Agricultural Extension in East Africa

Lisa A. Schwartz and Jacob Kampen
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Lisa A. Schwartz and Jacob Kampen
FOREWORD

This report offers a candid assessment of current problems and provides constructive suggestions for improvements in agricultural extension in East Africa. Drawing heavily on the field experience of Bank staff and outside specialists, the report underscores the importance of a comprehensive framework for accelerating technology development in East Africa. Such a framework should address key medium to longer-term issues such as: plurality and sustainability of extension systems; greater involvement of farmers, particularly women farmers; increased sophistication of farmer needs; use of modern communication systems; multi-sectoral dimensions of extension; collaboration between research and extension systems; and the importance of technical skill development.

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<tr>
<td>AFDB</td>
<td>African Development Bank</td>
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<tr>
<td>AFMET</td>
<td>Agricultural and Farm Management Training Project</td>
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<td>AGTECHP</td>
<td>Agricultural Technology and Training Project</td>
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<td>ARETP</td>
<td>Agricultural Research Extension and Training Project</td>
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<td>ARP</td>
<td>Agricultural Research Project</td>
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<td>ARPT</td>
<td>Adaptive Research Planning Teams</td>
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<td>ASAL</td>
<td>Arid and Semi-Arid Lands</td>
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<td>CADU</td>
<td>Chilalo Agricultural Development Unit</td>
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<td>FLDP</td>
<td>Fourth Livestock Development Project</td>
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<td>FSC</td>
<td>Farmer Service Center</td>
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<td>FTC</td>
<td>Farmer Training Center</td>
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<td>IARC</td>
<td>International Agricultural Research Center</td>
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<td>IDA</td>
<td>International Development Association</td>
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<td>IFAD</td>
<td>International Fund for Agricultural Development</td>
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<tr>
<td>KARI</td>
<td>Kenya Agricultural Research Institute</td>
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<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
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<tr>
<td>MOLD</td>
<td>Ministry of Livestock Development</td>
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<tr>
<td>NARS</td>
<td>National Agricultural Research System</td>
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<td>NEP</td>
<td>National Extension Project</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>PADEP</td>
<td>Peasant Agricultural Development Project</td>
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<tr>
<td>RELC</td>
<td>Research Extension Linkage Committee</td>
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<tr>
<td>SIDA</td>
<td>Swedish International Development Agency</td>
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<tr>
<td>SMS</td>
<td>Subject Matter Specialists</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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EXECUTIVE SUMMARY

This report reviews the status of agricultural extension in AF2 countries (Ethiopia, Kenya, Mauritius, Somalia, Sudan and Uganda). While significant progress has been achieved in Kenya and Mauritius, internal strife in the other countries has held back major efforts to strengthen the role and performance of agricultural extension. The review attempts to draw lessons from the experience gained so far and explores the key issues that need to be resolved during the design and implementation of future extension projects in East Africa. Major conclusions of this report are:

- A national extension system should reflect different strategies to meet the needs of various agroclimates and farmers (this is referred to as “pluralism”).

- Alternatives to exclusively government-funded extension services must be found.

- In order to expand coverage, field extension staff should place much greater emphasis on providing services to groups of farmers.

- Farmers need to be closely involved in selecting, supporting and evaluating extension staff.

- As communications and transportation infrastructure improve farmers will be less dependent on direct contact with extension staff for new technologies and practices.

- The need for specialized advice on new technology requires better trained extension staff.

- Linkages with the research community and academic institutions need to be reinforced through appropriate incentives for collaboration.

- Agricultural colleges and training institutes should strengthen curricula in the areas of extension management, diagnostic studies, on-farm economics, and the use of media.

- The issue of gender should be brought into the mainstream of adaptive research and extension projects.

- Extension for resource-poor farmers must be reinforced by providing advice on nonfarm rural activities that can increase household income.

- Agricultural research extension and training mutually reinforce each other; therefore, support for strengthening these programs through Bank projects therefore must be closely coordinated.

Action on these conclusions would address the key limiting factors of World Bank-supported agricultural extension projects (or components):

- Unclear national objectives for extension.

- Unsustainable financing and unreliable financial management.

- Extension systems insufficiently tailored to different conditions.
- A lack of coordination between institutions implementing extension programs.
- Weak management and support of human resources.
- Minimal farmer participation in designing and managing extension programs.
- A lack of attention to the needs of women farmers.
- Inadequate links between research and extension.
- A lack of appropriate technologies particularly in difficult environments.
- Poorly supported educational institutions leading to inadequate extension staff training.
- A shortage of experienced subject matter specialists and weak in-service training.
- Poor coordination between extension services, supply of inputs, and market access.
- Monitoring and evaluation systems not being in place or not functioning effectively.
- Extension efforts being often disrupted by civil disturbances.

The objectives of extension must be clear in order to design an appropriate extension strategy. Whether these objectives are set "at the top" by governments and donors or "bottom-up" through a dialogue with farmers is a point of debate. Ideally, grass roots participation in the policy-dialogue should be married with national level decision-making. In whatever way extension policy is decided, the organization and management of the extension system influences its effectiveness and sustainability. As budgets for extension are under pressure, a key challenge for policymakers is to identify alternatives to government funding, such as contributions from: agricultural parastatals, private corporations (for example, agro-processing companies), local banks, cooperatives, export cesses, levies on imported inputs, and farmers' organizations. Private extension services are sometimes appropriate for specialized farmers or livestock producers and can cut the costs of public extension systems. However, the private sector has little incentive to carry out the social welfare aspects of extension, so both public and private extension services are needed and should complement each other.

Staff size, supervision, support and training are critical human resource management issues. The desirable size of field staff differs according to circumstances including available financial resources. Staff increases should not be accepted until all possibilities of using existing manpower more efficiently have been exploited. Some methods for extending coverage are working with groups, using the media to raise awareness, and providing training at Farmer Training and/or Service Centers. Supervision can be strengthened through management training workshops and increased staff involvement. In addition to reasonable salaries, staff need transport and housing; consideration should be given to sharing the latter costs with clients.

The report recommends improving the links between research and extension by:

- Developing mechanisms to bring together the disparate players involved in research, extension and farming on a regular basis.
• Improving the responsiveness of national and regional research centers to actual farmer needs.

• Providing research and extension staff with both the communication skills and the incentives to improve the two-way flow of information; for example, by making participation in joint courses, on-station trials, and meetings count toward promotions.

• Expanding adaptive research activities to bring researchers and extensionists in closer contact with farmers.

• Increasing training of extensionists and researchers in adaptive research skills.

• Strengthening attention to evolve messages for poor farmers.

Some additional suggestions to improve the relevance of adaptive research are:

• Develop the capacity to incorporate techniques from indigenous farming systems.

• Involve farmers and extension staff directly in on-farm trials (taking care not to exclude women farmers).

• Incorporate the economic implications of recommendations in extension advice.

• Use subject matter specialists as technical backstoppers for adaptive research in addition to their tasks of training extension field staff and supervisors.

The relationship of extension with farmers in Africa tends to be one way and efforts must be directed at improving this linkage. It is especially important to increase extension’s accountability to its clientele. Extension staff should provide farmers with the skills and information they need to be better managers of their own enterprises. In this regard, much emphasis should be placed on extension’s capacity to mobilize and support farmers’ groups and organizations. Extension should facilitate access to inputs and provide marketing advice but not become directly involved in distributing inputs or purchasing output.

To ensure the continued relevance of agricultural and extension education to the actual requirements of extension on the ground, it is essential to foster closer linkages between extension and agricultural colleges, universities, and training institutes. Field staff curricula should increasingly focus on extension management, extension methodology (e.g., how to facilitate participation), diagnostic skills, farm management and marketing, adaptive research methods including on-farm economics, teamwork with research, group discussion techniques and the use of media channels for communication. Institutions providing agricultural education also need to adapt their curricula to prepare some students to enter the private sector in agriculture.

Extension in Africa has often failed to reach resource-poor farmers and current extension strategies do not adequately meet the needs of this group. To make a greater impact on resource-poor farmers, extension must be placed in the context of an overall rural development strategy. Two groups are discussed in detail: women farmers and pastoralists. Efforts to reach these farmers must identify appropriate strategies to contact such groups and develop effective messages for them. Some priorities are information on soil and water conservation, diversification into small-scale intensive
production of cash crops, group credit linked with appropriate training, and advice on opportunities for non-farm employment.

Women, who represent a large share of Africa’s food producers have relatively poor access to productive resources (such as labor and land) or financial assets (such as land title). The gender impact of extension messages often is not considered until negative consequences have taken place. The issue of gender should be brought into the mainstream of design and implementation of extension (and research) projects. All field staff should be trained to consider the implications of technological change on women’s activities within the farming system. Since women farmers have different needs and constraints, male extension staff require special training to understand how to reach them with relevant information. Additionally, the recruitment of female extension agents should be increased.

Pastoralists are difficult to serve because they are remote. A key constraint for pastoralists is a lack of veterinary services and drugs. Pastoral areas need multipurpose extension agents who can act as conduits between herders and government on issues of range management, veterinary services, water needs, and marketing. Interaction with herders near strategic meeting places such as dips, watering holes, and so on, is an effective way to communicate information. As grazing areas become smaller, some previously nomadic pastoralists have begun to cultivate crops. This group urgently needs extension advice in livestock and crop production and in maintenance and conservation of their fragile environment. As in the traditional mixed farming areas, an integrated field extension service (backed up by SMS expertise in different ministries and agencies), is the most efficient option.

It is argued that future extension programs in Africa should include a much greater role for farmers in designing and implementing extension services and in establishing priorities for agricultural research. Farmers, particularly in groups, also need to be involved in supporting and supervising extension field staff. Because much of the interaction between field staff and farmers occurs at the regional and district level, the Regional Research Centers should have the flexibility to attend to local priorities. It is therefore important for donors to recognize the dangers involved in creating rigid national organizations that may inhibit responsiveness to local demands and priorities. The key recommendation is to decentralize extension (and research) systems within a national framework, to encourage local initiative and decision-making while ensuring feedback to the center.

To achieve pluralist, demand-driven extension systems in Africa, it is essential to incorporate flexibility, specificity, participation and sustainability. The main areas for extension decision-makers to target for implementing these ideas are: national extension policy and technical issues (with focus on setting objectives); the organization and management of extension systems (with focus on financing issues and human resource management); and finally, the linkages between extension and farmers and extension and other organizations such as research, educational institutions, agribusiness, and the donor community. Such linkages can probably be most effectively established in the context of "Agricultural Technology" (AGTECH) projects that would reinforce research, extension and training simultaneously. Some progress is being made, for example the very productive Workshop on the Agricultural Services Initiative held in Lilongwe in February 1991, but much further work is needed.
1. INTRODUCTION AND BACKGROUND

1.1 This report reviews the status of agricultural extension in the AF2 countries (Ethiopia, Kenya, Somalia, Sudan, Mauritius and Uganda). The report discusses key problems and makes recommendations on how to make agricultural extension services to small-scale producers in low-income countries more effective, efficient and sustainable. The report is organized as follows. The first section provides background information on extension in the AF2 countries. Many of the constraints to extension activities in the AF2 countries also occur in other developing nations and experience with agricultural extension projects in these six countries illustrates some common problems. The second section discusses objectives and the relation between objectives and extension strategies. Section three describes some problems of organization and management, including financing implementation, human resources and in-service training. Section four addresses linkages with farmers and other organizations. Section five focuses on reaching resource-poor groups, especially women and pastoralists. The concluding section suggests some new extension strategies relevant to AF2 as well as to other African countries. Four annexes review the overall agricultural knowledge system; the history of agricultural extension in Africa; the costs of World Bank-supported extension projects; and some approaches to improve procurement.

Ethiopia

1.2 The Chilalo Agricultural Development Unit (CADU), a comprehensive rural development project, was initiated in 1967 with the support of the Swedish International Development Authority (SIDA). The approach called for diffusing innovations through "model" farmers and focus on small geographic areas, with intensive investment in rural infrastructure, credit, vehicles, and seed multiplication. The first "minimum package" project, supported by IDA, was designed to reach large numbers of farmers with a few innovations (fertilizers, improved varieties and more effective farming practices) by providing advisory services and input distribution points along the roadsides. The second minimum package project provided extension services through farmers' associations. From the mid-eighties, Bank-assisted extension in Ethiopia (and elsewhere in the region) was based on the "Training and Visit" (T&V) model.

1.3 There are three Bank-funded projects with extension components in Ethiopia: the Agricultural Research Project (ARP); the Fourth Livestock Development Project (FLDP); and the First Peasant Agricultural Development Project (PADEP I). The major problems to date have been:

- Inadequate funds for operating costs.
- A shortage of trained subject matter specialists (SMS).
- A fragmented extension program.
- Inadequate supplies of farm implements and other inputs.
- Extension services that bypass female farmers.
- A lack of appropriate technologies.

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1/ The issues presented are drawn from the literature and interviews with development professionals from the World Bank, the United States Agency for International Development (USAID), Cooperative American Relief Everywhere, Michigan State University, the University of California (Berkeley), the Academy for Educational Development, the International Council for Research on Agroforestry, and Development Alternatives Incorporated.

**/ Numbers refer to "Notes" following section 6.
Kenya

1.4 The World Bank and the International Fund for Agricultural Development (IFAD) support the National Extension Project (NEP), which began in 1984. The Kenya Agricultural Research Institute (KARI) has been reconstituted to coordinate all ministries and agencies involved in agricultural research. Kenya invests more than 1% of agricultural gross domestic product in agricultural research (World Bank, 1985, p.93). A follow-up project (NEP II) will continue to support the mixed farming areas and expand coverage to the arid and semi-arid lands (ASAL). Due to population growth, land scarcity, and escalating land costs, farming intensity is increasing in the ASAL; the pressure on the land is higher in those areas that have the greatest potential for agricultural production. In more marginal areas with low population densities, the extension challenge is how to reach widely dispersed livestock producers.

