Farm Management Training Project and Kenya - National Extension Project I, are closed.
- Wherever Bank/IDA lending for extension is not apparent from the Staff Appraisal Reports, it is estimated taking into account factors such as, the percentage of Bank/IDA lending for the project, foreign exchange costs of extension and the pattern of financing of recurrent costs.
- The following projects were recently approved: Nigeria (Nat. Ag. Tech.) Ghana (Nat. Extn.), CAR, Niger and Mozambique.
- Extension projects in Uganda, Malawi, Zimbabwe and the Gambia are expected to be approved shortly.

Legend

- | | | | |
|----|----------------------------------|----|---|
| @ | Redesigned Kaduna Project | 5/ | Livestock projects with significant extension component |
| 1/ | Free standing extension projects | 6/ | Tree crops/commodities |
| 2/ | Extension + Research projects | 7/ | Women in Development |
| 3/ | Agricultural Services | | |
| 4/ | Area development projects | | |

List of Participants¹

- | | | |
|-----|---------------------|--|
| 1. | Mr. R. Clough | Agricultural Country Officer, Malawi |
| 2. | Mr. A. Brizzi | Agricultural Extension Specialist, Benin |
| 3. | Mr. W. Roider | Agricultural Country Officer, Cameroon |
| 4. | Mr. J. N'degwa | Agricultural Extension Specialist, Kenya |
| 5. | Mr. D. Moran | Agricultural Extension Specialist, Ethiopia |
| 6. | Mr. T. Bredero | Agricultural Extension Specialist, Madagascar |
| 7. | Mr. J. Weetjens | Agricultural Extension Specialist, Zaire |
| 8. | Mr. R. Unamma | Agricultural Extension Specialist, Nigeria |
| 9. | Mrs. E. Gadzama | WID Specialist, Nigeria |
| 10. | Mr. F. Schorosch | Agricultural Extension Specialist, Senegal |
| 11. | Mr. M. Niang | Agricultural Extension Specialist, Niger |
| 12. | Mr. P. Yao | Agricultural Extension Specialist, Chad |
| 13. | Mr. C. Leduc | Agricultural Extension Specialist, Burkina Faso |
| 14. | Mr. Q. Minh Doan | Agricultural Extension Specialist, Mali |
| 15. | Mr. F. M'buka | Agricultural Extension Specialist, Malawi |
| 16. | Mr. D. Sungusia | Agricultural Extension Specialist, Tanzania |
| 17. | Mr. C. Chidawanyika | Agricultural Extension Specialist, Zimbabwe |
| 18. | Mr. K. Cleaver | Division Chief, Africa Technical, Agriculture
Division(AFTAG) |
| 19. | Mr. J. Peberdy | Agricultural Adviser, AFTAG |
| 20. | Mr. V. Venkatesan | AFTAG, Headquarters |
| 21. | Mr. A. Spurling | -- do -- |
| 22. | Mr. A. Qaraeen | -- do -- |
| 23. | Mr. Z. Matmor | AFTAG, Nairobi |
| 24. | Mr. J. Fremy | AFTAG, Abidjan |
| 25. | Mr. Ben Mayor | -- do -- |

¹ The status of the participants is as at the time of the workshop. Some changes have taken place since then, and these have been incorporated wherever possible.

Presentations of Country Experiences**Introduction**

This Annex contains the summaries of country experiences presented by the participants at the workshop. The presentations have been reduced to a common format to facilitate reading. Information relating to five key fields (listed below) is included in the summaries. Wherever no information was available in the presentations regarding a given field, no reference to the field is made. To keep the length of the Annex at a reasonable level, the presentations have been condensed, consistent with the need for clarity. The reader will also notice that the style and diction are not uniform; the editors have tried to preserve the flavor of the papers as presented. Additionally, there is considerable variation in the lengths of the country presentations.

The countries covered are: Benin, Burkina Faso, Cameroon, Central African Republic(CAR), Cote d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mali, Nigeria, Senegal, Sudan, Tanzania and Zaire.

Explanation of the Key Fields

STATUS AT THE COMMENCEMENT OF THE PROJECT - Pre-project conditions.

GENERAL DESCRIPTION OF THE PROJECT - Time-frame, methodology, farmer-extension agent ratios or other indicators of extension coverage, and REL.

MAIN CROPS, ANIMALS, KEY TECHNOLOGICAL INNOVATIONS - The major focus of extension messages.

MAIN PROBLEMS - Problems with project implementation.

IMPACT - Quantitative and qualitative measure of extension performance.

RECOMMENDATIONS

OTHER POINTS OF INTEREST - This includes special focus on a particular group, such as women and youth, or treatment of issues such as environment or the private sector.

BENIN²**Status at the Commencement of the Project**

The government of Benin has recently begun a program of democratization and structural adjustment. Up to the present there has been no clear national strategy regarding agricultural services, which have been provided by six donor-funded regional development agencies (CARDER). Each CARDER has a seed farm and conducts agricultural research in relative isolation. Currently, the CARDERS are being divested of many commercial and production responsibilities and have undergone a 50% reduction in staff. Plans have been made for the privatization of seed farms, and veterinary services and markets are being liberalized.

General Description of the Project

The Bank finances 2 CARDERS:

- * The Borgou Regional Development Project started in 1981 with a T&V pilot in 1986. The focus is on cotton which is grown by 90% of farmers representing 70% of total national production. Cotton farmers were paid a fixed price linked to world market levels. Most cotton farmers are organized and in charge of marketing.
- * Zou Regional Development Project started along with a T&V pilot in 1984.

The key problems with the T&V projects have been: poor training; inadequate links with research; poor applications of the contact farmer strategy; and extension staff working on many non-extension tasks (such as data collection, credit recovery, and input supply). A noteworthy new concept was introduced in some areas: "assisted self-evaluation". Farmers are asked to evaluate past performances and make propositions for the coming year. Information is analyzed village by village and tasks "divided among different partners".

Main Crops, Animals, Key Technological Innovations

In Borgou, the focus is on cotton. Key issues are the adoption of modern varieties, and the use of fertilizer, pesticides and ox-carts. Cotton farmers' adoption of new practices has been high due to a good economic environment, low risk involved in commercialization, good access to credit and inputs, and sound and available advice. However, food crops have been completely neglected. In Zou, the focus of the project is on the entire farming system.

² Information drawn from "The Benin Experience" by Mr. Adolfo Brizzi as presented at the workshop.

Main Problems

In general, the agricultural administration requires restructuring. Management structures need to be streamlined. Staff size should be reduced and financial resources re-allocated. Finally, training to raise technical and diagnostic skills and communication capacity is needed. In Bourguou the key problems are: stagnant low yields for food crops; excessive focus on cotton; non-integration of livestock husbandry into the overall farming system; cotton production methods depleting the natural resources of Benin at an estimated rate of 60,000 ha per year.

Impact

In Bourguou the results of extension have been "spectacular" in cotton: yield increase from 1 m.t/ha to 1.3 m.t/ha; total cotton production increase by 600 percent.

In Zou, results are "satisfactory":

- * Cotton yields up by 270% from pre-project, 75% above the project target;
- * Maize yields 22% over target; rice, beans, cowpeas, groundnut all on target;
- * Average annual increase of food crops over project life 4.5%; cotton 2.5%; and
- * 40% of all farmers contacted.

Recommendations

- * Encourage participation of research and extension in jointly adapting research results to fit local farming situations and needs.
- * Place increased emphasis on women and environmental issues.
- * Address the issue of donor opposition to a public national extension system in Benin.
- * Incorporate the farmers' associations into extension efforts.
- * Devote more attention to the farmers' economic environment and how it may be inhibiting the adoption of new messages.

Other Points of Interest

A pilot project is being run in Benin on "On-Farm Adaptive Research (Recherche Appliquée en Milieu Rural)". It may be replicable on a larger scale under the Agricultural Services Project under appraisal. The objective is to improve and adapt technology through on-

farm trials on farmers' fields and through collaboration between farmers, extension staff and researchers.