1.5 NEP’s problems have been:

- Weak research-extension linkages.
- Weak extension supervision and management.
- An inadequate focus on women.
- Poor monitoring and evaluation.
- Overstaffing and conflicts between the Ministry of Agriculture (MOA) and the Ministry of Livestock Development (MOLD).

Improvements will require: i) strengthening research and extension linkages (that is, integrating KARI into the technology dissemination system); ii) closer coordination between crop and livestock extension activities; iii) development of an appropriate extension system for the ASAL; iv) cooperation with the private sector; and v) closer donor coordination. Highlights of NEP II are more work with farmer groups, increased use of mass media, and greater focus on women farmers.

Mauritius

1.6 The 1987 Bank-assisted Sugar Industry Project called for a Farmer Service Center Program (FSC) to provide integrated support services (including extension) to smallholders in sugarcane-based cropping systems. Difficulties encountered were:

- An uncoordinated institutional framework leading to duplication of some activities and inattention to others.
- A lack of in-service training for extension workers.
- Insufficient management capacity for farmer visits and technology demonstrations.
- Poor salaries and facilities for field staff.
- A lack of attention to women’s needs.
- Inappropriate curricula at pre-service educational institutions.

An Agricultural Management and Services Project that includes extension for non-sugar crops, has recently been approved. The extension approach being suggested is to expand the capacity of the FSCs to take on responsibility for technical advice on non-sugar crops and livestock.
Somalia

1.7 The 1980 Agricultural and Farm Management Training Project (AFMET I) was funded by the International Development Association (IDA), USAID, and the African Development Bank (AFDB). It introduced the T&V system in 10 of 15 regions. The most serious problems encountered were:

- A weak research base (especially in rainfed areas).
- Confusion among donors on the most appropriate extension methodology, which lead to weak management.
- Poor vehicle maintenance that limited field staff mobility.

1.8 The Somali Ministry of Agriculture has a Directorate of Research that is responsible for establishing links of extension with research stations, project research units, and the Somali National University. In 1987, a second project, was designed: i) to improve extension services; ii) to improve research planning and coordination; and iii) to strengthen research-extension linkages. The Bank-assisted Bay Region Agricultural Development Project intended to initiate a research and extension program and facilitate input supply in rainfed farming areas; although this project has been reasonably successful, a 1984 mid-term review mission was skeptical about expanding extension efforts because the technologies available to assist farmers were considered insufficient.

1.9 Before the recent civil unrest, plans were under way for a National Agricultural Technology and Training Project (AGTECH). This project would focus on the interaction among research, extension, and the Somalia National University; it would also reinforce on-farm research, in-service training, and the dissemination of information to farmers.

Sudan

1.10 Before the late 1980s, technology transfer activities were limited mainly to provision of supplies and services through the top-down "inspectorate" system of the Agricultural Production Corporations in the irrigated areas (World Bank, 1985). Although a network of Regional Research Centers with specific responsibility for technology development was established under the Agricultural Research Corporation in the 1960s, linkages between research and extension remain inadequate. The Agricultural Research Corporation is weak due to frequent staff turnover, lack of continuity in the research agenda, and inadequacies in accounting and administration. The quality of work at many of the Regional Centers has deteriorated because of a lack of stable financial support. Because numerous subsectors, including irrigation, livestock, and university-sponsored research are outside the control of the Corporation (World Bank, 1985, p.95), it does not have the power to formulate a national program and oversee project implementation. Thus projects are supervised in a piecemeal fashion by the implementing agencies.

1.11 The Agricultural Research Extension and Training Project (ARETP), started in 1986, intends to establish a professional extension system for the irrigated sector based on the T&V model. Although costs have been a serious constraint, pilot extension activities have been started successfully at Rahad and New Halfa, and are to be expanded to the Gezira/Managil Scheme. In rainfed areas, there are two pilot projects to introduce T&V-based extension systems: the Southern Kordofan Agricultural Development Project (effective February 1989) and the Southern Kassala Agricultural Project (effective July 1989). Critical problems are clarifying the goals of extension activities, identifying relevant technologies and developing appropriate training programs for extension staff.
1.12 A follow-up AGTECH project is being planned to assist 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 project would also involve the agricultural universities in training and extension education.

Uganda

1.13 The Agricultural Development Project in the northeast is implementing a pilot T&V-based extension component. The project has suffered from problems with salaries, unclear allocation of responsibilities and a lack of confirmed technologies. The Headstart Program for Agricultural Research and Extension, which is part of a recently approved agricultural sector adjustment credit, will lay the groundwork for a proposed AGTECH Project. Headstart will support research and extension initiatives in key areas, including financing operating costs, training and technical assistance, and adapting and disseminating technologies. The AGTECH project being prepared would provide long-term support for agricultural research, extension and Makerere University.

2. THE EXTENSION SYSTEM: STRATEGIES, OBJECTIVES AND SUSTAINABILITY

2.1 Agricultural extension is part of the overall agricultural knowledge and information system. No single strategy applies to an entire nation; a national extension system should comprise different strategies to meet the needs of varied agroclimates and populations. This philosophy is defined as "extension pluralism."

Setting Objectives

2.2 Setting objectives is fundamental to designing an extension strategy (see Annex 1, Figure 1). If a strategy is inappropriate it will have limited potential for fulfilling the objectives set by government policymakers and extension clients. For example, if the objective is to increase homogeneous cash crop production, a private extension organization that can provide inputs and purchase the final product may be appropriate. However, there may be other national extension goals, such as environmental protection, resource conservation, improved health and nutrition, and youth development. If extension has a broad mandate to promote the well-being of its clientele, a private organization is unlikely to provide the required services. As extension strategies evolve to fit new objectives, the extension system must be flexible. Within such a system, diverse strategies can be implemented and improved.

2.3 An extension policy with broad goals can lead to contradictory technical messages and conflicting time requirements for field staff. For example, advice aimed at improved soil conservation sometimes may conflict with advice on crop mixes or practices geared to increase short-term farm income or yields (King, 1990). Contradictory technical messages should be identified and addressed by agricultural researchers and extension agents. Such conflicts might be resolved by giving farmers various options (based on individual preferences) setting priorities (at national or lower levels), and seeking compromises through adaptive research.

***/ The Compagnie Francaise pour le Developpement des Textiles in Francophone Africa is one such example.
2.4 How should extension policies be set? At the International Seminar on Rural Extension Policies at Wageningen (IAC, 1990), two views were presented: set policy at the top through governments and external donor agencies, or set policy through a dialogue with field workers and farmers. There is also a middle ground where grassroots participation is married with national decision-making. The success of such a compromise depends on the efficacy of feedback mechanisms; the ability of extension and other institutions (such as farmers’ organizations) to facilitate participation; and the national commitment to grassroots participation (Mulugetta Mekuria 1990, personal communication). How extension policies are actually set depends a great deal on the balance of power and the political process. In a democracy extension systems should reflect the demands of taxpayers and farmers. In Africa, however, where the one-party state is predominant, objectives have typically been set by national politicians and bureaucrats in cooperation with local experts and those provided by donor organizations.

Effectiveness and Sustainability

2.5 Two important objectives for all extension systems are increased effectiveness and sustainability. Effectiveness refers to the extension system’s ability to achieve specific goals. A sustainable extension system must be self-generating in terms of funding, programming, staffing, and clientele support to allow it to function at a constant level of activity. With regard to funding, national policy should indicate whether the objective is to have an extension system that can be run independently of donor assistance or one that will need continued support. If the objective is to have an extension system that is sustainable without donor assistance, such resources as information, human capital, investment capital, funds for operating costs, and facilities for education and administration must be considered when designing extension strategies.

2.6 Sustainability requires a continuing political commitment to extension. This means that extension must generate benefits that are perceived as valuable to politicians holding the purse strings, or it must maintain strong clientele support, or both. Second, the extension system must be well-organized and managed. Third, extension must be perceived by farmers as useful in order to ensure their continued support. This means that the farmer-extension linkages must be strong. A fourth prerequisite is a flexible institutional structure with linkages to affiliated organizations. Finally, strong training and formal education to develop human capital are essential. A sustainable extension system is able to adjust to the evolving needs of its clientele over time.

3. EXTENSION ORGANIZATION AND MANAGEMENT

3.1 Efficient organization and back-up support must be in place to make an agreed extension strategy a reality. Well-organized extension advisors, managers, supervisors and adequate field staff are essential. Management duties include the administration of the earmarked funds for extension; human resource management; purchase and distribution of supplies; links with research, input suppliers and marketing organizations; and participation in training design and implementation. Critical human resource management issues are: optimal staff size; staff training and participation; supervision; promotions and staff support. Practical extension management workshops are an effective method of providing in-service training.
Financing Extension Services

3.2 There are three main sources of funding for extension services: government funds (often supplemented by international donor funding); client contributions (from those by farmers’ organizations to individual gifts to field staff); and private sector sources. A critical and urgent challenge is to identify alternatives to government-funded services. Extension start-up costs can be substantial particularly for new or rehabilitated buildings, staff housing, vehicles, and overseas training for administrators. Incremental recurrent costs are the most daunting financial problem of public sector extension. These costs include: vehicles (purchase and maintenance), equipment and supplies (office and field), staff support (salaries, housing allowances, and educational materials), training, travel, media, and so on. High recurrent costs may mean that an unsustainable annual percentage of agricultural Gross Domestic Product is spent on extension operating costs. The traditional T&V system, which requires fairly intensive coverage (e.g. one field worker for fewer than 1,000 farmers), has been criticized for generating high recurrent costs (Axinn, 1988 and annex 2). Financial planning of donor-supported extension projects should incorporate serious consideration of a government’s ability to handle "after project" costs. A manageable level of funding should be related to expected values of agricultural products including the value expected to result from current development efforts. Alternative sources of funding may be provided by: agricultural corporations, banks, cooperatives and local crop processing companies; cesses on agricultural exports or levies on imported inputs; and farmers’ organizations. 

3.3 In terms of client contributions, it is not reasonable to expect free government services to be taken over voluntarily by farmers. However, if clients perceive services as valuable, it is likely that they would be willing to contribute. To institute partial client financing, extension management (national and regional) and local clients would have to work together to develop acceptable mechanisms for sharing operating costs to support field staff. Farmer contributions to field staff could include provision of transport, housing, labor (for demonstrations) and/or payment in kind. Local support of extension should be accompanied by a system of performance evaluation and by involving farmers in field staff selection (see Box 1).

Box 1

Local Accountability In Botswana

Family Welfare Educators (FWE) in Botswana are chosen from the local community, sent for training and assigned to work in their home area. Farmers reported that they were the most effective of all extension cadres in the country. Of 21 villages studied, 14 said that they received effective services. The three workers who were nonresidents were labeled ineffective; all residents were considered effective. Agricultural Demonstrators (ADs) were said to give 7 of 21 villages effective services; Assistant Community Development Officers (ACDOs) were judged to be effective in only 5 of 21 cases. These workers were chosen on the basis of academic merit, sent for formal training and then posted by the government. The effectiveness of FWEs is enhanced by their local involvement, their assignment to a limited geographic area, and their clear job descriptions. Moreover, 97 percent are females serving predominantly female clients (Fortmann, 1985).
3.4 In two AF2 countries, financing problems were addressed in different ways. In Somalia, the Ministry of Livestock, Forestry, and Range has proposed to establish a separate national research network for livestock. Separate research (and possibly extension) would result in inefficient use of scarce resources; high costs; and coordination problems between research and extension (for livestock and crops) that would tend to work against effective extension support for mixed farming systems. Further subdivision of services should therefore be discouraged. Somalia is largely dependent on donor financing and there is a serious problem with the costs of housing for field staff. There may be viable local arrangements whereby farmers, herders or community groups could either partly fund extension or take over much of this function themselves. A possible model is the Range Management Areas program in Botswana; this program trains representatives of herders' associations to provide information to members and act as a liaison with veterinary services and other government agencies (LAPIS, 1990). The following activities, which were initiated before the recent turmoil, were expected to improve extension efficiency and reduce costs:

- Establishing an Agricultural Information Center to link research institutions with field services.
- Setting up a network of field trials to provide feedback to researchers.
- Training extension staff in new methodologies such as result demonstrations and dialogue.
- Developing skills so that field staff recognize innovations that will fit into local mixed farming systems.
- Organizing saturation efforts in the form of special campaigns in areas of limited potential.
- Identifying and organizing client groups.

Such activities aimed at more sustainable extension will need continued support under the proposed AGTECH Project.

3.5 In Sudan, except for staff salaries, annual budgets for research and extension have been entirely inadequate during the past few years (about 50% of ARETP estimates). Irregular disbursements have affected continuity. There is a need to develop alternative funding sources, such as contributions by Agricultural Production Corporations or crop-processing companies. The Rahad and New Halfa Corporations are already involved. Additionally, revolving funds could be started with the proceeds from Farmer Training Centers (FTCs) demonstration farm products. If extension activities were sponsored by FTCs, the funds could be reallocated to the extension budget.

3.6 Private Extension Services. Private extension services provide alternative financing. Some private extension is provided by private voluntary organizations (PVOs), farmers organizations, agricultural cooperatives and commercial firms. In the mid 1980s, some development experts pushed for privatization of extension services arguing that payoffs to public sector extension models were "disappointing." It was suggested that alternative ways of disseminating agricultural technology should be developed, including the private sector and mass media. One suggestion made was for public sector extension and research to work on packaging research findings and recommendations to make them more accessible to private extension, input suppliers, and the media (McPherson, 1985 and Claar, 1988).
3.7  In the authors’ view, complete privatization of national extension systems is not desirable. In many situations, agricultural technology transfer is not the only task of extension. Private extension may not be well suited to carry out social welfare functions. However, private sector information supply services, or shared public/private funding of such services, can reduce the financial and managerial burden on public sector extension organizations. For example, private extension is already being used for highly specialized commodities such as tobacco, flowers, vegetables, dairy products and so on. Governments will always bear some of the burden of providing information services even when a portion of the extension system is private - as is the case in most developed countries. In some cases there may be resistance to increased involvement of the private sector in provision of extension and related services. For example, public sector livestock extension officers earn extra income from providing clinical veterinary services. Nevertheless, creative and appropriate ways of combining private and public extension should indeed be sought, and this is currently being attempted in the context of Kenya’s NEP II.

Human Resource Management

3.8  Size of staff, effective supervision, proper incentives, and staff support influence extension performance and critical human resource management issues that need to be addressed to ensure effective and efficient extension services.

3.9  Staff Size. Objectives determine the optimal number of field staff. The intensity of coverage (i.e., ability to establish direct farmer contact) should correspond to the distribution of farmers, the terrain, and the weather; the need for services (a function of available and expected technology, the type of production system, and the policy goals for extension); and cost-benefit considerations. The extension literature suggests some farmer-to-agent ratios. A 1962 report (DeWilde) suggested a general rule of "between 1:350 and 1:1000" (p.172). In the cotton-producing areas in French-speaking countries, the ratio of agents to farmers is much higher (see annex 2). The desirable ratio differs according to specific circumstances and changes over time as farmers and extension staff become more efficient (or less so) and as other conditions change (literacy, access to media and roads, etc.). Staff increases should not be accepted until all possibilities to use existing staff more efficiently have been explored.

3.10  Direct contact with farmers is especially important when teaching complex skills. One method for extending coverage is to work with groups (see paras 4.16-4.19). Another is through the media, including radio, cassettes, books, pamphlets, newspapers, magazines, journals, videos and films (see Box 2). Good coverage alone does not guarantee an effective extension system. It must be accompanied by appropriate messages, feedback from staff and farmers, and strong supervision (Drinkwater, 1987). The literature on extension concludes that media should be used to complement the personal contact with front-line staff. Feder et al (1986b) present results from India indicating that the share of radio in effective extension is constant regardless of access to other extension services. Radio is also helpful for reaching women who are unable to attend extension meetings, and can create an interest in extension activities among women.

3.11  Training in the use of the media should be included in the curriculum of agricultural colleges, particularly hands-on training in how to prepare audio-visual aids using local materials. The key to effectively using the media for agricultural extension is to dovetail media and visits. Training should therefore cover both design and coordination of different types of extension through media and personal visits. Marketing information can also be provided effectively through the media. Investments in telecommunications systems should be promptly planned. For example, if a
telecommunications network that ignores resource-poor areas, is put into place, it will tend to skew extension services toward the areas where communications infrastructure is in place.

3.12 **Staff Participation and Supervision.** Including the field staff in extension planning is a creative management technique that should be used more effectively in AF2 countries. At a workshop utilizing this technique in Kenya (around 1976), 22 of 26 attendees said that involvement in setting up the course improved their ability to teach. They were able to incorporate ideas raised in the planning sessions and identified more closely with the work plan (Schonherr and Mbugua 1976, pp.19-20). The quality of supervision requires substantial improvement. Supervision visits often leave much to be desired; they tend to be short on two-way interaction and long on speeches and reprimands. Several factors affect visit quality: selection of supervisory staff; training in supervisory skills; and field induction period after formal training. To improve the quality of supervision, discussions with managers on their perceptions of supervision and how it can be improved should be included in management training workshops. Feedback should also be sought from the best front-line people (and perhaps from some of the worst) concerning their views on supervision. Such information could be used to develop materials for training. Involving agents in supervision is another way to improve field staff performance. Additionally, field staff could plan part of the itinerary of supervisory visits. This would help focus the supervisors’ attention on issues of concern to front line staff and also help to incorporate feedback time into the visit. Training on how to design an itinerary and prepare useful feedback would have to be developed and presented at monthly training sessions, FTC courses, or during pre-service training.

3.13 **Field reports indicate that transport is the key to supervisory visit frequency and dependability.** Vehicle procurement delays and inadequate fuel budgets limit the mobility of extension managers. Managers become preoccupied with transport problems to the detriment of other duties. The continuity of supervision is interrupted and promised follow-up visits to staff and farmers are not made, frustrating and demoralizing both groups. Thus logistical problems are often to blame for poor supervision. Streamlining procurement arrangements during project preparation and appraisal is one way to improve the mobility of supervisory personnel (see annex 4). As extension becomes more demand-driven the question of supervision becomes less of a public sector problem and more of a managerial issue for the organization providing extension services - such as farmers’ associations.

3.14 **Promotions.** Promotions that put good field staff behind desks weaken the extension system (De Wilde, 1967). Better options might be: (i) an increase in salary; and (ii) additional training to upgrade to SMS level. Other incentives could be designed to reward good performance such as opportunities for study; cash bonuses; and bicycles or motorcycles. Staff should be surveyed to find out whether these incentives -- or others -- are desirable. Ideally, to increase flexibility, middle- and upper-level extension managers should have a say in decisions to hire and fire, promote and transfer, and set up flexible pay scales. Field staff that work directly with farmers should be paid according to performance and experience.

3.15 **Staff Support.** Adequate salaries and support in the form of transport and housing, are essential if staff are to function properly. Base salaries should be adequate to live on or extension work should be officially part time. For example, in Uganda field staff are paid 2,000 - 4,000 Ugandan shillings per month (US$2.50 - 5.00) and are often not provided housing or transport. Under such conditions, staff should only be required to work part time so they can pursue other income-earning activities without shirking. The key issues related to transport are access and maintenance. To improve on the maintenance side, efforts could be made to build up capacity at the local level by providing credit and training to local mechanics as part of an extension project. Small vehicle maintenance projects could be initiated by NGOs and coordinated with pertinent
extension projects. In Somalia, government vehicle maintenance workshops were supported by the Second Agricultural Extension Project. Such workshops should include development of training materials and trainers (e.g., training on maintaining stocks of spare parts). Local communities could be encouraged to provide a bicycle (or other appropriate conveyance) to their extension staff, thus introducing a degree of direct accountability. Staff housing is also problematic; this may be another aspect of support which the government could turn over to, or share with, the local community.19

Training

3.16 Extension training should concentrate on improving: (i) technical competence; (ii) diagnostic ability; (iii) effective communication skills; and (iv) team work. There is a need to improve staff training both pre- and in-service.20 Training is required to improve extension staff and researchers’ ability to involve groups of farmers in the process of adapting research results. Training through special courses overseas or at home should be followed up to ensure that the training is put to use.21 Two steps can be taken while the training is in progress. First, the training program should be evaluated to determine what the trainee is learning. Second, the home office should prepare to use the trainee’s new skills upon return. All consultants involved in training should develop training materials for local use after they are gone.

3.17 Training programs often lack financial and human resources. In many countries funds for training are the first to be diverted to other uses when budgets are under pressure. Many educators and technical specialists do not consider extension an attractive job. Much better use could be made of locally available technical resource staff through improved incentives. Training in the field or at FTCs could be improved by adopting the following suggestions:22

- Evaluate training by SMSs regularly and base promotions on their performance.

- Assign the Director’s position at FTCs to good administrators from government, universities or colleges and use it as a stepping stone toward higher posts.23

- Arrange for talented field staff and faculty from the universities, colleges or technical institutes to lecture at training centers and be paid honoraria.24

- Use junior staff or advanced students for assistance in preparing of training sessions or short courses as part of their education.

- Assure reasonable salaries to FTC staff. Their work at an FTC or other training facility should be a condition for promotion within their ministry or agency.

- Improve supervision, including unbiased performance evaluations, and improve motivation.

Farmers’ training is an area for renewed focus. Dejene (1989) suggests short courses to train farmers to teach other farmers. After farmers reach a certain threshold of knowledge they could help transfer technology to other farmers (see para. 5.9).
4. LINKING EXTENSION TO OTHER ORGANIZATIONS

4.1 The interaction between extension and other organizations (such as research institutes, universities, non-formal training facilities, input suppliers and marketers, farmers associations and the donor community) is a crucial part of the extension system. The mutually reinforcing character of research, extension and training makes close coordination of efforts to strengthen these areas essential. This may be most effectively done through projects that simultaneously and concurrently provide support to agricultural research, technology dissemination and training — as proposed under the AGTECH projects (see paras. 1.09, 1.12, and 1.13).

Interaction with Research

4.2 Extension and research are mutually dependent (Whyte, 1975). Research provides extension with technical information, and feedback from farmers is conveyed by extension agents. This linkage requires much improvement in Africa and elsewhere. A review of the T&V-based extension system in Asia indicated that the technical problems of rainfed farming should be given a much higher priority (Cernea, Coulter and Russell 1983, p.145). Research-extension linkages must be in place to allow such feedback to be effectively transmitted. A review of 128 World Bank research and/or extension projects from 1974 - 1980 also focused on interaction and five problems were identified:

- National agricultural policy was unclear.
- Country input into project design was limited; research and extension activities were not coordinated with related work.
- Officials did not understand sectoral or economy-wide issues that affect research and extension activities.
- An institutional separation divided research and extension practitioners.
- Consensus was lacking concerning the various stages in the process of technology development and transfer (World Bank, 1985, p.8).

4.3 Several additional factors affect the interaction between research and extension. First, the educational background of research and extension staff contributes to professional attitudes toward working together. Classroom and extra-curricular activities should be geared toward generating positive professional relations. Second, incentives are needed to ensure quality participation in research/extension interaction from both sides. For example, several back-to-office reports from NEP I in Kenya note that research participation was weak as the representatives were junior staff and not well prepared. Incentives should be in place to provide: i) consistent management and reasonably good facilities; ii) adequate salaries; and iii) bonuses or promotions based on practical work rather than on publications. Alternatively, one could provide an outside source to enforce linkages, such as the district commissioner; but an additional person will only help if that person is committed to improving linkages and is not partial to any local managers. Third, external and internal support mechanisms must be in place, such as cooperation with universities, agricultural colleges, international agricultural research centers (IARCs), and non-government organizations (NGOs). These organizations could share resources and provide technical support in the form of training and
facilities. Negative incentives alone don’t work that well and thus should be combined with positive ones as described above.

4.4 The budgets allocated to research and extension in Africa show little recognition that the effectiveness of investments in these two areas are closely related. For example, in East Africa there has been a high level of spending on extension expenditures relative to research in contrast to the practice in North American or semi-industrialized nations (see table 1). One reason for this is that in low-income developing countries, one can employ and support about 20 extensionists at the same cost as one researcher (in industrial nations, the ratio is 3 to 1). Instead of training students to become scientists, governments have built extension systems with large numbers of relatively untrained and unskilled workers (Evenson, 1986, p.76). Increased recognition of the complementarity between research and extension investments could lead to a better allocation of resources. Benefit/cost analyses can assist in determining whether the desired returns to research and extension investments can be attained with available resources.

### Table 1 EXPENDITURES ON RESEARCH AND EXTENSION, BY REGION

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<tr>
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<td>0.59</td>
<td>0.68</td>
<td>1.37</td>
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<td>0.53</td>
<td>0.56</td>
<td>0.84</td>
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Note: All figures are expressed as a percentage of the value of agricultural product.

4.5 Linkages with Research in AF2. In Ethiopia an attempt is being made to establish effective research-extension linkages in the context of the ARP and PADEP through regional research/extension linkage committees (RELCs) and a national committee. For example, in Shewa Province, close collaboration between researchers and MOA staff resulted in rapid identification and dissemination of improved wheat varieties. Similarly, on-farm research is being conducted on improved management methods for heavy black cotton soils. In other provinces, however, cooperation and interaction between local leadership and research and extension staff is less developed. MOA needs to clarify the involvement of the Agricultural Development Department in on-farm trials, assign specific responsibility for development and dissemination of farm implements, and make the RELCs exclusively in charge of the regional technology generation and transfer program.

4.6 Kenya’s lead agricultural research institute, KARI, has many links with the IARCs and this has reinforced research-extension collaboration. Meetings of the regional professional specialization groups (RPSGs include extension staff, researchers, and university faculty) and district extension workshops, bring researchers, extensionists and other MOA staff regularly together. Other linkages are joint farm visits and field days at experiment stations. Such interaction can have a
significant impact both on technical recommendations and on research priorities. A recent task force report on establishing a farming systems approach has proposed a number of new mechanisms for interaction between research and extension, including a national farming systems coordination committee to develop policy guidelines, coordinate research, and rationalize resource allocations to farming systems research activities.

4.7 The sugarcane research program at the Mauritius Sugar Industries Research Institute (MISRI) organizes lectures for divisional extension staff. The Ministry of Agriculture, Forestry and Natural Resources (MAFNR) conducts separate weekly meetings of field staff for crops and livestock with the headquarters extension staff. Neither activity involves much feedback, and extension staff have little confidence in the researchers’ ability to train them. Extension staff collect data and work in community development while researchers attempt to do their own extension without adequate skills or personnel. It has been recommended that research and extension be managed under one directorate. The proposed Agricultural Services Project will include strengthening research and extension activities for crops other than sugarcane along these lines.

4.8 Somalia has had similar difficulties. Investment in extension has not been matched by investment in research institutions or in the agricultural college of the Somalia National University. The efficiency of the research units should be considered to determine an appropriate national structure. It is essential to ensure that responsibility is properly delegated to the regional centers to avoid inefficiency due to a lack of autonomy. To prevent duplicating expensive research facilities, proposals to establish separate research units should be thoroughly evaluated (see para 3.4).