BURKINA FASO³**Status at the Commencement of the Project**

The initial focus of agricultural extension in Burkina Faso (during and immediately following the colonial period) was on cash crops (such as groundnuts and cotton) and involved the promotion of basic agricultural techniques such as row planting, regular weeding, improved varieties, animal traction, and the increased use of inputs. From 1975 onwards, extension messages have shifted toward the protection of productive resources and the environment. However, in spite of significant manpower and financial commitments, the adoption of recommendations has been poor (except in cotton-growing areas). Few recommendations were area-specific or adjusted for changing environmental conditions. Key problems with extension prior to Bank involvement were: inadequate training of extension agents; failure to translate existing technical information into extension recommendations; weak linkages with research; extension agents too busy with other duties; and lack of coordination among extension authorities.

The overall extension system in Burkina Faso is complex, with extension responsibilities spread over the Directorate for Agricultural Extension in the Ministry of Agriculture and Livestock (MAL) and 3 other ministries; 12 regional offices under MAL, and numerous other government bodies and 73 NGOs, all involved in extension work. External problems that affect the adoption of extension recommendations are: insecure land tenure, poor price policy, market distortions, lack of credit, and inadequate infrastructure.

General Description of the Project

Bank support for extension in Burkina started in 1979 with the National Support Services Project. In addition professional extension based on T&V was introduced in the early 1980s under 3 Bank-supported area-specific projects. The main features of the extension reforms were: an adaptive research component, contact farmer groups (some gender-mixed groups and other separate groups), fortnightly training held in the "field schools" followed by visits to "micro-plots" on farmers' fields, "demonstration herd" for livestock recommendations, agriculture field workers advising on crops and livestock with separate backstopping organizations at the provincial level.

The Bank-supported extension projects in Burkina have focused on setting up an efficient system of coverage of different agro-ecological areas. Projects have resulted in an increased number of "micro-plots" now carried out by 42% of the farmers (11,000 - 21,000 plots).

There are also annual extension review workshops, and technical committee meetings with 10-15% farmer participants.

³ Information taken from "Atelier AFTAG: Vulgarisation Agricole, Revue De L'Experience." presented by Mr. Christian Leduc at the workshop.

Main Crops, Animals, Key Technological Innovations

In Burkina Faso, most of the agricultural production is carried out on small (2 - 7 ha) farms which include a mix of soil and slope conditions. Most farmers are interested in risk-limiting recommendations rather than on profit-maximizing ones. Cereals account for 90% of acreage and 80% of gross value of agricultural output. Cotton and vegetables are also important in terms of revenue and area. Cattle (2.6 million head) are managed in extensive pastoral or agro-pastoral systems with low calving and high mortality rates, poor nutrition and deteriorating grazing resources.

Main Problems

The main problems with extension in Burkina Faso are: weak diagnostic capacity of the SMSs, and front-line staff; and limited availability of relevant recommendations. The main problems with technological recommendations are: non-site specificity, excessive risk, findings not delivered on time to facilitate implementation, new varieties with unacceptable taste or appearance.

Impact

As yet there is limited information available on the adoption of technologies by farmers. Available data are scarce and difficult to analyze — especially due to the participation in extension activities of multiple organizations⁴. The "diguettes" (terraces) started by a local OXFAM project and continued under Bank-supported extension have spread from a few hundred hectares in the 1980s to over 180,000 ha in 1991. The main constraints are raw material and equipment shortages. Overall recommendations that are suited to farmers' needs are adopted "quickly" such as forage cropping and storage improvements.

Recommendations

- * Focus on continued improvements of: the process of identification of constraints to agricultural productivity; research work to overcome them; and design and dissemination of recommendations for farmers.
- * In-depth review of overall progress of extension implementation, and the opportunity to share lessons between projects.
- * Increased use of audio-visual tools — especially videotapes.
- * Pre-technical committee sessions between farmers and SMSs and other staff to identify priority topics for feedback to research.

⁴ Although it adds to assessment difficulties, this complexity may be a benefit in terms of providing diverse types of services to suit different needs. (Ed.)

CAMEROON ⁵**Status at the Commencement of the Project**

After independence in 1960, the Ministerial extension services continued to follow a paternalistic, regulatory approach. Farmers were considered backward traditionalists with little interest in change. Crop and region specific parastatals were created in the early 1970s and although the Ministerial services were relatively ineffective, they could not be dismantled due to civil service rules. In the case of livestock, separate Ministerial services concentrated on veterinary assistance and vaccination campaigns, and extension on husbandry did not exist.

The agricultural parastatals concentrated on export crops, and expanded rapidly with financing from donors and exports revenues. Extension was one element in a vertically-integrated scheme including input supply, credit, marketing, processing, and infrastructure development. Numerous expatriates were hired as managers and local school-leavers were recruited as field agents. These field agents in most cases did not have much to offer seasoned farmers except the free, or subsidized inputs which they distributed with their advice. In the mid-1980s, the export crop parastatals became increasingly inefficient as public debt increased, world market prices fell, and Cameroonian competitiveness diminished. Most extension packages had been based on assumptions of subsidized inputs and high product prices and lost their relevance as market conditions changed.

The adoption of modern farming technology in crop agriculture varied widely. There is substantial large-scale, modern plantation sector producing oil palm, rubber, bananas, tea, rice and maize. The degree to which modern technologies have been adopted by smallholders depends on market incentives. For example, the entrepreneurial cocoa and coffee farmers in the south and west are aware of the use of fertilizers, modern plant protection, pruning, processing etc., but incentives to use them have been inadequate. In cotton, improved techniques have been more widely adopted; farmers in the north have switched to HYV varieties, row planting, proper plant density and rotation to cotton, the rotation crops being millet, sorghum and groundnut. Highly-specialized onion production is also found in the north. However, the development and application of improved farming methods for food crops has been limited. For the livestock sector, many technologies are available, but there are bottlenecks in the delivery and land tenure systems.

The main current constraint to the adoption of recommended techniques is a lack of effective incentives to produce more for the market.

⁵ From the report of Messrs. Roider and Mitchnik, presented at the workshop by Mr. W. Roider.

General Description of the Project

The World Bank finances three projects in agricultural services: an agricultural research project; a livestock sector development project and an agricultural extension and training project. The last is called the National Agricultural Extension and Training Project (NAETP) supported by a US\$21 million loan over a five-year period to improve the efficiency of the extension services. The project finances operating costs, vehicles, equipment and training. Incremental recurrent costs after the project would be lower than the savings from the parastatal reform program and the elimination of duplication of extension services. The NAETP would accomplish these objectives through: (a) reorganization and strengthening of national and regional extension structures through the organization of the dormant field services of the MOA along T&V lines to replace the crop-specific and parastatal extension services that have become too expensive; (b) a training program including orientation and refresher courses (in-service and overseas); (c) improvement of research extension linkages; (d) support to seed multiplication activities.

In addition to NAETP, which has completed a 18-month pilot phase, modified T&V systems have been in operation in crop agriculture extension systems run by SODECOTON operating in the cotton-growing areas in the north, and MIDENO, a regional rural development project in the English-speaking Northwest of the country.

Main Crops, Animals, Key Technological Innovations

SODECOTON in the North provides advanced technologies for cotton and food crops in the cotton rotation such as millet, sorghum and groundnuts. The main technologies are HYV varieties, row planting, plant density, and rotation. In the densely-populated areas of the West and Northwest improved technologies for maize and vegetables have been introduced by MIDENO and others. Generally, however, the development and application of modern technologies by small farmers food crops is low. Development of modern technologies for food crops is lagging behind, because (a) the lack of attention to them in the past; (b) the difficulties of formulating extension packages acceptable within the production systems characterized by inter-cropping and widespread subsistence orientation; and (c) the lack of extension focus on women who are the main producers of food crops. For the livestock sub-sector, it is widely accepted that technologies exist that are capable of addressing the major problems in animal health and feed; bottlenecks are found in the delivery and land-tenure systems.

Main Problems

The main extension problems for NAETP have been: inadequately-trained staff, lack of well-tested extension packages and insufficient availability of quality seed. Agents have faced farmers' distrust because they do not supply free inputs.

Impact

Experience within the NAETP is limited, since only two production seasons have been covered. Extension coverage is still thin. During the pilot phase, 3,000 adoption plots were planted by less than 1 percent of the farmers in the area. Systematic assessment of results is difficult as monitoring is still weak. However, some observations are as follows: adoption plot yields of maize and groundnuts were double or one and a half times those observed using traditional culture in the East. However, farmers have trouble marketing the surplus.

MIDENO has developed a broad extension program covering maize, food loss reduction and a coffee nursery program. However, apart from maize seed sales which increased to about 40 tons/year, there are no reliable indicators to assess the progress of the general extension program.