4.9 In Sudan, poor incentives and living conditions lead to high staff turnover and make it hard to recruit and keep good people. In the Rahad and New Halfa Agricultural Production Corporations, researchers and extension staff are conducting highly relevant on-farm trials on crop production and irrigation management. This is, at least in part, due to high quality leadership and direct contributions by the Corporations in research financing. It has been recommended that the Agricultural Research Corporation, the National Extension Administration and the directors of the research centers work with the other APCs to strengthen links between research and extension similar to the arrangements in Rahad and New Halfa.

4.10 Numerous ministries are involved in agricultural research and extension in Uganda; most research is just being revived. The Agricultural Policy Committee is responsible for overseeing implementation of policies to strengthen agricultural research and extension. A National Agricultural Research Organization has been proposed similar to the KARI model in Kenya. It is considered essential to involve Makerere University and encourage participation at the local level.

4.11 Adaptive Research and Feedback. Adaptive research involves adjusting technological innovations to different agroclimates and socio-economic conditions. Adaptive research has been weak in much of Africa. The problem is that most researchers don’t look at why farmers are doing what they do but try to develop new technologies from their own perspective (Drinkwater, 1987, p.23). In the 1950s and 1960s, agricultural extension’s role was seen mainly as disseminating new technology. But it is now recognized that extension’s role should include feedback from farmers and participation in the adaptive research process. In order to make sure that research results are practical for farmers all over the country, linkages must be in place. The challenge is to marry farmer innovation with experiment station research. This requires intimate knowledge of existing farming systems (see Box 2). Extension staff are well prepared to participate in adaptive research because they are in close contact with farmers, understand the real constraints farmers face, and can
tailor recommendations to fit different types of farmers. Village extension workers can assist in field trials and may even carry them out in farmers’ fields (Von Blackenburg, 1982).

4.12 More effective linkages between research and extension should be encouraged by:

- Introducing monthly workshops for in-depth technology reviews to share the combined knowledge of research and university scientists, adaptive research staff, and SMSs. This technique is being used in Nigeria.

- Meeting regularly in working groups to address the specific needs of the local farming community (for example, the regional professional specialization groups in Kenya). Field-based workshops for administrators, researchers, educators (extensionists), and farmers are another possibility.

4.13 Improving Adaptive Research. To facilitate adaptive research, the roles of national and regional research centers should be clearly defined and coordinated. The key is to search for ways to decentralize agricultural research within a national framework and to encourage local initiative and decision-making, while ensuring feedback to the center. In some cases it may be better to support specific crop and livestock centers because national agricultural research organizations may interfere with the regional stations and actually discourage participation by farmers. Officials should avoid giving the majority of financial support to national agricultural research entities that may not be well managed because the regional centers may suffer.

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**Box 2**

**ADAPTIVE RESEARCH AND INDIGENOUS KNOWLEDGE**

The Moru people in Southern Sudan have an agricultural system based on the use of varieties with differing maturities to reduce the risk of crop failure. New crops, such as cassava and groundnuts, were introduced and although cassava was easily adaptable, the recommendations were that groundnuts were not appropriate. Row planting was introduced to make early weeding easier but the message about weeding was not communicated to the women (who do the weeding). Wide spacing of plants led to rosette damage, but when farmers used a closer spacing, the problem was solved (Sharland, 1982). Such experience indicates that it is helpful to learn about farmers’ current practices and work allocation. Moreover, farmers can adapt to suit the circumstances and should be given opportunities to develop ideas with researchers in the field.
4.14 The relevance and efficiency of adaptive research can be improved by:

- Studying aspects of indigenous farming systems for use by the research community.
- Incorporating the economic implications of proposed innovations in the early stages of research work.
- Involving women in adaptive research (see Box 3).37
- Streamlining and clarifying the duties of SMSs.38 One option is to use teams with natural and social scientists and a research extension liaison officer (as in Zambia).39
- Improving training and education (pre- and in-service) to provide communication skills to improve the two-way flow of information and technical skills to adapt general research results. Staff from the agricultural universities who are good at training (if necessary with a consultant), could teach workshops on communication.

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**Box 3**

ADAPTIVE RESEARCH IN BOTSWANA

Botswana's Agricultural Technology Improvement Project aims at increasing the production of farmers with limited resources (mostly women). On-farm trials were supported by group discussions (primarily made up of women). Individuals reported specific farming problems and the group discussed them. Mid-season field visits were made to stimulate discussion. A formal assessment of the field trials and the group process suggested that small homogeneous groups worked better. The meetings were useful for clarifying instructions and creating peer pressure. The discussions also informed farmers who were unable to carry out on-farm trials (Sagar and Farrington, 1988, pp.31-32). In another area, officials introduced 20 to 40 farmers to researchers and extension agents, who offered a range of innovations. The farmers decided what they wanted to try and the project provided materials. Late in the season, each participant was visited and gave a demonstration. There were some problems with the groups. For example, many of the agricultural problems discussed had no immediate solution and research data were not as quantifiable and objective as the evaluations of on-farm trials.

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4.15 The final stages of on-station trials should be carried out jointly by extension staff and researchers before proceeding with on-farm trials.40 The quality and relevance of such trials can be improved if: (i) subsidized inputs are not provided except under special circumstances, (ii) on-farm trials are carefully distinguished from extension demonstrations, and (iii) the results are used to refine extension recommendations. Critical areas in on-farm research that need improvement are methodology, managerial structure, and financial support. It may be advantageous to set up a
separate account for on-farm research activities to avoid budget cuts in this area when extension and research budgets get tight. Additionally, there must be incentives for researchers to spend adequate time with extension staff and farmers in the field, or adaptive research will suffer. Finally, the participation of farmers in on-farm trials needs to be greatly intensified.41

Farmer-Extension Interaction through Groups

4.16 The relation between agricultural extension and farmers in Africa tends to be one way. Bunting (1986) wryly described it as "a relationship between the knowledgeable and the grateful." Agricultural extension should be more than this. It should collaborate with farmers and livestock producers to learn from them and help them acquire the skills and information they need to generate greater benefits from their activities. The capacity to mobilize and support farmers’ groups and organizations is needed to achieve this objective. It is particularly important to increase extension’s local accountability and to ensure that services are perceived as useful. Thus, extensionists and researchers should not be impeded by the rigidities of highly centralized national systems. Local staff must be free to attend to local priorities and to seek innovative inputs by farmers.

4.17 Farmers’ organizations and groups can be national bodies, such as farmers’ unions or small local groups (see Box 4). In Ethiopia, it has been suggested that extension interact with peasant associations with technology training taking place at central meeting places such as schools and places of worship (rather than working exclusively through individual contact farmers). The following list suggests ways in which farmers organizations can contribute to the sustainability of extension services.

- By articulating the needs of the farming community.
- By lobbying for financial support for extension.
- By sending representatives to training sessions of research and extension staff.
- By assisting with input supply and marketing.
- By participating in group extension activities and in the selection, support, and evaluation of extension staff. 42

4.18 Working with groups, formal or otherwise, is an effective way to cut costs and improve access to inputs (Stavis, 1979). Work with groups can enhance the coordination of marketing output. The size of the group affects the structure of group sessions and the number of visits the agent can make. Group size can vary greatly depending on client interest and available resources. Although there is no "correct" group size, a general rule of thumb is fewer than 30. Some other advantages of working with groups are: better decision making because people may more freely express themselves when they are in a group 43; better follow-up (groups will implement new ideas more readily than individuals); stronger competition; wider dissemination of ideas; division of labor; regular contacts between extension field staff and farmers; easier access to inputs and marketing (see Box 5), and savings on transport and other costs (Ndimande, 1987). Groups can be difficult to set up and may require political leadership. Working with already established groups is one way of limiting such problems (Stavis, 1979). Already existing groups should be supported - not taken over - by extension. 44

- 16 -
4.19 Group structure may vary from a contact farmer/follower farmer format to a group of equal members with a rotating leader. Roling (1982), reports that many extensionists say that the "contact farmer approach is old wine in new bottles, in that the 'progressive' and 'registered' farmers of the past are now the contact farmers." The extension agent must therefore work with the group so as to avoid providing unequal benefits to contact and follower farmers (Von Blackenburg 1982). There are many techniques for extension to work with farmers’ groups. Whyte (1975) suggests the concept of a group leader who is an "educational liaison". The farmer is selected by the community, sent for training and posted back home to act as a teacher and motivator. To implement this idea, extension planners must determine:
• How the appropriate person is to be chosen.
• What incentives the trainees should receive.
• How much and what kind of training they require.
• How extension and other services can support the returned trainees.

One way of improving extension farmer interaction is to include group leaders in regular extension training meetings (Drinkwater, 1987, p. 23); farmers can then transmit the messages to their peers. The extension staff would reinforce new ideas and act as a trouble-shooter for farmers adopting new technology.

**Linkages with Universities and Training Institutions**

4.20 Links with universities and other training institutions offer many potential advantages:

• New information is made available to farmers, and scientists in academia get feedback from farmers.
• Activities of extension, research centers, and universities can be coordinated to avoid duplication of efforts. 45
• Involving university (and agricultural college) staff in the dissemination of research results in the field makes curricula more practical.
• Contacts may stimulate the establishment of university "think tanks" on agricultural economics to support diagnostic work of field staff through training and assistance in analysis. 46

4.21 **Extension Education.** Existing agricultural colleges, universities, and training institutes in Africa need to be empowered to meet the requirements for extension trainers, teaching materials, and specialized courses. Actions to strengthen these institutions are critical. There are two primary changes that should be made in formal agricultural education in the AF2 countries (and probably elsewhere in Africa). First, funding and facilities for practical applications of classroom lessons are badly needed. Second, the content of training programs should be adapted to prepare some students to enter the private sector as entrepreneurs and "model farmers" (a good example of such a program is the Student Enterprise Project in Lesotho). 47 This would alleviate part of the problem of an oversupply of agricultural graduates in relation to the current requirements of government ministries in countries such as Kenya. Third, training for field agents (both formal and in-service) should concentrate more on extension management, extension methodology (i.e. how to encourage participation), diagnostic skills, farm management and marketing, adaptive research methods, team work with research, moderating discussions, and use of media. Finally, follow-up after training and feedback is important to ensure that new skills are put to use.

4.22 **Staff Selection and Education.** The level of education required for field staff is open to debate. A World Bank publication on research and extension projects (1985, p. 65) argues that it will be necessary to "progressively raise the education level of field staff to help farmers adopt new technology more rapidly". Other authors contend that more highly educated field agents are relatively less effective as they have higher expectations for income and other benefits than they will receive as field extension staff. Basically, good personnel management is needed to properly place staff.
members. If the job requires complex diagnostic skills and farm management advice (possibly including the use of computers or other equipment), highly skilled staff are needed. In areas where simple innovations are being recommended (such as a new variety, or different row and plant spacing) and baseline information is being gathered for feedback, it may be appropriate to have staff with less formal education.

Specific Adaptations of Field Staff Curricula

4.23 **Extension Management.** The management of research and extension activities in Africa is generally weak. Many authors argue for greater attention to management training (Von Blackenburg 1982, Oram 1985, Claar 1985, Compton 1989). However, all students being trained for managerial positions should do some field work. Students could be given housing locally and a food and necessities stipend by their training institution. This would help keep costs down and would provide future managers with field experience. Different types of training are needed for different jobs, and for different areas or even within a given area. As Roling (1982) points out, it is difficult to train a field officer to serve both small and large-scale producers.

4.24 **Facilitating Participation and Diagnostic Skills.** Training to encourage participation should combine sociology with hands-on communication labs (preferably with real groups in the field). There is a large body of literature available on these topics that is beyond the scope of this paper; however, improvements in communication and group process skills are essential. Diagnostic skills should be improved to the point where field staff can assess a problem after observing it in the field. An additional skill required by field staff is the selection of contact farmers or group leaders. Von Blackenburg (1982) found that two characteristics were essential: an appropriate farming standard (between traditional and progressive); and an ability to convey messages to other farmers. Although farmers may actually do the selecting, field staff will need to moderate the process.

4.25 **Farm Management.** Farm management should be included in the pre-service extension curriculum to increase the agent’s ability to provide services that the farmer needs and can apply. Collinson (1968) reports that, “the debt ceiling of the small farmer may be an initial obstacle to his accepting a recommended practice”. Extension and political pressure can induce farmers to accept a new practice despite reservations. But such actions cannot sustain use of an inappropriate innovation. The alternative is to educate farmers to handle a new innovation within the context of the economic environment he/she faces. Farmers should be able to identify "bad" messages (in terms of their own resource allocation) and reject or adapt them as they see fit. The recent ARETP mid-term review in Sudan found an urgent need for work on the economics of recommendations; intensive training for SMSs in farm management economics was recommended. Additionally, field staff should be trained to point out to farmers the advantages (and disadvantages) of a new technology translated into financial terms. Training should include a budget analysis of recommendations and this should be conducted with the farmers.

4.26 **Teamwork and Professional Attitudes.** Creating a capacity for adaptive research methods and teamwork between extension and research could be achieved through a series of courses on these topics (in a formal curriculum). Such courses should be required for students from different disciplines, (crops and livestock, research and extension), include field exercises and focus on building positive professional relationships. The courses could be designed by an advisory body made up of university, research and extension staff. Extension staff should be trained to moderate discussions and encourage a participatory atmosphere during in-service training sessions and group meetings. Ideally such training would enable them to project an image of facilitating rather than controlling the sessions they organize.
Input Supply and Markets

4.27 A central question in the debate over the design of extension systems is whether or not field agents should supply inputs and help market output. The argument in favor is based on the convenience of having the person who works most closely with farmers also supply inputs to them. The opposing argument is that extension agents will soon be overburdened with supply tasks. The authors' experience in many African countries suggests that input supply activities are extremely time-consuming and quickly become the focus of the agents' work. Especially if supplies are scarce, it is better to work on improving long-run availability by helping farmers and farmers' groups build contacts with suppliers than to spend time obtaining and delivering inputs. Mosher (1978) warns that field staff who supply inputs will tend to concentrate on farmers who already use, or can afford to use, purchased inputs; moreover, extension field staff may become politicized if they control input supplies. A more essential service is facilitating access to inputs by mobilizing farmers and pressuring suppliers to respond in a timely fashion.

4.28 If increased production is the goal of extension, healthy markets are essential. If there are problems, such as late payment (or failure to pay) lack of storage, or inadequate communication and transport infrastructure due to poorly functioning parastatals or cooperatives, farmers may lose interest in a crop advocated by extension. Thus, extension staff must interact with marketers of agricultural and livestock products and give farmers marketing advice. Such services can often be provided by combining mass media and personal contacts.  

The Donor Community

4.29 Another important issue is coordination related to donors both between national extension programs and donor-supported projects, and among multiple donors supporting extension. Uncoordinated programs may seem contradictory, resulting in confusion and impaired credibility. Donors can reinforce each others' work if they coordinate activities to capitalize on their comparative advantages. For example, NGOs are well-suited to work at the grassroots level; large donors can fund major changes in infrastructure. Recently, donor agencies supporting extension in Kenya met in consultation with the local Ministries involved in extension and agreed to organize semi-annual consultations during the implementation of NEP II. This sort of forum might serve as a model in other countries. Because there is no clear incentive to coordinate extension efforts, it is up to individual governments to insist on donor coordination; the World Bank should facilitate this approach.

5. SERVING RESOURCE-POOR FARMERS AND "MIXED" FARMING AREAS

5.1 Many authors concur that extension has often failed to reach resource-poor farmers but few effective strategies for overcoming this failure have been developed. This section focuses on women farmers and pastoralists as important but resource-poor groups. It also addresses the question of efficient extension in mixed farming areas with cultivation of crops and livestock production in one enterprise, some have argued for separate extension services. Overall, resource-poor farmers lack access to land, reliable water sources, and credit (and thus labor and capital goods). Many are located in remote areas that are not well served by roads or accessible to markets. Most women farmers do not own land and cannot obtain credit even where such inputs are available to male farmers.
5.2 Limited access to land, either in terms of quantity or quality, is the most widespread constraint to resource-poor farmers. In Zimbabwe, Chopak (1991) found that 50% of the 285 surveyed farmers had less than one hectare of land; in Kenya 80% of all farmers have less than two hectares. The extent to which a new cash crop, a farm input or implement can be adopted on small units is therefore critically important (Uchendu and Anthony, 1975). As Chopak argues, there is often no new technology that once adopted will increase the income and/or food production of resource-poor farmers to a level of subsistence, let alone surplus. Similarly, there is typically no price reform policy or credit program that, alone, can transform these enterprises.

5.3 In many low-income countries more than half of all villages remain unconnected to any all-weather road (World Bank, 1988b). Remote location causes limited access to extension, transport, supplies and, perhaps most importantly, markets. Additionally, supporting extension staff in such remote areas is difficult. As noted earlier, to be effective staff must have access to transport, regular visits from supervisors, some way of communicating with the main office and so on. Water shortages (for irrigation and other purposes) are a common problem in Africa. In the mid-eighties, 34 (of 43) Sub-Saharan African countries had only 5% (or less) of cropland under irrigation (in contrast to 8 out of 12 Asian countries). In rainfed farming, there are fewer technologies to extend and the environment in which they are applied is much riskier. Thus, the task of extension services is more complex.

5.4 The lack of access to credit is a key constraint for all resource-poor farmers. Such resource-poor farmers typically face multiple obstacles obtaining credit including collateral requirements (such as land title) and literacy skills needed to understand and complete forms. Small loans also involve relatively high costs in terms of time required for waiting and processing. Without credit farmers have no access to capital goods, such as animal drawn equipment and oxen or tractors, and limited access to inputs. Lack of equipment can translate into an inability to plant on time, which causes decreases in yields. Credit therefore is an essential ingredient to helping resource-poor farmers.

Extension for Resource-poor Farmers

5.5 Developing effective and sustainable services for resource-poor farmers within the context of broader rural development strategies is a critical challenge. A large part of that role should be focused on facilitating farmer participation and mobilizing people to organize themselves. Efforts should be oriented around two objectives: increasing two-way interaction between extension staff and resource-poor farmers; and developing effective messages for such farmers.

5.6 Two-way Interaction. Orivel's (1983) studies reveal that the initial beneficiaries of agricultural extension projects are "amongst those farmers who are least deprived" (p.19). The lack of services to lower income farmers may be partly due to extension staff choosing to work with larger, wealthier farmers. Remote location also exacerbates the problem of poor extension interaction with resource-poor farmers. The best mode of extending coverage for resource-poor farmers is likely to be work with groups. However, where there are few messages to extend it may be more practical to carry out media campaigns and temporarily assign field staff in the area to follow-up. Tight government budgets are a key constraint. Extension funds are already stretched to cover commitments under existing extension projects (see annex 3). Institutional creativity will be needed to develop sustainable sources of financing and relatively inexpensive methods of reaching resource-poor groups (see section 6).
5.7 **Messages for Resource-poor Farmers.** Extension messages are especially critical in the case of resource-poor farmers. Melkote (1988) suggests that few appropriate messages are developed for small-scale farmers because research stations generate packages of innovations based on extension profiles of progressive farmers who are the most common contact for extension and research staff. This element is combined with a "pro-innovation bias" that assumes that all innovations are good and anyone who does not adopt them is a "bad" farmer. Small farmers may not adopt innovations because they lack the resources needed to adopt them or because they are not economical at a small-scale level of production. This problem is illustrated by the "Master Farmers Clubs" in Zimbabwe that require farmer applicants to reach a yield threshold that can only be attained through the adoption of certain inputs and practices. Consequently, there are far fewer master farmers in the low-potential agro-ecological zones than in areas of higher potential -- not because of lack of interest but because viable technology is not available and access to resources is limited (Chopak, 1991 personal communication).

5.8 **Special Approaches.** When access to land or reliable water sources is limited, there are several possible strategies -- all of which require substantial work on the part of agricultural research. One option is to develop methods of soil and water conservation such as small-scale irrigation technology. Work has been done on this area in Kenya and Ethiopia with water being collected in small ponds for later use on crops. Where appropriate, high value cash crops may be introduced for production on a small-scale. Two examples are burley tobacco in Malawi and sesame in Uganda -- both can be grown on a small-scale and command a high price. Extension may encourage groups to expand into cooperative farming activities to reduce risk related to introducing new commodities and to improve access to inputs and markets. Another strategy is to help farmers develop non-farm rural enterprises to supplement their incomes -- especially in processing agricultural products. Extension's role in implementing such ideas is to work with farmers to develop appropriate strategies for solving current problems, funnel the information to researchers, work with them to adapt technologies to fit specific areas, design a dissemination strategy, and monitor the results.

5.9 Because of the difficulty in maintaining direct contact with many small farmers, Robert Chambers (1974) suggested targeting farmers who are at an "adoption or capital threshold" and phasing out services to those who pass the threshold. An alternative scheme is to involve those farmers who reach a certain level of expertise in teaching other farmers. They might help organize follow-up activities after courses at an FTC, moderate for radio listening groups, carry out adaptive research trials on their farms, help the extension agent in surveying the input needs and so on. By motivating and enabling clients to get more involved, extension staff help build a demand-driven extension system.

5.10 **Problems and Opportunities.** Women are often resource-poor farmers with little access to land, credit, labor or extension services. But women have sometimes exhibited a powerful drive to mobilize people and organizations in Africa. In Zimbabwe, the proliferation of predominantly female rural savings clubs has contributed to the widespread adoption of hybrid maize (Gura, 1986). In Zambia, the inclusion of women in agricultural development projects led to higher adoption rates (Eklund, 1988). Additionally, women represent a large share of food producers and agricultural wage labor and have a wealth of knowledge concerning traditional food crops. Figures on the proportion of women's labor in farming households vary greatly (Von Braun and Webb, 1989). Women tend to grow certain crops such as cassava, tubers, roots, and vegetables. However, the division of farm tasks breaks down easily in response to changes in demand and other economic factors (Buvinic and Mehra, 1990). The demand for female farm work varies with land tenure patterns, the commodity...
being produced, and the degree of integration of agriculture into the market economy. Women's participation in agriculture and contribution to farm income is greater on small farms oriented to local rather than export markets (Buvinic and Mehra, 1990, p. 292). Additionally, male labor migration increases demands on women's time. But women with relatively little cash income have poor access to wage labor. Technological change can affect women's labor, control over income, and family nutrition. Projects to promote smallholder productivity should therefore give special attention to the role of women.

5.11 In a 1970 study of farmers and extension agents in Kakamega District, Kenya, extension staff indicated that they chose target farmers based on gender, cash cropping and acreage. Women farmers were largely ignored, even those with relatively large farms (Leonard, Chalihu, and Tumwa 1970, p.8). A recent World Bank country study on women in agriculture in Kenya sheds some light on extension interactions with women:

- Women have little access to information and resources.
- The official number of female contact farmers is relatively low (20 - 40%), but wives of absent male contact farmers are also visited on a regular basis.
- On the whole, male agents work well with women and some agents view women as more receptive to extension advice than men; older agents, however, are less likely to work with women.
- Working with groups of women is more efficient and helps to reach women in Muslim areas.

5.12 In Malawi, where men often leave their farms for jobs on neighboring estates, 70% of full-time farmers are women. Yet, "female-headed households are often bypassed by credit and extension services" (African Farmer, 1990, no. 4, 1990, p.50). Roling (1982) asserts that it is not enough to think about reaching female heads of household, reaching females in normal male-headed households is also vital. In Cote d'Ivoire, efforts to increase food crop production in cotton growing areas have been relatively unsuccessful, in part because of the lack of extension assistance directed toward women. Women are not allowed to have individual fields for cotton although they are responsible for working on their husbands' fields, but 71% of 200 women surveyed did have sizable individual fields for food crops. Food crop production did not rise in this situation because increased cotton production demands on women's labor leave women with little time for food crops (World Bank, 1988a, p.96).

5.13 Prior to 1987 when the women's arm of the extension service was established in Ghana, women farmers and field staff were given little support. According to a recent census women farmers control more than half the land planted to food and vegetable farms but only a third to a quarter of land planted to cash crops (Spurling, 1989). Women also tend to have smaller plots, and less time due to obligations for child care, food preparation, wood and water gathering and work on men's plots. Production is constrained as well by an inability to expand acreage and acquire inputs. The traditional differentiation between men's and women's fields, the usual concentration of women's efforts on food production, and the critical role that most African women play in all aspects of farm management make it essential to adapt extension advice to fit their concerns and to communicate directly with them (Feldstein and Poats, 1989). Work to improve traditional women's crops often does not result in benefits to women. For example, the introduction of new technology for rice production in the Gambia has led to a shift of rice from a women's crop to a communal crop grown
under the control of men. Mechanization has also often displaced women. Shifting women’s labor out of food crops to cash crops may have an adverse effect on family nutrition. Extension and research should focus on whether a given message is appropriate for the whole farm and household system -- food crops, cash crops, livestock and resource conservation.

5.14 **Reaching Women Farmers.** The issue of gender should be brought into the mainstream of research and extension program design and implementation. However, there are many obstacles to improving extension for women: returns to working with them may be perceived as relatively low and empowering women may be considered politically and socially threatening in some societies. There are a number of authors who suggest separate female extension services. Berger (1987) argues that, if essentially the same technological information is required by both men and women groups, it is more efficient to have one service. However, she goes on to say that special efforts are needed to recruit female staff. Such efforts should begin early in the educational process, as in some countries where high school counselors encourage young women to study agriculture and livestock. Reorientation of male agents is another way to address women's needs as farmers (Gura, 1986). To improve effectiveness of extension visits to women's groups, the experience in different areas should be compared. In 1987, 51 out of 67 agricultural women's groups in Kirinyaga, Kenya were covered by extension routes compared to 39 in 1986. This improvement, and others like it, should be studied so that such efforts could be replicated. An awareness of the conditions under which women work should be a part of the extension field staff training. They should understand the time and labor constraint of household duties on women farmers. As indicated by several authors cited in Eicher and Baker (1982), women work more hours a year than men when non-farm tasks are included.

5.15 Buvinic and Mehra (1990) suggest that agricultural extension should help women increase food production while shifting more of their labor to export crops. As noted above, women's labor productivity suffers from a lack of access to labor-saving implements compounded with the high demand on their time from other household activities. The key recommendation found in the literature for overcoming this problem is to provide women with access to credit so they can afford labor-saving technology, hired labor, or both (Due et al. 1987, Von Braun and Webb 1989, Buvinic and Mehra 1990, Flora 1982). African women have demonstrated great skill in organizing groups to pool savings, get loans and carry out projects; they should be supported by extension in such efforts.

### Extension for Pastoralists and Agro-Pastoralists

5.16 Livestock extension is the process of disseminating new technologies and improved husbandry and management practices to livestock producers. One subset of these activities is extension for pastoralists and agro-pastoralists. This group is resource-poor, lives in remote locations (and may be nomadic), and thus lacks access to information, marketing, and inputs. A difficult issue for livestock extension is who will deliver services to animal producers - field staff from the Ministry of Agriculture or the Ministry of Livestock Development or both? In most cases a parallel extension system for crops and livestock is not feasible. Crops and livestock professionals have different priorities, even if they all acknowledge the importance of increased crop and livestock production in the same integrated farming system. Furthermore, budgets are too tight.