CENTRAL AFRICAN REPUBLIC (CAR) and TOGO ⁶

Status at the Commencement of the Project

In a number of West African (Sahelian) countries, extension and research have been "ineffective and inappropriate". Extension has had little links with research, which paid little attention to the real problems of farmers, and farmers had little confidence in extension.

Main Problems

The key problems with T&V in CAR and other West African countries are: lack of messages to extend due to the poor research base; reliance on contact farmers which is inappropriate for Africa - groups are better; even though the Bank never makes a claim to that effect, T&V is seen as a "universal panacea" instead of one among the many avenues for rural development.

Impact

T&V in Togo has had "remarkable results" and led to "substantial improvement in farm output", strengthening of farmers' associations, introduction of draught oxen (350 pairs). It is regarded as a good approach for managing extension.

Recommendations

- * Improvement of research by: strengthening NARS and establishing a critical mass (at least 15 people) in the regional research stations; focussing on long-term planning and national strategy; looking at non-traditional topics (environment, production systems etc.); improvement of training and increasing contacts between universities, researchers, extension and farmers.
- * Improving extension through better training and more recruitment from rural areas; learning about local knowledge and needs through multi-disciplinary field research; flexible approach to management;
- * Recommendations for CAR: sparsely-populated areas need to focus on productivity of labor, not land; focus on women farmers; integrate livestock raising and forestry; target young people; allocate most funding to farmers, not bureaucrats; increase emphasis on conservation of the environment; and reform system of land ownership.

⁶ Based on a memo from M. Bordes, Extension Specialist in CAR. This paper also covered Togo and is based on the experience of M. Bordes in a number of W. African countries.

COTE D'IVOIRE

Status at the Commencement of the Project

Prior to the project, crop productivity was quite low despite intensive extension programs developed over a thirty-year period by three specialized extension agencies (SATMACI, CIDT, CIDV). The yields on farmers' fields were generally much below those obtained at the research stations, and in maize just about 35 percent of the latter.

The outreach activities of these agencies were targeted at a portion of the population (29% in 1985/86) and the actual functions of the supporting agencies consisted essentially of: selling inputs (plant materials, fertilizers, pesticides) and farm equipment, often at subsidized prices; and providing additional technical advice, in the form of "technical packages", linked to these inputs and farm equipment. This led to an emphasis on commercial activities rather than on extension as it is generally understood.

Barely 18% of all the technical personnel working in the three extension agencies were graduates of conventional agricultural training schools. The remaining 82%, which includes the field-level extension staff, have a general primary secondary education and were recruited and trained on the job. On-the-job training was done either as: induction training (2 - 3 months) focussing on general agriculture; retraining which took place only on the occasion of internal promotions at SATMACI (generally once every 9 years); and annual training on functional and technical aspects (carried out systematically only by CIDT). There were no procedures for evaluating or determining training requirements.

Time Frame and General Description of the Project

Implementation of the Agricultural Extension Project (AEP) by the Government of Cote d'Ivoire began in 1986 with the assistance of the World Bank. AEP cost a total of \$58.5 million, funded by the World Bank (\$34m) and Cote d'Ivoire (\$24.5m). The AEP was implemented by three agricultural extension agencies (SATMACI, CIDT and CIDV), in cooperation with two research institutes (IRCC, IDESSA), which divided up the country into four regions: (a) the northern half, CIDT and IDESSA for cotton and foodcrops; (b) the forested south, SATMACI, IRCC and IDESSA for coffee, cocoa and associated foodcrops (in the Central Region); (c) the forested southern quarter, CIDV and IDESSA for foodcrops, specifically grains (rainfed rice, irrigated rice, maize).

The management system followed under the AEP is based on the underlying principles of T&V. During the pilot phase, the Ivorian managers were impressed by the positive results of the T&V system in the field, specifically in the area of the organization of work and the methodological chart for the transfer of innovations and training of farmers. The three strategic objectives are to: (a) involve and effectively train the maximum number of farmers (rising from 29% to 50% of the target farm population); (b) provide regular functional and operational training to extension agents; and (c) strengthen the links between extension agencies and research

institutes. Within each agency four main components were introduced under the project: research & development, training, extension and follow-up/evaluation.

Agricultural extension operations have been reorganized as follows: (a) farmers' contact groups are visited by extension agents following a bi-weekly schedule; (b) demonstration plots are used to spread messages; and (c) the system of follow-up, support and control by line management. Contact groups consisting of between 10 and 25 farmers were formed, reinforcing previously existing groupings. There is no contact farmer, but any of the farmers in the group can host visits and demonstrations by the extension agent. Over the period of the project, it was discovered that a reasonable schedule for SATMACI and CIDV extension agents was 3, with a maximum of 4 contact groups a day, or 24 to 32 contact groups every two weeks. Priority extension messages were originally the sole decision of the head of the agency, and institute staff, but this led to the continued dissemination of old messages that were not appropriate. Starting in 1988-89, a much greater awareness of field-level problems was introduced based on diagnostic tests and pre-extension activities with farmers. As a result, the messages designed primarily to address these problems have become more relevant. Demonstration plots, little-used at the beginning of the project, became increasingly accepted by SATMACI and CIDV after training. SATMACI, introduced a major innovation, viz. the check plot (CP) which facilitates farmer observation and helps agents illustrate comparative results.

Overall, the average level of technical staff has improved significantly, both in terms of knowledge of farming methods and techniques, and in analysis and approach to dealing with the farmers. According to evaluations carried out by IRCC and IDESSA, 85% of the SMSs and assistant area managers were rated average to good in 1989, compared to a mere 25% in 1987. In course of time budgetary problems affected the training and visit schedule.

Main Crops, Animals, Key Technological Innovations

The project essentially focusses on those products which play a strategic role in the economy of Cote d'Ivoire (coffee, cocoa, cotton, foodcrops) and which directly or indirectly support 2.5 to 3 million farmers (approximately 900,000 heads of farm families) out of a total population of 10 million, 70% of which is rural. Coffee and cocoa generate 60% of export earnings in a normal year and are the main contributors to the 30% to 35% of GDP derived from agriculture.

Major areas of participatory research in cooperation with extension are: (a) in cotton, weed encroachment, declining soil fertility and the problem of Striga, optimization of inputs in the context of cropping patterns (and not exclusively cotton monoculture); (b) in coffee and cocoa, optimum plant populations (cleaning, thinning, pruning); (c) in food crops, socio-economic conditions favoring traditional cropping patterns and constraining the introduction of the technologies and varieties best suited to the various production areas.

Research/Extension Linkages

The two research institutes -- IRCC for coffee and cocoa and IDESSA for cotton and foodcrops -- have acquired international renown for developing new varieties of coffee, cocoa, cotton and rice, the development of general high-performance "technical packages" and thematic research. However, very few of these technical achievements have been adopted by farmers due to relatively weak applied research and the lack of operational cooperation between the extension agencies and affiliated institutes (with the exception of CIDR and IDESSA on cotton). Starting in 1988, more emphasis has been placed on participatory applied research. The focus of attention has shifted from station experiments to field trials. There is still a need to improve the participation of the farmers, who are all too often used merely as laborers rather than as decision-makers, by designing reliable mechanisms which will allow them to derive tangible benefits from their experience.

Main Problems

The Follow-up and Evaluation unit, as a vehicle for monitoring a range of activities and proposing corrective action, proved to be the weakest link in the project. Apart from CIDV, where numerous surveys focussing on issues such as farmer participation during extension visits, role of women, rate of adoption of messages, etc. enabled timely corrective action to be taken where appropriate, the surveys conducted by the other two agencies were either too cumbersome and slow or they did not respond to farmers' priorities. Notwithstanding two workshops organized by the World Bank in 1988 and 1989, the role of the Follow-up and Evaluation unit is still not properly understood by project management. There are also problems in the area of investigation techniques (sampling, question formulation, choice of type of survey and indicators).

Impact

The number of farmers who have benefitted by extension has increased from 255,000 (29% of the target population) in 1985/86 to over 593,000 in 1989/90 (60%). The record in this category was achieved by SATMACI, which registered 75% coverage of the farmers in its area of operations, compared to barely 20% in 1985/86. The CIDT, through re-organization, was able to release 200 extension agents out of a total of 1,450 (14%) from high-density, relatively more advanced areas of Korhogo to strengthen the Centre (Bouake) and the Northeast (Bondoukou).

The adoption of several technical messages under the project has had an important production impact. The majority of coffee producers accepted the priority message of "3 to 4 cleaning and thinning operations per year" (instead of 2), and this, in addition to the adoption of messages on cutting back coffee trees, enabled Cote d'Ivoire to reverse the downward trend

in coffee production, which all earlier studies had predicted⁷. It was diagnostic tests and pre-extension activities in the field that led to the rediscovery of the crucial effect of cleaning and thinning on the yield of coffee trees, as compared to more expensive practices such as mineral fertilizers. The field tests showed that the increase in the number of "cleaning-thinning" operations resulted in a gain of 380 kg/ha in a plantation of average density (1,000 to 1,320 stocks/ha) without fertilizer.

Second, the work by CIDV's Follow-up and Evaluation unit has shown that approximately 5,000 farmers who accepted the messages relating to "seedling density" (planting out) and "manual weeding" improved their average yields between 1986 and 1989 by 16% for rainfed rice; 24% for irrigated rice; and 15% for maize.

7

Coffee production in Cote d'Ivoire (in tons of coffee beans)

<u>Year</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>
<u>Output</u>	491,400	485,000	345,900	408,300	521,300

ETHIOPIA ⁸

Status at the Commencement of the Project

Ethiopia has had several projects since the mid 1960's which included extension components. The comprehensive rural development ("maximum package") project (initiated in 1967 with support of the Swedish International Development Authority (SIDA) used an extension approach involving diffusion of innovations through "model farmers". The project focussed on small geographic areas with intensive investment in vehicles and other inputs such as rural infrastructure, credit, and seed multiplication. The First Minimum Package Project (MPP), which was supported by IDA, aimed to reach a large number of farmers with a few innovations (fertilizer, improved varieties and practices) by providing combined advisory and input distribution points along the road side. The second MPP used peasant associations as an extension channel instead of model farmers. The implementation of the MPP and other extension activities of the Ministry of Agriculture (MOA), such as adaptive trials on demonstration plots was disrupted by the revolution in 1974.

General Description of the Project

There are currently three Bank-funded projects with extension - related components in Ethiopia: (1) The Agricultural Research Project (ARP) which became effective in 1985; (2) the Fourth Livestock Project (FLP) which includes a pilot T&V component; and (3) the First Peasant Agricultural Development Project (PADEP I) in the Northwest.

The implementation of PADEP I started in 1987 using a modified T&V strategy. The methodology included training of Development Agents (DA) monthly instead of fortnightly; DA to farmer ratio of 1:1300 (in surplus areas); and SMS workshops once each quarter instead of monthly. In some regions the regional and awraja ⁹ SMSs are trained by researchers although there is no uniformity in this respect; in some regions, only the regional SMSs are so trained. In some regions the participation from the research centers in these workshops is minimal. At the Awraja level, the extension coordinator (EC) is in charge of the extension organization of the awraja. The EC is assisted by an array of SMSs. The DA is assigned at the service cooperative level and his duties as the secretary to the service cooperative tend to interfere with his schedule of visits to farmers.

Main Crops, Animals, Key Technological Innovations

The research base in Ethiopia is still in the process of being developed to serve the needs of extension. Although there are research/extension linkage committees (RELC) in each

⁸ Information taken from memo by Dov Moran and augmented with information from Schwartz and Kampen, 1992.

⁹ An administrative unit in a district.

Agricultural Development Zone (ADZ) to provide policy direction, approve extension recommendations and review operation of research/extension linkages in the zone, actual linkages are still weak. There is a national field trials network covering a wide variety of agro-ecological zones, but the linkages between this network and extension are not apparent.

Main Problems

The major problems with the efforts to improve extension have been: (i) lack of appropriately adapted technologies especially for relatively low potential areas; (ii) lack of experienced and trained SMSs; (iii) a national extension program which is fragmented due to the allocation of the responsibility to support certain sections of the country to specific donors; (iv) poor supply of inputs and farm implements; and (v) lack of attention to the needs of women farmers.

Impact/Performance Measures

No specific reference.

GHANA¹⁰**Status at the Commencement of the Project**

Past systems included both input supply and extension. During the 1980s different extension strategies (some overlapping) were tried in Ghana under various projects. Therefore, it is difficult to evaluate separately impacts of the individual projects.

T&V in Ghana has been introduced under a number of projects. First, in 1976 the Upper Regional Agricultural Development Project (URADEP) adopted T&V. It started out with a group contact approach, then shifted to individual contact farmers in 1983 (1:500 target ratio). Second, in 1982, the Volta Regional Agricultural Development Project (VORADEP) started out with the T&V system. The target coverage was 1:500 farmers gathered in groups of ten. Finally, after VORADEP, a pilot project was started to implement T&V in eight districts. This project includes only an extension component.

There were cost increases under both URADEP and VORADEP. Staff were paid extra allowances (20% over regular salaries), provided with transport, extra field officers were employed to attain the target ratio, and training was increased.

An additional project with a major extension component is the Sasakawa Global 2000 launched in 1986. Global 2000 became very popular with farmers and extension officers within a short period of time. The basic extension concept was the "learning by doing" approach to reach small farmers using production test plots (PTP), which were essentially on-farm trials (OFT). Farmers receive all information and inputs on credit. At harvest, they compare PTP and traditional plots and repay the credit obtained in the form of inputs. There has been much enthusiasm for the program which started with 40 farmers in 1986 and after two years has 20,000 farmers (1989). The MOA started to use PTP in 1989 and the number climbed to 85,000. While the credit recovery was high up to 1988, it fell in 1989.

Impact

The general achievements of T&V under the various projects are: the idea of regular visits and training has been well-adopted throughout the country (although modified from the original concept); and field staff have been freed from other duties.

Specific impacts of T&V under VORADEP - as measured by before and after technology adoption surveys in pre-1982 and post-1987 - are as follows¹¹:

¹⁰ Information based on "Experiences and Future Strategies in Agricultural Extension in Ghana" by Mr. C.W. Hong, presented at the workshop.

¹¹ The surveys were done by the CFS and M&E departments of VORADEP.

- * increase in the number of farmers receiving advice and thus, enhanced awareness of recommendations;
- * 45% increased adoption of maize HYVs;
- * 38% increase in fertilizer application;
- * 31% increase in correct planting time; and
- * 19% increase in good weeding practices.

The lessons from Global 2000 are:

- * Learning by doing works;
- * Availability of necessary inputs is crucial for technology adoption; and
- * Small-scale farmers must have access to credit facilities or they cannot adopt, no matter how good the technologies are.

Despite the increase in adoption levels, there has not been any significant increase in overall production, due to the non-availability of inputs in time. Ghana's agricultural problems are much broader than can be addressed by extension alone.

Recommendations

T&V together with PTP will be used in the forthcoming Ghana NEP; the following key aspects of the systems will be integrated:

- * T&V: systematic management, regular training and visits, improved research/extension linkages.
- * PTP: active learning; facilitation of farmer adoption through improved access to inputs.

KENYA ¹²**Status at the Commencement of the Project**

A major development at the commencement of the project was the fact that some time prior to the start of the Second Phase of the National Extension Project (NEP II) the Ministry of Agriculture and Livestock (MALD) was re-organized into two ministries, viz. the Ministry of Agriculture and the Ministry of Livestock. Agricultural research was transferred from MALD to the Ministry of Science and Technology. The most serious implication of this re-organization to extension was the manner in which it affected the implementation of the concept of unified extension for crops and livestock. It took some time to sort out the problems arising out of the reorganization of the ministries. The Government of Kenya has recently decided to institute a joint extension service for crops and livestock as a pilot in the Second Phase National Extension Project.

General Description of the Project

The First Phase of the National Extension Project started in 1983 and the second phase began in 1991. The current phase will incorporate various new ideas with a view to overcoming mistakes of the past and consolidating the gains made during phase one ¹³.

Main Crops, Animals, Key Technological Innovations

The present project will continue its work in the mixed farming areas of Kenya and expand coverage to the Arid and Semi-Arid Lands (ASAL) on a pilot basis. Due to the high population growth (greater than 4%), land scarcity and escalating land costs there is increasing pressure on ASAL areas. The ASAL areas experiencing the most pressure are typically those with the highest potential for agricultural production. For the drier areas, the key question will be how to most effectively reach widely dispersed groups of farm families. Other aspects to consider are how to coordinate extension with other agricultural services.