5.17 Three options have been suggested: (i) an agricultural extension officer who also advises on livestock; (ii) an animal health assistant with primary training in veterinary medicine; or (iii) an animal husbandry agent with specialty in animal nutrition, hygiene and management. Opponents of the last two options say that lack of transport and staff support make it more effective to have one person deliver messages on several subjects (Leonard, 1987, p. 231). It is essential that whatever
type of livestock extension system is devised, it be thoroughly coordinated with animal health
services. For example, in Kenya close linkages between the implementation of NEP II and the
Animal Health Services Project are required. Barring expensive increases in staff and vehicles, it is
unreasonable to expect the staff of the Ministry of Livestock Development in Kenya to provide both
clinical and extension services. However, Animal Health Assistants follow a regular schedule and
can conveniently carry out many activities, including some related to extension, at the dip site. They
are responsible for supervising the dip attendants, who are local residents with a primary education.
In Kenya (as of 1986), there were 1,869 persons attending to government dips and 3,440 dips in
operation. Dip attendants in mixed farming areas are therefore good candidates to help extension
field staff, if given adequate training.

5.18 Livestock extension in ASAL. The three main production systems in the ASAL are
ranching, nomadic/pastoral, and agropastoral; in addition, some crops are grown in many areas.
The primary constraints to extension services to ASAL areas are a lack of technology, somewhat
negative perceptions of government interventions on the part of pastoralists, and incorrect assumptions
about pastoralists on the part of government officials and outsiders. Improved technology for
rangelands is seriously lacking. In order to design appropriate services for ASAL areas, it is
essential to understand the environment and the people who live there. A study designed by the
International Service for National Agricultural Research for Somalia is a good example of the kind of
data collection procedure required to understand rangeland areas well enough to design appropriate
interventions for them. A study along these lines might be helpful to Kenyan and other situations if
properly adapted. The actual design of extension systems will require pilot projects to test out new
designs on a small scale.

5.19 Many experts feel the key issue in the pastoral areas is animal health. They stress the need
for veterinary services and an adequate drug supply and argue that there are really no production
technologies to offer through a conventional extension system. According to Sanford (1983),
pastoral areas need multi-purpose extension agents who can act as conduits between herders and
government on issues of range management, veterinary services, water needs, and marketing.
Because pastoralists are so remote, he suggests using each "occasion of contact" between herders and
extension to exchange more than one kind of information. He describes three social groupings that
can be used for communication: camping communities (people who migrate and camp in the same
area); watering communities (groups that use the same water points or well clusters); and traditional
political and social structures (age and kinship groups). These types of contact are being suggested for
pilot activities in the form of travelling teams under NEP II. Field staff chosen to work on these
teams should have knowledge of local language and traditional culture. Additionally, extension
services in ASAL areas could post a limited number of SMSs to carry out demonstrations and pilots.
Representatives of pastoral organizations (based on traditional groupings) can be trained to work as
field level advisors (de Haan, 1990, personal communication). Many countries have successfully
used pastoral organizations as a channel for animal health services, including Central African
Republic, Guinea, Niger, Somalia and Senegal.

5.20 Mass communication, such as radio, backed up by veterinary services can be used to reach
pastoralists. Kenya has used mobile audio-visual units; these attracted attention but tended to break
down. There have also been efforts to develop residential training courses for pastoralists, but they
often foster a "sense of unreality" (Sanford, 1983, p. 146). Local training centers in northern Kenya
have had trouble drawing pastoralists because they tend to give the impression of "lecturing down" to
attendees. As Kenya's population grows, farmers are moving increasingly to ASAL areas to cultivate
crops on these marginal lands. Additionally, as the area for grazing becomes smaller, some
previously nomadic pastoralists are beginning to cultivate crops. These agropastoralists need
extension advice on crop and livestock production, and need to know how to maintain and conserve their fragile environment. Because the households in this group are relatively far apart but generally not nomadic, meeting with groups may be appropriate. Because of the emphasis on livestock, it may be useful to establish meeting places near dips or other locations for clinical services.

5.21 **Livestock extension in mixed farming areas.** The observations made in paras 5.18 to 5.20 also have implications for improvement of agriculture in mixed farming areas; coordination between ministries dealing with livestock and crops is especially important in such areas where single field agents will be responsible for both crop and livestock extension. There is a general consensus that in highly specialized areas it is necessary to have specialized extension staff. For example, in areas like Kiambu in Kenya where floriculture is prevalent, or in intensive dairying areas, extension agents should be trained to the level of SMS (or graduate degree level). They could divide their time between extension, classroom teaching, and research and make less frequent but regular visits to clients. They could also organize intensive training for advanced producers on issues such as marketing and business management.

5.22 Training dip attendants to serve as front-line staff could be useful as they are in regular contact with groups of livestock owners. Private initiative is increasingly important in these areas. Educational institutions should therefore train students to enter the private sector in various professions such as veterinary medicine pharmacists, accounting, and business. Colleges and training centers should offer short courses (in-service) and diversify their curricula into areas such as student enterprise projects (see para. 4.25). Professional perceptions of jobs such as extension advisers in mixed farming areas should be changed through training at the universities and technical colleges.

6. **EXTENSION PLURALISM**

6.1 Extension pluralism is a conceptual framework for improving extension systems. True pluralism will not emerge under the control of top-down hierarchical structures that suppress initiative and responsiveness. To achieve pluralism, institutional creativity is needed to make extension systems in Africa more demand-driven, decentralized, and linked to research, universities, and agribusiness. An important reason for pursuing this conceptual framework is the increasing rural stratification in Africa. As Eicher (1990) points out, development strategies must go beyond reliance on new agricultural technologies to meet the needs of the following farmers in the 1990s:

- Resource-poor farmers -- net food buyers, who need to supplement their income by working on larger farms and in non-farm activities.
- Smallholders and herders -- who produce food, livestock and export crops using family labor.
- Medium size or progressive farmers -- many of whom use oxen or hired labor; they are able to bear risks, provide some employment to poor farmers, and produce a marketable surplus.
- Large-scale farmers -- a new class, who are emerging from the ranks of soldiers, merchants, present and former civil servants, and the new professional class; this group is politically powerful and able to extract a relatively high proportion of resources and services from governments (Eicher, 1990, p.505).
6.2 The expectation of economic growth is an important reason for pluralist extension systems in Africa. Building in institutional flexibility to anticipate changes may diminish both the direct costs and transactions costs. Not only can change in extension increase production, but economic changes can also force extension to develop and adapt. In the African context, infrastructural development, especially in transportation and communications, will have a significant effect and as economic opportunities for women change, they will be able to shape extension services to serve them better. Pluralist extension systems in Africa must meet the need for specialized field officers in advanced areas. Costly approaches requiring intensive field staff coverage, such as the T&V and commodity-based methods, may be more appropriate for intensive farming systems. Generally there is proven technology available only for certain areas of a country. There may be other types of extension programs appropriate for areas with less potential, such as general community development focusing on poverty and hunger alleviation. Even in high potential areas, there is often a need for information beyond agricultural technology. In the Sudan, monthly "village" days are being organized to attend to such needs. Thus, there is a need for two actions: in intensive, high-potential areas, current extension approaches must encourage more inputs from farmers (the T&V-based system provides opportunities); and more efficient, less costly extension approaches are required for areas of limited productive potential.

6.3 Extension planners should start from the available resources and work toward an approach that is sustainable, rather than starting from an "ideal" approach at an expenditure level that may be untenable. The application of ex-ante cost-benefit analysis including social cost-benefit studies may be helpful. Another option is to use a scenario analysis. Such an exercise should help identify the services that are needed and the options for providing them - including privatization and cost-sharing. One of the costs of developing more pluralist, demand-driven systems is uncertainty. A key factor in improving chances for success is to move slowly. Large-scale institutional overhauls often pose great risk.

Toward a Demand-Driven System

6.4 Governments have played the dominant role in providing agricultural information in Africa. Government officials have a vested interest in keeping a large field staff to serve multiple functions that generate benefits to them. In order to control this force, they control selection, training, and programming of agents. In commodity-focused systems, field staff are controlled by private or quasi-private agencies, but government generally dictates the contract terms and may select local field staff. In some cases, local people select volunteers for training, and these trainers come back to teach, but the message they transmit is shaped at the government level. How can greater responsiveness be built into African extension systems? What rules, legal mechanisms, and social attitudes have government-run agricultural information systems imposed that impede responsiveness? A major factor is a fear of speaking out - especially for women. Others factors are insufficient information or communication infrastructure, poor education and illiteracy, and often a lack of a common language.

6.5 Several options to induce bottom-up control of field staff have been discussed: local selection of agents, cost sharing, local evaluation of agents' performance, and participation of extension staff and farmers in training. Decentralization of power means relinquishing control and a potential loss of benefits for bureaucrats and politicians; thus, resistance is to be expected. Nevertheless, there are two sources of pressure that are envisaged to generate a bottom-up or demand driven system in Africa: the increasing costs of maintaining control; and a perception of benefits from assigning some degree of control to small and medium sized farmers. Pressure for change may come from different sources. Government itself may take up the mantle (as in Kenya's District Focus Strategy). Another possibility is a change in the costs of production or the prices of products. As relative factor
prices change, producers have incentives to change their use of resources and therefore to adopt new technologies. This may lead farmers to pressure extensionists (and researchers) to provide them with the information they need. Finally, political leaders may see an advantage (altruistic, political or economic) in organizing local people to take collective action. Regardless of the source, the power aspect of institutional change must be considered.

6.6 Three other forces that affect institutional change also apply to extension. First, changes in the institutional choice set may occur. As African governments become democratized and markets are liberalized, corresponding changes will occur in economic and agricultural policy. Conversely, choices can be removed. For example, if donors discontinued long-term direct funding of national agricultural extension systems, the options for institutional reforms would be drastically reduced. Second, changes in non-agricultural technology affect extension’s institutional structure. Innovations in (or construction of) communication and transportation systems would change the relative effectiveness of different types of extension institutions. For example, low-cost telephone coverage in rural areas would change the options for extension, as would roads and reliable transport in remote areas. Third, changes in other institutional arrangements affect extension. Changes in research services and related agricultural service institutions (such as introduction of commercial FSCs that offer advice and sell inputs) can affect extension, as would the development of FTCs, or strong farmers organizations.

6.7 But a demand-driven system will not necessarily benefit resource-poor groups unless they organize to pressure the government or private institutions to provide services. They will have to compete with other groups of farmers. The NGOs are a potential source of support for such efforts. Initially, the pressure for services will probably have to come from the government. However, frequently the motivation at the top is to leave the existing power structure in place. Thus, the needs of resource-poor farmers -- especially women -- could be ignored, making donor attention necessary in these areas.

**Making Demand-Driven Pluralism Work**

6.8 How do these ideas work on the ground? Roling (1982) states that "the best areas received the best extension staff" and "good sublocations had demanding farmers, whom the extension service wanted to keep happy, lest they should voice strong objections". This is certainly a good indicator that demand-driven systems are working in some places, albeit for relatively powerful client groups. If in fact pluralism is the best way to improve extension systems in Africa, how can it be introduced in the face of entrenched bureaucracies and the difficulties of mobilizing grass roots change (especially for relatively powerless clients)? It was argued earlier that a condition for increased local participation in extension is a change in the relative benefits and costs as they are perceived by local groups and government. Thus, actions may be required by governments to change (liberalize) agricultural price policies and by research establishments focusing more closely on the economics (not just the yield effects) of new technology. What is needed are catalysts, facilitators, new incentives, and improved access to information for the inhabitants of low-potential areas. Inspired field extension staff, of whom there are many, can fill that role but must be much better trained and supported. Two key questions in this regard are: how can local people be encouraged to take on some support for field extension personnel; and how can the cycle of poor management be broken.

6.9 Other conditions are necessary for implementing pluralism. There will often be conflicting objectives within the extension mandate. This factor combined with limited resources requires trade-offs. The AFMET project in Somalia is an example of the trade-offs involved in meeting various goals. The objectives were to increase food production to the highest level of national self-
sufficiency feasible; and to increase farm income while keeping consumer food prices stable. Extension was concentrated in three regions; crops in the area covered were grown under irrigation. Mullen (1989) criticized the project because it concentrated on the richest farmers with access to irrigation and purchasing power for inputs; he argued that the project worsened access to improved technology by the majority of small farmers, many in rainfed areas. Is it reasonable to ask a government to focus only on helping smaller, resource-poor farmers who are unlikely to generate food production increases great enough to meet the goals stated by the nation? The bottom line is the need to help both sectors. Perhaps, irrigated farmers in Somalia should pay for more of the services they receive (if they value them) but the needs of resource-poor farmers should not be totally neglected. It is essential to take an overall view of the agricultural sector within a pluralistic system rather than concentrating on projects that extensionists benefit a certain group.

6.10 In order to make effective recommendations about improving extension, it is important to be realistic about what can and cannot be done. Expecting demand-driven pluralist systems to work when people have become accustomed to direction - or worse - coercion, will take a long time. Unfortunately, donors and governments often expect that new ideas will yield results in a short timespan. The combination of this expectation of quick results and the fact that people may need time to feel comfortable participating in group extension activities is a serious obstacle to the evolution of demand-driven systems.

6.11 Difficulties notwithstanding, to achieve its potentials, extension in Africa must evolve into a mobilizing force for change rather than being a supervisory arm of the government. To do so, it will have to adapt to incorporate local accountability. Governments will need to create mechanisms (legal structures) to facilitate local accountability for extension and decentralize some of the responsibilities for extension programming (and procurement) to local entities. At the same time, governments need to develop regulations which incorporate issues of broad social concern into activities such as extension agent selection, evaluation, and pre-service and in-service training. To achieve this, it would be useful to investigate how a de-centralized extension system could benefit governments in monetary terms and how the process of institutional change in agricultural extension could be part of an overall transition to democracy and market economies in Africa.
NOTES

1. The approaches involved in CADU are discussed in more detail in annex 2.

2. All Bank-supported extension projects in AF2 are currently based on the T&V approach; for some of the basic characteristics of T&V, see annex 2, paras. 19-20.