Main Problems

Two major areas for improvement are research/extension linkages and training. Research contact with extension is not given high priority due primarily to financial constraints. It has been suggested that if the extension services require the assistance of the Kenyan Agricultural Research Institute they should pay for it. Active participation of researchers at SMS workshops is not regarded as worthwhile or beneficial to research work. Often SMSs are not strong-enough

¹² Information taken from short memo prepared for the workshop by Messrs. Matmor and N'degwa and augmented with information from Schwartz and Kampen, Agricultural Extension in East Africa, World Bank Technical Paper 164, World Bank, Washington DC, 1992.

¹³ A more detailed account of this given in Schwartz and Kampen, 1992 (ibid.).

partners in the interaction with researchers to gain their interest. This is a result of inadequate training and also affects the efficacy of the fortnightly trainings (FNTs). FNTs are underutilized opportunities and often regarded by the frontline extension staff as not very relevant to field problems. Too little effort is made to develop staff at the village extension worker (VEW) level. This is largely due to the quality and capability of those responsible for conducting fortnightly or regular monthly sessions, viz. the SMSs who are clearly a weak link in the overall system.

Impact/Performance Measures

An assessment of the performance of extension in Kenya has been done by the Bank under the guidance of Professor Evenson of Yale University. The results of this study which will be published by the bank shortly are summarized in chapter 7.

Recommendations and Future Plans

The main goals for NEP II are to further strengthen crop-oriented extension, address livestock extension, develop an extension system for the ASAL, strengthen REL, improve donor coordination and develop possibilities for cooperation with the separate extension services being provided by the private sector.

MADAGASCAR ¹⁴

Status at the Commencement of the Project

Extension was characterized by vertically-integrated commodity-oriented strategies through the 1960s and 1970s with massive inputs of transportation, expatriate support, special staff benefits at the national level, and subsidized inputs and agricultural credit at the farmer level. Following the decline of external support for the commodity-based organizations, research efforts also declined.

General Description of the Project

In 1985, a professional extension system modelled on T&V was introduced in Madagascar in 2 districts under the Operation Developpement Rurale (ODR) project. Early ODR extension efforts were not successful due to a focus on contact farmers which was not in conformity with the local custom of working in groups. In 1987, a pilot extension project was launched (with Bank support) covering 3 districts under the Agricultural Institutions Project (AIP). The 1987 pilot concentrated on rice production in the Highlands. Specific problem areas were identified based on surveys at the outset of the pilot ¹⁵. The project started working with already-established groups of farmers oriented toward specific objectives. Farmers participated in on-farm trials on numerous off-season crops.

The main feature of the National Agricultural Extension Program and (NEP) is that it addresses the whole farm enterprise and is not commodity-based. It utilizes structured work plans with informal contact groups. In NEP districts, VEWs cover 300-500 farmers broken into 10-14 groups. Systematic and regular visits are made to 1-3 contact groups per day, 7 days every fortnight. The major extension tools are demonstrations and on-farm trials. The NEP includes the regular training of extension staff and SMSs, monitoring and evaluation of the work plan and explicit linkages with research.

Research was long-neglected in Madagascar but is now being supported under agricultural research projects funded by multiple donors. NARS has been generally staffed with inadequately-trained personnel. There are very few advanced degree holders. Recently-formalized research/extension linkages cover: diagnosis of farming situations and constraints; design and analysis of on-farm extension trials; trouble-shooting; participation of researchers in monthly workshops.

¹⁴ Information taken from "Agricultural Extension Experiences in Madagascar" by T. Bredero (1991) as presented at the workshop.

¹⁵ This is a good example. The traditional messages were being rejected for sound economic reasons. Therefore, the survey identified areas where work could be done to overcome these obstacles versus "forcing" the inappropriate message. (Ed.)

Main Crops, Animals, Key Technological Innovations

The resource base for farmers is a critical issue. There are 1.5 million subsistence smallholders in the 1-2 ha range. Less than 5% of arable land area is cultivated and 80% is pasture for cattle. Beef cattle are a very important product providing 16% of the agricultural GDP.

The staple food is rice which provides 30% of agricultural value-added and is grown on more than half of all cultivated land. Most farmers use traditional methods and 100,000 hectares are irrigated. Till 1974, Madagascar was self-sufficient in rice production with small exports. After 1974 there were net imports of rice - peaking in 1982. Market deregulation and improved producer services (including extension) led to increased production and self-sufficiency in the 1990's. Other main food crops are tubers followed by maize.

The main exports are sugar and cotton, coffee, cloves, vanilla and pepper. Problems related to coffee are low producer prices; over-taxation by government; monopolistic parastatal marketing system; and serious quality decline.

The main technologies focused on by the project are:

- * Cultivation of upland crops;
- * Soil conservation and watershed protection;
- * Off-season crops to be grown on the bottom-lands (wheat barley, potatoes, vegetables); and
- * Communal seed production.

Main Problems/Weaknesses

Early extension efforts lacked vision on how to organize farmers' groups. There was a lack of technical recommendations other than for lowland rice.

Impact/Performance Measures

- * Farmers have been stimulated by the on-farm trials.
- * Field staff morale improved as they began to feel more "wanted" by the farmers.
- * Better extension has had a visible impact on increased rice production.

Recommendations

- * **Upgrade pre-service training to allow field staff to fully benefit from in-service training. Key areas to focus on are: soil science; plant production; plant-water interaction; animal production; applied agronomy and farm management; skills in communication and dialogue with and within groups; and the use of practical demonstration methods.**
- * **Emphasize diagnostic skills: diagnosis of crops, valley systems and farming situations; preparation, observation and interpretation of on-farm trials and demonstrations.**
- * **Train trainers to pass on their technical expertise.**

Other Points of Interest

During the mid-1980s the government changed its policies and moved towards less intervention and liberalized markets. Following liberalization, local entrepreneurs started agro-processing and marketing businesses. Many have their own farmer servicing systems including supplies of inputs, extension and marketing services. It is a small but growing sector.

MALAWI ¹⁶**Status at the Commencement of the Project**

Extension services in Malawi have evolved from a focus on individual visits to a group visit method. The formation of groups was not planned but developed in areas and communities where there was an expressed demand for information or some special activity (such as strip cropping groups which practiced communal crop rotation and improved practices together or seasonal credit groups). In 1981, the Government of Malawi (GOM) decided to officially emphasize and expand the group method to reach a larger number of smallholders. The essence of the approach was to organize groups of farmers to work with a field assistant (FA) every fortnight at a demonstration plot to learn about improved practices. FAs would follow-up with visits to farmers' fields. The poor performance of this system led the GOM in 1986 to request Bank assistance in assessing the weaknesses of the extension system.

Major problems discovered during a 1987 mission were: most farmers attending the demonstration plot sessions were those with access to credit (80 -85% of farmers without credit access were left out); FAs play a major role in the credit system and have limited time for other work; follow-up visits were not organized and often not carried out; and very little supervision from extension management at all, levels to FAs on farmers fields. In terms of training, fortnightly sessions to upgrade FAs' technical knowledge tended to focus on administrative and organizational matters technical subjects; and SMSs have limited involvement in training due to scheduling problems. The need for area-specific recommendations and improved research/extension interaction was keenly felt.

General Description of the Project

Following the assessment of weaknesses in the system, recommendations for improvement were made and a pilot project started in the 1987-88 season covering two Extension Planning Areas (EPAs). During 1988/89 the coverage of the pilot project was expanded to cover 18 additional EPAs. During the 1990/91 season the program had gone into a national phase to cover 90% of the EPAs in the country.

Main Problems

After the first years of the project the following problems have emerged: lack of commitment by some staff members (especially at the level of the Agricultural Development Block headquarters; front-line extension staff pre-occupied by duties other than information supply (such as credit club management, credit recovery, and data collection work); irregularity and poor quality of fortnightly /monthly in-service training; poor visiting and supervising records of field staff to farmers and management to field staff, respectively; weak research/extension

¹⁶ Information taken from "Agricultural Extension: The Malawi Experience" by Francis W. M'buka (1991) as presented to the workshop.

linkages; lack of adequate mobility of staff (due to delays in vehicle procurement, etc.); inadequate recurrent funds for training and supervisory activities; and delays in preparation and processing at HQ which slows release of funds. More monitoring and evaluation is required to assess the quality of performance and impact of extension work. Finally, the Global 2000 project which issues free fertilizer to farmers who would plant a demonstration garden tends to spread a message that farmers cannot afford fertilizers unless they are supplied free; and this is contrary to the T&V focus on low-cost cultural practices.

Impact

Some of the key achievements under the Bank-supported extension program are:

- * Field Assistants (FA's) are beginning to make regular visits to farmers according to the shared visitation schedule with contact farmers.
- * Demonstrations plots are done both on large and small scale to address specific, localized problems.
- * In some areas, FAs feel more confident that they are meeting the needs of farmers under the new system.
- * Farmers appreciate the idea of mini-plots to try out recommendations on a small scale. Yields on the mini-plots show significant increases compared to regular fields ¹⁷.

¹⁷ No specific information was given on what level of increase, what crop, what the specific causes were and so on. (Ed.)

MALI¹⁸**General Description of the Project**

In 1988/89, a World Bank-supported pilot project was started as part of the effort to improve the effectiveness of extension services in Mali. The project objectives included: regular training, stronger links between research and extension, integration of farming and livestock raising activities, and professionalization extension field work. The research extension linkage was one of the weak points during the first two years of the program and in the third year, on-farm research was expanded. The pilot project has a three-tier organization: national, regional, field-level. The project will include strengthening the resources of the extension system. The Government proposes to implement a National Extension Project (NEP) and this is currently being negotiated.

The methodology of the pilot project incorporates on-going regular training of managers and field staff. This includes annual and monthly workshops, and fortnightly training sessions. There have also been inter-regional visits by extension agents and farmers (within the country and regionally, e.g., to Burkina Faso). The other key aspects of the project include: regular supervision; follow-up and evaluation; technical support through SMSs; and focussed job descriptions which relate only to extension. There has also been an active involvement of village associations which helps to raise the awareness level of farmers and organize contact groups. The National Project, which will be based on the same principles as under the pilot, should provide resources to strengthen the National Agriculture Directorate and NARS to enable these agencies to become more involved in coordinating extension activities in the project areas.

Main Crops, Animals, Key Technological Innovations

Areas being studied by on-farm research are:

- * Striga;
- * Millet/cowpea inter-cropping;
- * Varietal testing with short- and intermediate-cycle millet and rice;
- * Manure testing to find optimum dosage; and
- * Integrated farming and livestock-raising systems.

Main Problems

Follow-up and evaluation achievements remain modest even though staff have participated in the annual regional workshops on M&E arranged by the Bank.

¹⁸

No indication given regarding the writer of the report.

Impact

The improvement in extension services, the involvement of the farmers' organizations and the tailoring of the approach to local conditions contributed to an increased farmer participation rate. All the farmers involved are enthusiastic and satisfied. The field staff are "pleased with their work" because they have better training and are better organized professionally. The regional development organizations are impressed with the "visible results" and are increasing their participation.

Other Points of Interest

- * An environmental protection component during the third year of the program focussed on introducing green manure, nitrogen-fixing tree crop and working on soil and water conservation methods.

NIGERIA

Status at the Commencement of the Project

From the mid-1970s to 1986, extension services were organized under the Agricultural Development Projects (ADP), with farmer to agent ratios along the order of 1:600 - 1:300. Despite these relatively low ratios, adoption rates were slow and yield increases were low. Two key reasons for this poor growth record were: shortage of well-trained extension agents; and lack of adequate technical messages for the mixed cropping system common to most farmers. The World Bank mission to some of the ADPs in 1986 concluded that extension services should be reviewed and efforts redirected to overcome their weaknesses.

Time Frame and General Description of the Project

The pilot phase involved the reorganization of the extension system in four representative ADPs. During the pilot phase, work was also done on ensuring that the linkages with research were functioning. Achievements of the pilot phase were: improved morale among extension staff; progress towards establishing fixed visit schedules for extension agents (EAs) and contact farm families per farmer group; and regular holding of monthly technology review meetings (MTRMs) between research and extension. In addition, numerous specific constraints to improving extension were identified. Between 1989 and 1990, other states introduced extension reforms.

Main Crops, Animals, Key Technological Innovations

The recommendations for improving agriculture are broken down by agroclimatic zones. Some of the key technical issues addressed by the project include land preparation, planting densities, diffusion of improved varieties, proper application of fertilizers, and processing and storage of crops.

Research/Extension Linkages

In Nigeria, the T&V approach has been blended with Farming Systems Research which has led to the widespread adoption of some technologies, particularly improved cassava varieties. In terms of organization, two to five ADPs are linked up to one National Food Crops Research Institute which is charged with the responsibility of providing research and training back up to the ADPs, in collaboration with the other neighboring research and training agencies, including the Universities. Each ADP has an on-farm adaptive research team and monthly technology review meetings. The continuum of coordinated research and extension activities include: surveys of farmer practices, their environment and constraints, prioritization of problems for solution, on-farm research to test and adapt new technologies, formulation of production recommendations, diffusion of information through small demonstration plots, and relaying of feedback from farmers back into the research process.

Impact

In the absence of detailed field surveys to estimate the adoption rates for various technologies, judgement on impact and performance are based on a mid-term review, other non-quantitative information and some components of the survey data of the M&E units.

Through the joint efforts of research and extension, a number of appropriate technologies are being generated, developed and extended to farmers. These efforts have resulted in over 80% of farmers being reached by extension within the last four years in most states. Yields of some major crops (e.g., rice) and crop mixtures (cassava intercropped with maize) have increased by over 50% through the dissemination of improved varieties. Resource-poor farmers have been able to generate more cash income through the adoption of new technologies than they were getting four years ago.

In terms of sustainability of the extension projects undertaken, no comprehensive evaluation has been made. Some positive indicators have been: strengthening of research/extension linkages; efforts to improve the availability of required production inputs; and the existence of a large number of small demonstration plots using relevant technologies on farmers' fields.

Recommendations

- * Efforts should be made to implement the unification of extension services, which has been recommended by the Federal Government for all the ADPs.
- * Research on the identification of relevant technologies for the different agro-ecological zones and resource situations should be continued.
- * Increase focus on women farmers, improve (regular and in-service) training, develop standard parameters for measurement of performance.
- * Seek ways of using the mass media for extension.
- * Integrate support for agro-processing industries into the extension program.
- * Develop extension on irrigated topics.
- * Train farm families in financial management.

SENEGAL ¹⁹**Status at the Commencement of the Project**

The most important aspect of the agriculture scene has been the groundnut basin where the major crops are groundnuts and millet; and the minor crops sorghum, maize and cowpeas. Livestock are also an important element in the farming system. Since independence in 1960, substantial efforts have been made to improve groundnut production.

"Minor" innovations have included the use of seed of selected varieties of groundnuts; seed treatment with a fungicide-insecticide mixture; sowing in rows on the right date with correct spacing, depth, and with animal-drawn seed drills; use of animal draught power, use of inorganic fertilizer, harvesting groundnuts with a mechanical lifter. The following "major" innovations have been proposed by research: land improvements (destumping and application of phosphate), heavy fertilization, plowing closely with teams of oxen, crop diversification, and 4-year rotations.

To encourage the spread of the above innovations, an ambitious "agricultural program" was undertaken which included the provision of credit, fertilizer, agricultural equipment, and extension. Public sector marketing and input supply institutions were set up for groundnuts. The result was a drastic change in cultivation techniques, and the replacement in less than 20 years of manual by mechanical production techniques. Many of the "minor" innovations were adopted but often the "major" were not. After the demise of the "agricultural program", changes in economic and climatic conditions have led to the need to re-examine the technical recommendations and to develop more labor-intensive, low-input intensive technologies. The main constraints to farmer adoption of innovations have been the requirement to purchase inputs which are either expensive or unavailable.

The extension service at the outset of the project, in 1987, was split between no less than five ministries, six regional development agencies (RDRs), and separate provincial agriculture and livestock organizations in each of the ten administrative regions of the country with little coordination between them. The ministerial and provincial extension services suffered from a lack of funds and immobility and were generally out of touch with farmers. The staff of these bodies often carried out data collection and monitored crop development, and livestock staff focused on vaccination campaigns. The RDRs were dependent on external funding and often had programs that did not fit into any coherent plan at the national level. There were also some 100 NGOs' implementing programs that often included extension, with little monitoring from the government. RDRs focused on input-intensive packages not appropriate for resource-poor farmers. Additionally, the absence of rules at the national level regarding staff allowances led to instability as staff tended to gravitate towards projects paying higher salaries.