3. Dejene (1989) judged the pilot implementation of the T&V-based system to be successful in some of the high-potential areas of Ethiopia. However, he explains that in the low-potential and/or relatively inaccessible areas, the intensive visit schedules of the traditional T&V system might not be warranted.

4. Cost effectiveness as different from overall extension effectiveness is discussed under the financing aspect of sustainability.

5. The need for management training is supported by numerous authors (Oram 1985, Claar 1985, Compton 1989).

6. In their overview of the Asian experience with T&V, Cernea, Coulter and Russell (1983) suggest that in rainfed areas in African countries, the cost of an extension agent may be lowered by involving villagers in the selection and support of extension agents from their own communities. To the authors’ knowledge there are no large-scale examples of local groups funding their own extension agents’ salaries in Africa; front-line staff are however, frequently provided meals and small gifts during their field visits.

7. However, farmers may be willing to pay for an agent whose services they especially value. A group of Senegalese farmers however, were willing to pay their very consistent extension agent rather than have him transferred and risk getting someone inefficient (Schillhorn Van Veen, 1990, personal communication).

8. One reason complete privatization of technology transfer is not practical is well stated by Compton (1989) as follows. In the process of technology transfer, "transfer should not be the major goal. The major goal should be the transfer of science or the capacity to generate indigenous technology, appropriate to the needs and circumstances of a developing society" (p. 114). Voices of caution have been raised insisting that the public sector’s role as a provider of educational services to farmers via classrooms, experiment stations and extension services can be augmented by the private sector but never replaced (Findley, 1985). For further discussion of private sector extension see Schwartz (forthcoming).

9. According to Claar (1988), the constraints on the increased use of commercial or non-profit firms for extension work in developing countries are: (i) such firms tend to focus on a specific commodity; (ii) they usually serve large commercial buyers; (iii) they focus only on a single facet of the production process and do not address management skills or decision making problems as an integrated topic; (iv) the objectivity of such organizations is often questionable; (v) usually payment of some kind is required from the farmer to the firm; and (vi) they do not address the need for an independent source of management training.

10. The kind of production system has a major influence on the type of extension strategy appropriate for an area. For example, sorghum and cattle versus mixed high intensity dairy, maize and coffee.
11. In 1986, for CFDT cotton farmers, the ratios were 1:80 in Cote d'Ivoire, 1:150 in Togo and 1:400 in Burkina Faso. The reason CFDT in Cote d'Ivoire gives for maintaining such a high ratio is the need for organized pest and disease control at the village level. However, they expect that the high ratios will be lowered as well-organized farmers' groups are formed (World Bank, 1988).

12. It may be impossible to rely on the media to distribute relatively complex information. In Malawi, efforts to prepare materials describing the process of preparing and growing seedlings were futile. In the end, posters were used purely to promote the idea of tree planting, while instruction was done in person (Mitka, 1983).

13. During the Guided Change Project (GCP) in Nigeria, radio was used to inform local people about the details of the project. "...The radio program helped in increasing farmers' knowledge about application dates, dates of delivery to the villages, special arrangements for late applicants at the central store etc." This function of radio was especially important under the GCP due to a "strong tendency on the part of some farmers to monopolize vital logistical information" (Huizinga, 1982, p. 128). The withholders were testing the project's four bag (fertilizer) limit by trying to impose a surplus. They assumed that if extra supplies were left over, they would be distributed and those in the know would obviously benefit.

14. World Bank field notes documenting a June 4, 1987 supervisory visit to Nyandarua District in Kenya (under NEP I), discuss the need for training materials on pyrethrum production. The crops officers were advised to prepare illustrated handouts on preparation of nurseries, planting, weeding, harvesting and drying and to publish them with the help of the Agricultural Information Center (AIC) or the Pyrethrum Bureau. Although these handouts were intended for use with staff, they could be designed to be useful for farmers also.

15. There is currently work underway in Mali to develop radio programming to inform farmers about market prices. An example of written material used for providing marketing information is published by the Marketing Research and Information Institute (IVRAM) in Italy. It is a brochure with useful advice on how to grade and pack fruits and vegetables. A similar brochure published by the Agriculture and Home Economics Evaluation Service (AID) in Germany includes information on fruits and vegetables as well as information on storage, transport, marketing organization and marketing intelligence. Such material might not be immediately applicable but could be adapted to use in Africa (Wierer, 1973).

16. To this end, one method is to have field staff assist instructors in preparing training materials for short courses.

17. "Although most supervisors were going through the procedure of making supervisory visits, they did not appear to know what their supervisory job entailed or how to perform it effectively" (World Bank, 1985, p.64).

18. BTORS indicate that there is frequently no adequate garage near the district or division extension office.

19. In Somalia, 196 front-line staff houses have been completed under AFMET and handed over to field staff, but maintenance has been a serious problem. An additional issue is relative quality of housing. The Second Agricultural Extension Project in Somalia provided some relatively
substantial (brick and corrugated roof) houses. If projects do provide housing for field staff, it should be solid but appropriate for the area. Ostentatious housing can isolate an agent and damage his reputation with clients.

20. In addition to basic subjects, off-season in-service training topics might include areas like food storage, food processing, soil conservation, etc. In the particularly slack months of the year, there may be time to: do workshops on audio-visuals; meet with (and integrate messages with) health and nutrition staff; study and carry out statistical analyses and so on.

21. Several countries have had problems with overseas training components (long and short term) financed by donors. Some trainees did not return to their jobs after training. They went to work in other places, in part because no provision was made in the project design for them to have stimulating and relevant positions after they returned from training.

22. For additional information on more effective extension training see Farmer Training in Central and Southern Africa, Cyril Barwell, 1985.

23. For example, promotion to such positions as District Agricultural Officer (DAO) or Assistant Dean at an agricultural college or university.

24. There are some problems with the idea of visiting trainers. Prospective trainers and assistants might have to travel a long distance from their regular jobs and/or have responsibilities preventing them from travelling. As an incentive, University staff could be given a partial publication credit for work related to training field staff. There may also be a language problem for guest trainers. This could be addressed by matching training interns to their work area according to language.

25. "A good extension service does not exist without effective linkages to an agricultural research organization. A research organization may be well rated by tradition-minded agricultural scientists, nationally and internationally...but the farmers don't read the technical papers and, unless the research program is effectively linked with some human service to bring the fruits of new knowledge to the farmers, and to bring the concerns of the farmers to the researchers, the organization's research output will only enhance the professional standing of its scientists" (Whyte, 1975, p.40).

26. The failure to establish such linkages has in part caused the lack of success of U.S.-supported efforts to promote national extension systems in Latin America during the 1940s and 1950s (Rice, 1971).

27. These ratios are based on the ongoing costs of support— not including the initial cost of education (Evenson, 1990, personal communication).

28. The RPSGs provide information in specific technical areas to the District meetings.

29. For example, during an October 1985 visit of extension staff to Bungoma District in Kenya, it was noted that farmers were using closer spacing than recommended for cabbages (because small cabbages were demanded on the local market). The supervising officer noted that extension should communicate to the SMSs (and research) the need for a different spacing recommendation rather than try to enforce an inappropriate one. Another example of the effect of research extension interaction is provided by Kisumu District's Kibos research station where in 1986, based on observations on farmers' fields, researchers started carrying out investigations of the
farmers' practice of intercropping cotton and maize; earlier research had focused only on sole crops of maize and cotton resulting in irrelevant recommendations. Such tests of indigenous knowledge should be expanded and incorporated into KARI's regular research agenda. Extension should be involved in helping to identify useful farmer practices, managing field trials and providing feedback. Extension training should deal with how to train farmers to carry out field trials on their own or with minimal supervision and to report the results to extension (and other farmers).

30. Based on experience in Bangladesh and the Philippines, the formulation of a national regulatory body or council that would develop policy guidelines has been suggested (Quisumbing, 1990, personal communication). Such a committee would determine research priorities; carry out monitoring and evaluation; help generate local and external funding support for the national agricultural research system; approve and recommend allocation of funds and other resources for research programs and projects submitted by the ministries; and link extension with research through national commodity factor SMSs who train front-line staff and assist in on-farm research. Members would include representatives of relevant agricultural sectors at deputy minister level and representatives of financial and budgetary ministries; assistance would be provided by a highly skilled Technical Secretariat. It is suggested that this idea could be adapted to also link with national universities. Deans of the relevant departments could be represented on the committee and the technical secretariat, and could include university staff who might also function as SMSs. Advantages of combining such a regulatory body with academia are: the availability of training facilities and expertise; presence of technical expertise and research facilities; dilution of political focus; direct connection to staff development through influence on curriculum building. Whatever national organization for priority setting and coordination evolves, it is essential to ensure adequate autonomy at the regional level.

31. Much work has been done in this area at the International Service for National Agricultural Research (ISNAR) in the Netherlands under the direction of Deborah Merrill-Sands and David Kaimowitz (Merrill-Sands and Kaimowitz, 1989).

32. As argued by Von Blackenburg (1982), "a better orientation of research toward the needs of practical agriculture cannot be achieved without the assistance of extension, which has to bring research officers in contact with farmers".

33. Compton, 1989, states that there is a need to develop mechanisms to draw together the disparate players involved in research, extension and farming. Having a liaison office(t) is not sufficient. One problem with liaison offices (officers) is that they generally lack the authority to enforce interaction.

34. Such meetings function through the following mechanisms (Hayward, 1990): (i) continuous and regular upgrading of technical expertise of the SMSs including sensitizing scientists to farmers problems; (ii) collaborative research/extension development of farm production recommendations; (iii) joint field visits to study farming systems and field problems; (iv) joint planning and review of on-farm research trials; and (v) providing a forum for inter-disciplinary discussions on holistic farm problems (including technical areas, economic aspects and social problems).

35. It is desirable to include in such groups some younger staff members and representatives of different disciplines such as rural sociologists and environmentalists. Although they are not likely to all agree, diverse issues will be raised and the research agenda broadened. The managerial role of the chairperson is a key factor in the success of such groups (Compton, 1989).

37. A recent Kenya country study on women argues that there is a need for technical packages that will address the main crops and livestock that women work with, especially fruits and vegetables (World Bank, 1989).

38. SMSs are often diverted away from close and frequent interaction with researchers and farmers into administrative activities. Many person days per year are spent in the provincial office or travelling to and attending meetings and seminars. Too little SMS time is spent in making individual forays to research stations or university college campuses to seek specific answers to urgent problems, nor to farmers’ fields to conduct in-depth analyses of any emerging problems.

39. The Zambian teams are called Adaptive Research Planning Teams.

40. For example, once could bring in a group of extension staff and have them discuss a given innovation with researchers to give their views on how they envision it working for their area. One could then let the extensionists design a trial to test out their hypothesis and implement it under appropriate soil, rain and pest incidence conditions. Researchers should monitor these trials (teaching extensionists in the process). Research and extension staff should then analyze the results together and come up with a suitable message for dissemination or, jointly, design on-farm trials for further verification and/or adaptation.

41. One way to incorporate adaptive research into the extension mechanism is through cooperation with farmer groups and associations. In the national agricultural extension service in Zimbabwe, extension staff are very much involved in adaptive research. Extension staff assist researchers in selecting target areas for farmer trials. Researchers carry out FSR and extension then adapt the results to specific areas with research support. In some instances, extension staff and farmers have developed new practices on their own without a formal research process. To enable extension staff to carry out these endeavors, they require training in how to characterize target groups for OFTs.

42. A practical handbook that could help field staff encourage participation is "Participatory Monitoring and Evaluation: Handbook for Training Field Workers" (Stevens, 1988). The booklet contains a guide for training field workers to assist village groups who want to develop a monitoring and evaluation self-help system as a tool for learning from experience and for use by those who are beneficiaries of a project or program. ("Tropical Abstracts", V4(6):99)

43. Although this may seem counter-intuitive, it is the case in some cultures.

44. The field reports from NEP I contain two interesting cases of effective self-started farmers organizations. In Meru, Timau Division, Ngarindari Location, the farmers have organized themselves and are carrying out a diverse set of tasks on their own (BTOR, NEP I, Oct. 1-2, 1986). In Kilifi District, Montondia Division, Bahari Location, Gonze Sub-Location there is an interesting self-initiated group of dairy farmers (BTOR, NEP I, Aug. 13-14, 1986). It would be helpful to know how these groups got started and what keeps them going. Some factors to consider in investigating such cases are: the farmer’s social organization in the area; the strength
of leadership at the grass roots level; the source of the field agent’s motivation and the possibility of using the field agent for assisting with training others.

45. For example, university scientists might do basic research and the first stages of adaptive work in association with the central laboratories of national research bodies. Then the regional research stations would carry out the adaptive work in cooperation with extension staff and farmers.

46. These might be attached to (and located together with) research units carrying out agronomic adaptive research in the field and could focus on analyzing the benefit/cost implications of various alternatives.

47. The Student Enterprise Project is a three-year program that includes a one-year training period focused on training students to become entrepreneurs through "hands-on" courses. A special feature of the program is that students receive a loan through college (at the going interest rate) to pay for all costs of their enterprise and they keep the profits. They pay for the use of all school facilities and other materials out of the loan money. In addition to application of technical skills, the students have practical business management experience. The program has been so successful that local banks have offered graduates loans with only a letter from their principal as security for the loan.

48. An agricultural agent from Zimbabwe argued that in his country, "the main problem is that we are emphasizing technical know-how, but we are not really putting any emphasis on management" (Drinkwater, 1987, p.22).

49. Participation may be inadequate for other reasons than just poor communication skills. As illustrated in the following example, sometimes the problem is poor extension management and understanding. The farmers at Olijoro Orok, in Nyandarua, Kenya, were supposedly very difficult "non-participating" farmers. When they were brought to a meeting during a field visit by an extension supervisor, they participated very well and said they were interested in participating on a regular basis. The problem with their participation had been caused by: (i) inconsistent day and time of field agent visits (which could have been exacerbated by a lack of transport and supervision) and; (ii) a lack of interesting messages except at planting time and other key periods in the cropping season.