¹⁹ Information taken from "Senegal: Experience with T&V Extension." (1991) by Mr. Franz Schorosch and presented at the workshop.

Research, carried out by the Senegalese Agricultural Research Institute (ISRA), had poor linkages with extension and was heavily oriented toward plant breeding. In addition, research on food crops, cereals and legumes, focused on high input packages. Crop specific orientation diverted the attention of the researchers from farming systems issues such as mixed-cropping, anti-erosion measures and so on. Finally, little emphasis was given to developing adaptive research programs based on a diagnosis in the field with farmers and extension agents, using on-farm trials. In the case of livestock, although significant progress has been made in terms of disease control and vaccine development and production, more needs to be done to transfer and integrate research findings into the current production systems. Despite its shortcomings, ISRA has generated many useful agricultural technologies, especially drought-resistant varieties to compensate for climatic changes (short rainy seasons).

General Description of the Project

The Bank-supported extension reforms in Senegal began in 1987 with a pilot extension project (PAGRI) involving three RDRs and ISRA in specific agro-ecological zones. During 1988 and 1989 about 100 field-level staff participated in the first year pilot program. Unfortunately neither the Department of Agriculture (DA) nor the Département de l'Élevage (DE) were included in the first year of the pilot program. A full-fledged national extension project (PNVA) became effective in 1990. The PNVA focuses on strengthening the DA and DE versus the RDRs. In addition to strengthening crop and livestock extension service, the PNVA will: strengthen producer organizations through training their leaders (including literacy training); and strengthen the analytical capacity of the Ministry of Rural Development through training and short-term consultancies in policy formulation, project preparation, appraisal and performance monitoring.

The PNVA will cover some 50% of Senegal's geographical area and some 60% of the farming population after the first 4-year phase. The project concentrates on zones where there has been little previous extension effort. Village extension workers under the project were about 200 during the first year and will number 530 at the end of Phase one. There will be no incremental addition of field staff under the project. In fact, reductions will be made in field staff from the RDRs.

Researchers participate in SMS workshops and research/extension linkages vary in quality depending on the research center. It has taken time under the pilot project and PNVA to clarify both administrative and incentive questions related to research/extension interaction (at the SMS and field levels). Identification of suitable SMSs has also taken time. However, wherever there are ISRA farming systems research teams, much collaborative work has already been done and joint surveys or diagnostic studies have been easily organized.

Main Crops, Animals, Key Technological Innovations

The innovations being emphasized by the project focus on improved husbandry and also cover the wider aspects of soil fertility improvement, soil erosion control, crop diversification,

integration of agriculture and livestock, agro-forestry and introduction of appropriate equipment. Promising new varieties and many research results developed by ISRA require testing under farm conditions. Technologies being introduced are not of the "green revolution" caliber. They have limited applicability in terms of agroclimates and numerous improvements must be made by farmers in order to increase the agricultural growth rate. Hence, it is important for extension to promote overall improvement in farm management skills.

Main Problems

The project is still in its early phases and has no major problems. However, one element interfering with the development of the national extension system is the constant institutional change in the agriculture and natural resources sector. Changes in other elements such as education, agricultural policy, "governance", NGO and farmers association activities affect the progress of the project. These changes in and of themselves are not problems but they do affect the project.

Impact

There is as yet no quantitative data on the repeated adoption and diffusion of technologies. However, a survey is being carried out by the PNVA monitoring unit in an area of the groundnut basin and results are expected by March 1991. However, field observation indicates that certain technologies are being widely tried out, particularly seedbed management in vegetable growing areas. Also, a review of the regional technical recommendations shows that they are evolving to fit local circumstances. Some extension messages are spreading across whole farming communities such as rice transplanting in line, and seedbed management.

Overall, PNVA is doing a better job of reaching farmers than the previous extension efforts. A review of extension agents' work programs for 1988 to 1990 shows that extension agents' number of contact groups has sometimes doubled or tripled. However, there is still much scope for improvement as senior managers become more accomplished.

The most successful new techniques/technologies include: setting aside of special plots for seed; better management of nurseries; greater attention to optimal plant density (seed treatment, spacing, planting in line and so on); better-adapted seed drill for millet; "reintroduction" of organic manure; thinning of millet by hand; rational use of water, fertilizer, and phytosanitary products in vegetable growing; and soil conservation measures. Farmers are being encouraged to experiment.

Recommendations

As PNVA was only started in July 1990, it is premature to propose specific future plans. However a few ideas are listed below:

- * **In the early years of PNVA, focus on DA and DE to strengthen them as professional organizations; the key point is to get the basic elements of PNVA working before new elements are added.**
- * **Eventually merge DA and DE as well as water and soil-conservation departments.**
- * **Encourage coordination, with pressure from the outside, between public extension, NGOs and regional donor-supported projects; PNVA should play the role of a catalyst, clearing house role in regard to NGOs and other projects.**
- * **As PNVA matures it should expand its range of activities to include collaboration with credit and input suppliers, and marketing.**
- * **Review the education system and its capacity to support agricultural development.**
- * **Take concrete measures to give farmers a greater say in running extension to increase the responsiveness of PNVA.**
- * **Increasingly focus on personnel management in the extension service.**

SUDAN²⁰**Status at the Commencement of the Project**

In the Sudan, during the 1960s a network of regional research stations was established under the Agricultural Research Corporation (ARC). However, ARC did not have the power to oversee the national program and to implement projects. This has led to a lack of input into the research and extension agenda by government planners and policy makers and resulted in a piece-meal approach by the research implementing agencies. Technology transfer activities were limited mainly to provision of supplies and services through the inspectorate system of the Agricultural Production Corporations.

General Description of the Project

In 1986 T&V was introduced under the Agricultural Research, Extension and Training Project. In the Sudan 4.5 million hectares of irrigated land are managed by 9 agricultural parastatals. T&V has been introduced in two of these: Rahad and New Halfa. The major objective of the extension aspect of the project was to convert the regulatory system of inspections into a professional extension service using T&V principles. One modification has been the introduction of "village days" where extension staff work on promoting community development - hygiene, literacy, village sanitation and so on.

The key research/extension linkage mechanisms under the project are: monthly field days; monthly workshops and training sessions; and joint participation in on-farm trials.

Main Crops, Animals, Key Technological Innovations

- * Sorghum was introduced in 1987 - now nearly 30% planted with these varieties.
- * Over 60% farmers have adopted recommended planting dates.
- * 30 percent practice ridging in groundnuts.
- * Cotton: 90% plant on recommended date; 70% accepted thinning; in 90% of sown area early picking is up and short furrows are replacing long.
- * Wheat introduced last year (in Rahad) now 10% of farmers have adopted the full package.
- * Horticultural crops increasing and private forestry has begun.

²⁰ Information taken from a memo by Mr. Satish Kumar, and augmented with information from Schwartz and Kampen, 1992 (op. cit.).

Main Problems

A key problem has been training and orientation of extension staff, scientists and others participating in the program. Because of this the transition has been slow.

Impact/Performance Measures

The project has had moderate impact. One accomplishment has been that extension is now being seen as an effective tool for taking technology to tenants for securing increases in production. Second, adoption of innovations is increasing.

Recommendations and Future Plans

- * Strengthen and "optimize" extension "machinery" considering costs and benefits.
- * Introduce commercial crops now under adaptive trials and promote livestock development.
- * Invest in infrastructural development and manpower training and orientation.
- * Land tenure reform is needed to move away from the parastatal system.

A follow-up project, the Agricultural Technology and Training Project (AGTECH) is being planned which will provide support for both agricultural research and extension services in irrigated and rainfed areas in the context of a reinforced national organization responsible for all publicly financed agricultural research. This proposed project will also include involvement of the agricultural universities in agricultural research and training.

TANZANIA²¹**Status at the Commencement of the Project**

The rural population undertake four categories of small-scale farming: household plots for subsistence, block farms made up of individual plots managed by village authorities, village communal plots, and private holdings away from the home. Historically, extension services consisted mainly of occasional campaigns combined with individual visits focusing on recommended management practices, sometimes involving a package including purchased inputs. Use of manure from livestock corrals is limited and often confined to homestead plots. The majority of farmers use traditional husbandry practices due to poor supply of appropriate recommendations by extension, cash flow difficulties and lack of credit, unavailability of inputs due to weak marketing infrastructure. Technologies based on high yielding genotypes of crops and livestock and research station trials usually require a level of management and inputs which are not beyond the resource poor farmers.

The extension service has been operated as a general agricultural service including handling of inputs, credit supervision, administration of veterinary services, data collection, report writing and so on. Even these "extension" activities in due course dwindled to a very low level due to shortage of funds and transportation. The shortage of resources was accentuated by the existence of two parallel extension services, one for livestock and one for crops. The quality of extension messages also suffered due to a lack of regular training and poor supervision, and weak linkages with research. While in-service training handled by the Ministry provided an opportunity for career development, there was no organized and regular retraining program.

Interaction between extension and research before the introduction of T&V consisted primarily of annual research coordination committee meetings which brought together principal researchers and senior extension officers. In these meetings extension has been typically passive and most research recommendations required the use of purchased inputs. Research activities were spread over four autonomous parastatals with overlapping mandates which have been competing for limited resources. Collaborative activities with extension, including monitoring of technology adoption, have been minimal. Interaction between research and extension could be seen only in some donor-supported FSR programs which guarantee transportation and additional operating funds.

General Description of the Project

In 1977, under the Rural Integrated Development Project the T&V system was introduced in Mwanza and Shinyanga regions funded by IDA and in Tanga funded by FRG. When external

²¹ Information taken from "The Training and Visit Approach to Agricultural Extension in Tanzania" by D. Sungusia (1991) as presented at the workshop.

support ended, local resources were not sufficient to sustain T&V. In 1987/1988 a project was launched on a pilot scale in five districts covering 50,000 farm families organized into 6,500 groups, working with 105 village extension workers. The pilot project was initiated prematurely, before procurement of vehicles. The first phase of the National Project became effective in July 1989 and would implement T&V in 12 regions of Tanzania over a period of 8 years. Currently T&V has been started in 9 regions. Coverage is approximately 1:1000 or 1 VEW for 2 villages. The cost is a total of US\$30.4 million which includes US\$11.2 million for recurrent expenses.

The main methodology has been to deliver extension messages to contact groups and to demonstrate new techniques on small plots. Messages are adapted to the production systems, cash flows, and access to labor of small farmers.

Main Crops, Animals, Key Technological Innovations

T&V has been introduced in three areas: semi-arid central Tanzania, parts of the western plateau, and the highlands in the north and west.

- * Semi-arid lands: predominant land use is agropastoralism; major crops were identified by a research and planning workshop, as sorghum, groundnuts, sunflower; extension messages for these indigenous cattle were developed. A training program to be coordinated with the cropping and livestock calendar has been planned.
- * In the Western plateau, messages focus on maize, tobacco, cotton and sedentary/semi-sedentary grazing. For all crops except tobacco, which has a full package of recommendations including inputs, messages are simple (density, row planting, tillage and post-harvest storage, dry-season forage conservation and disease prevention).
- * In the highlands, messages focus on permanent cultivation and inter-cropping of coffee, bananas, beans, maize and sedentary livestock rearing and dairy. The need to stratify farmers in this zone according to income levels has emerged as the next step to fine tuning the technology to match access to resources.

Main Problems

A key problem is the lack of appropriate crop-oriented messages for resource-poor farmers. Additionally, livestock messages are not well-focussed. Typically, interventions involve calf rearing, housing, forage conservation, and disease prevention/control for indigenous cattle. Use of corral manure has not increased much due to fields being away from homesteads.

Impact

No quantitative measurement of extension performance is possible as the project has started only recently. However, it is reported that the small demonstration plots have been effective in gaining farmers' confidence in extension recommendations. The majority of contact groups (6,500 groups under the pilot program) have set targets of 1 acre (0.4 hectares) to try the recommendations which, for the most part, do not require purchased inputs.

Recommendations

- * **Fine-tune the organizational structure for extension so that only a critical mass of SMSs are retained at the district and regional offices.**
- * **Develop pre-service and in-service training syllabi. Focus on general agriculture, diagnostic skills, and farm management for which training is often not sufficient, even for diploma candidates.**
- * **Bring the benefits of research on environmental protection and sustainability of the farming system to the farm level.**
- * **Develop appropriate interventions for pastoral systems in the context of land tenure and socio-cultural considerations.**
- * **Improve the marketing system to overcome some of the causes of non-adoption of cash inputs. Promote farmers groups for the purpose of credit and input supply.**
- * **Formalize linkages between research and extension and extend them to other services, especially marketing, input supply and credit.**

ZAIRE²²**Status at the Commencement of the Project**

After independence and prior to the establishment of the Service National de Vulgarisation (SNV) extension services State personnel had low pay, were poorly trained, lacked supervision and equipment. Public extension in general lacked technical messages to disseminate in part due to weak linkages with research. Their main objective was to enforce minimum crop area planting requirements, and collection of taxes. Private enterprises dealt with cotton, tobacco, coffee, sugar and other major cash crops. A wide diversity of NGOs also reached farmers, using different methodologies and each pursuing objectives based on its own philosophy. NGOs generally worked on their own with a minimum of coordination with each other.

In 1987 Government began to consider how to improve extension services. This led to the creation of SNV in 1989 with the following objectives:

- * Coordination between different extension organizations and between extension and research.
- * Harmonization of methods used in the field, primarily through application of T&V principles.
- * Providing technical and material support to the extension agencies including: regular organized training, dispatching of equipment, payment of allowances for field work, and establishment of trial plots on farmers' fields in coordination with research.

General Description of the Project

Under the project, the basic T&V approach has been adapted in the following ways.

- * The SNV itself is not the executing agency in the field. To avoid duplication of staff and a bloated bureaucracy, the SNV takes the existing structures as partners, who are invited to adjust their organizational structure and methodologies in accordance with the National Extension Policy and to coordinate their activities so that farmers receive only one extension agent. After the agreement to work with SNV is made, SNV and the implementing organization develops a shared budget: SNV is usually responsible for equipment and recurrent costs including allowances. This approach has proved to be efficient in the Zairian context.

²² Information taken from a field report by Mr. J Weetjens (RMZ) presented at the workshop.

- * Because of long-distance fortnightly training is often reduced to bi-weekly training. In some low-density population areas, farmer to agent ratios are as high as 1:250-450 families.

Main Problems

- * Government funding release has been limited and sporadic which has an adverse affect on staff morale. Funding release may be a problem even though the budget allocation is at a record high.²³
- * Some of the implementing agencies are the state extension services which are heavily politicized complicating the introduction of new approaches to extension.
- * Research is still very weak and not able to provide new technical innovations to extension for dissemination.
- * Often a lack of access to markets, for example due to deterioration in feeder roads, acts as a disincentive to farmers for adopting new technologies.

Impact

After almost two years, the SNU reaches about 276,000 farmers families' in 7 different pilot areas, representing almost 10% of total farm families in Zaire. 1,500 staff at all levels have been trained and now have a working schedule set up according to T&V principles. Farmers in all the pilot areas express satisfaction with the changes in extension services under the project -- especially the decreased emphasis on tax collection.

Early achievements include:

- * improvement of work ethic among extension staff due to introduction of clear job description, training, supervision, and provision of equipment and modest allowances;
- * introduction of simple technical themes such as seed selection, seeding density, time of planting, and weeding which allow farmers to increased production by 25-50% and/or introduction of use of inputs (seed, fertilizers, and insecticides) which lead to increases of 100 - 200%;

²³ Funds for 1991 have increased significantly (more than six times the 1990 budget) making the SNU the public agriculture sector with the largest budget.

- * figures on adoption rates are not available; however, farmers in the pilot areas report that they have adopted last years' technical themes and are eager to show the results on their fields during supervision visits;
- * reduction of visits of extension staff from different organizations to one farmer.

Recommendations

A number of pressing issues are the focus of future plans for the Service National de Vulgarisation (SNU):

- * Need to improve field staff motivation.
- * A feeder road project to ensure that farmers are able to market their increased produce and profit from adopting innovations.
- * Need to increase emphasis on agro-forestry issues under the Bank-supported Forest and Environment Project to overcome problems of deforestation and degradation of soil fertility.