50. As Drinkwater (1987) points out, even if farmers’ savings groups are formed to overcome financial constraints, this would not help unless the recommendations are economically viable. For example, in Zimbabwe, recommendations to farmers in the Chirumhanza area were found to be such that given climate, labor and resource constraints, it would be very difficult to make a profit using the full recommended input package.

51. Cimmyt has prepared good training materials for this purpose.

52. When in-service training is carried out by short-term consultants, provisions should be made for training selected staff members to carry out similar training later. The consultant should prepare teaching materials together with the local staff who should practice doing some of the teaching while the consultant is present.
53. According to Wierer (1973), a market advisory service should provide advice on market outlets and marketing techniques (such as interpretation of price information, adjusting production to meet quality standards, etc.). Approaches for getting farmers involved in the marketing aspects of farm management advice are: (i) involve the farmer in a survey and have him/her prepare records of the business (input prices and quantities, sales prices and volumes, storage losses, etc.) that can be evaluated and discussed with the agent; and (ii) plan and organize with farmers test sales of products that are better graded or packed test sales of new products, or trial shipments of products to various markets where they did not sell before (Wierer, 1973, p. 208).

54. In Asia, for example, India had 25% of cultivated land under irrigation, Indonesia 34%, North Korea 48%, South Korea 58%, Laos 13%, Malaysia 8%, Burma 11%, Nepal 28%, Philippines 18%, Thailand 20%, Vietnam 28%, and Pakistan 77% (World Resources Institute, 1990, p. 281).

55. Shumba in Zimbabwe estimates decreases on the order of 1.2% loss per day (Chopak, 1991, personal communication) and Edwards et al (1986) in Zambia quote a figure of 3% loss per day. Dry planting before the rains is not typically an option, especially for farmers depending on hand hoeing, due to the hardiness of the soil at the end of the dry season.

56. This client group generally has low incomes and a small amount of saleable product. Even if investments in extension for them lead to increased yields, there may be a relatively small multiplier effect on local and/or national income from gains in productivity -- especially because most production is consumed at home.

57. Saylor noted in the early 1970s that the need for adaptation of research results was "well-known but largely ignored." For example, he reports that recommendations developed at the Western Research Center at Ukimiguru (in Mwanza, Tanzania) tend to be uniform for the entire Western Cotton Growing Area with diverse physical and climatic conditions. For example, spacing recommendations are the same (23,000 plants per acre) regardless of soil type or rainfall patterns; and early planting is recommended without regard to soil moisture conditions. As indicated in the research/extension linkages section this is still a problem in the 1990s. For example, NEP II in Kenya has as one of its main project objectives improving "the relevance of extension information and technologies." A lack of adoption of improved animal husbandry practices can stem from similar problems. Raikes (1981) states that although there has been a continuation of various practices by which manure is used to fertilize fields and crop residues are used to feed livestock, there has not been very much development or intensification of these practices. Without fodder production, upgrading animals will achieve very little. Extension advice in relation to fodder production however, is seldom adjusted for the seasonal labor requirements of the peasant household. Since the resulting advice involves extra labor at inconvenient times of the year, there are constraints to its adoption.

58. The Master Farmer Schemes (originally clubs) were developed by Emery Alvord in Zimbabwe in the 1920s. The program is no longer formally running but remains an important element in the extension system in Zimbabwe.

59. There are many success stories with small scale cash crop production: tea in Kenya (170,000 farmers), cotton in Zimbabwe (45,000 families), and rubber in Malaysia.

60. One important role of extension is to package information in such a way that it is useful to people with little formal education. For example, a study in Northern Zambia indicates that
farmers had different concepts from extension (and research) about measuring area and distance (Francis and Rawlins-Branan, 1987). They did not use the concepts of hectare or acre -- yet all the recommendations were designed in terms of those units. One of extension's jobs should be to either adapt the recommendation to fit farmers' measurements or teach farmers how to use "common" units.

61. For a detailed discussion of women and extension see Saito and Weidemann, 1991.

62. For example, the proportion of women's labor in farming between countries ranged from less than 1% in strictly Muslim Hausa areas of Nigeria to 49% in Burkina Faso, and 46% in Southern Ghana; within the same regions in the Gambia it was found to be 8% for upland cereals and 77% in traditional women's crops such as swamp rice (Von Braun and Webb, 1989, p.519).

63. Female-headed households in a Tanzanian study were found to be poorer and to have less access to labor because fewer members of the family were available to assist (Due et al. 1987).

64. If farmers groups are divided along gender lines, reaching both sexes can sometimes be a problem. In Machakos, Kenya (Kagundo Division), it was noted that most of the farmers groups in the Division consist of women and thus male coffee farmers are not reached. To reach male coffee farmers, it has been suggested to meet them at the coffee factory where they go every day at harvest time. Additionally, this would be a good opportunity to discuss with the men the advantages of forming groups for more effective extension contacts near their farms at other times of the year.

65. As the yields per unit of land increased from 1.3 to 5.9 tons, the share of women's rice fields in the total dropped from 91% to 10% (Von Braun and Webb, 1989, p.523). Similar increased farm labor and substitution effects have been found with the introduction of other crops, such as high-value vegetables and commercialized dairy production (Buvinic and Mehra, 1990, p.299).

66. In the Gambian case this did not happen, as rice became a communal crop and a higher proportion was retained for home consumption (Von Braun and Webb, 1989).

67. For example, during a July 1986 visit to Kiambu, Kenya, it was noted that only 98 out of 280 women's groups were included in the field extension visiting routes.

68. An organization currently doing an excellent job of combining training and credit for women in Africa is the Uganda Women's Finance Credit and Trust.

69. Sanford (1983) points out that because veterinary services are in such short supply, it is difficult for veterinarians to find time to engage in anything other than urgent activities to control livestock diseases (pp.195 - 196).

70. Commercial ranching in Kenya includes large-scale commercial ranches, feeder lots with professional management and three types of smallholders ranches: (i) individual ranches in the Maasai and other pastoral areas (under 1,000 Ha in size, intended for a few hundred cattle); (ii) group ranches (land registered in the name of a specific social group); and (iii) cooperative ranching, which is more efficient in terms of water expenses and other facilities. The type of livestock support services needed by ranchers is ongoing training for ranch managers. This could take the form of short courses, or regular training meetings. The type of extension agent best suited to work with ranchers is similar to the type needed in intensive dairying areas. He/she
should be trained to the level of SMS and have the resources to run technically advanced training courses along with widely spaced regular visits. Additionally, written materials and radio/video programs would be helpful in reaching ranchers with new information.

71. It is necessary that outsiders understand that the social bonds, norms and structures which organize herdsmen living at low population densities and often on the move in arid or semi-arid areas, will necessarily be different from those prevailing in settled agricultural (let alone industrial) societies (Raikes, 1981, p. 27). According to Raikes, the general government attitude toward pastoralists has been one of how to get them to give up their way of life and to be more controllable. The pastoralists of course consider this to be a threat and view the government’s destocking and grazing control policies with much suspicion.

72. Without access to modern drugs, the traditional herdsman may have to exercise more skill to ensure the health or even the survival of his (or her) animals, than does the modern farmer who can rely on drugs and on veterinary doctors to prescribe and apply them (Raikes, 1981, p. 40). Jahnke (1982) argues that human rather than livestock development may be more important in pastoral areas. He feels that it is necessary to teach pastoralists how to adapt to life in other sectors of the economy so that the arid zone can be used within its capacities and continue to be a valuable resource. Extension should work with sociologists to develop educational materials and methods for use with pastoralists on finding markets for their products, creating services and developing alternative enterprises.

73. The Netherlands’ bilateral aid in Kenya includes some creative and effective livestock extension activities (but they are having problems dovetailing with NEP).

74. In some countries government is unable to absorb all the students being trained as veterinarians and AHAs. For example, in Kenya, approximately 310 AHAs are trained every year and 60 veterinarians (De Haan, 1990 PC). The benefits of hiring additional paraprofessional (junior) staff is offset by the increased costs of transport and professional supervision which are crucial to obtaining useful performance out of them. Training these students to enter the private sector may be more efficient.

75. Traditionally, extension in the U.S. has not sought to encourage the political support of other parts of its audience (outside the farming community) because it did not need to. As the political power of the farming community wanes, extension is increasingly turning to other groups. This means that extension will actively plan programs in such a way as to encourage/solicit support from these sectors (McDowell, 1985).

76. The District Focus Strategy is intended to decentralize management responsibilities (including planning and impact monitoring) to the district level in the expectation that greater autonomy for the districts will help alleviate the problems of bureaucratic bottlenecks in management systems that are centralized in Nairobi.

77. Take the example of the Cooperative Extension Service (CES) in the U.S., which is very much a demand-driven system. Sample data from 1981 concerning the characteristics of users of the CES indicate that extension clients are predominately middle class. They are middle to upper income, high school and college educated, white, married, employed, and homeowners. Those groups using extension services the least, include the poor, single, divorced, separated/widowed persons, those with less educational attainment, the unemployed, retired or students, and renters.
The study indicates that whites use extension more than non-whites. Of all racial/ethnic groups studied, blacks were the most underrepresented. This finding applied to both total previous use and use for one year (Warner and Christenson, 1984, pp. 64-66). Additionally, CES users are politically active. Users of extension services are significantly more likely to vote and to contribute to political candidates than are non-users (Ibid., p.66).

78. Another example of multiple goals for extension is provided by Cote d'Ivoire. An important objective for agricultural development in the north was to alleviate some of the problems of regional imbalance and low incomes: the rural exodus; inter-regional migration, which causes land disputes; and the general political dissatisfaction in the poorer regions, which threatens the unity of the country (Elliot, 1974, p. 1).

79. In the U.S., extension employees do not work directly for the government. Extension staff are employees of the land-grant institutions and are not direct-line employees of any of the three levels of government. Two-thirds of U.S. extension staff are employed at the county level. To a large extent, the system is funded locally.
A MODEL OF EXTENSION SYSTEMS

Central to the extension system are the objective(s) to be achieved by extension services. There are often multiple objectives. Extension strategies are made up of choices regarding each of the following elements in relation to different objectives. First, the organization of extension refers to both the internal structure and the linkages with related organizations and client groups. Second, the target refers to the clients with whom the extension service intends to interact. Third, the content of the interaction defines what will be offered by extension. Fourth, the mode of interaction is the method used. Many of the extension "models" described in the literature are actually strategies designed to address a certain objective. The overall extension system is made up of all the different extension strategies undertaken by various organizations (public and private) in a given country.

Figure 1: Basic Elements of Extension Systems */

*/ Adapted from Royen as cited in Roling (1982).
AGRICULTURAL EXTENSION IN AFRICA

I. CHARACTERISTICS OF EXTENSION DURING THE COLONIAL PERIOD

A. Introduction

1. Institutional change is costly, not only in expenditures for buildings, staff, training, and the like but also because of entrenched vested interests and expectations. To address the problem of improving agricultural extension in Africa, it is essential to know its history. This annex discusses the objectives of agricultural extension and related activities during and after the colonial period, the organization behind those activities, and the legacy in approaches to extension work.

B. The Framework

2. Most African colonial agricultural systems were in place until the early 1960s and some, such as in Zimbabwe, through the 1970s. Many of the institutions and "rules of the game" associated with extension in Africa are remnants of the colonial era: the hierarchical structures of the controlling bureaucracies, rules and conventions on personnel management, training design, report writing, and so on. Agricultural services during the colonial era were characterized by: (i) links to external empires that assured access to inputs, markets, technical information, and human capital; (ii) reliance on direction and compulsion (De Wilde, 1967); (iii) institutional instability; and (iv) lack of attention to appropriate technologies for small-scale farmers.

C. Objectives

3. As Annex 1 indicates, the central elements in any extension system are its objectives. The primary objective of colonial extension was frequently to ensure that commodity production for export was maintained at certain levels of productivity and quality. But the objectives in the colonial period differed for European and African farmers. In European areas, extension programs emphasized modern agricultural techniques and marketing. For example, in Zimbabwe, while extension officers serving white farmers became increasingly specialized, attempts at progressive extension for African farmers were repeatedly thwarted because of political controversy (Kennan, 1990, personal communication).

4. The objectives set for the agricultural sectors in the colonizers' home countries influenced the types of extension strategies used in the colonies. For example, Stevens (1981) observes that, domestically, France focused on competitiveness in the European market and Britain on increasing food production. He contends that although extension agents faced similar conditions, in Africa in French and English speaking areas the extension agents' strategies differed in accord with their domestic priorities. The British extension organizations were headquartered in the Ministry of Agriculture (MOA) and placed more emphasis on food production than French extension, which was managed by unrelated organizations that focused on single commodities. To devise useful extension policies for the future, the relation between economic and political priorities and choice of extension strategy must be recognized both historically and now.
D. Organization and Approach

5. The organization of colonial extension systems was top-down, whether the systems served the entire country or individual commodities. Colonial extension for African farmers was characterized by a high degree of coercion. In Tanzania, before 1950, the 1,500 or so extension workers were in effect rural policemen; they arrested and prosecuted farmers who did not follow the Native Authority rules and regulations. Most extension workers had only a few weeks of agricultural training, and many were related to, or appointed by chiefs (Coulson, 1982, p. 152). This system was abandoned after increases in production were attained in the 1950s without the use of compulsion. 1/

6. Another key characteristic of extension in the colonial period was institutional instability. This instability often stemmed from political pressure for institutional change rather than attempts to improve extension’s effectiveness. By the mid-1980s, for example, Zimbabwe had gone through six incarnations of extension services focused on African farmers. Until 1950, the Department of Conservation and Extension (CONEX) served the needs of settlers. For African farmers, compulsion was instituted in 1951 through the establishment of the Department of Native Agriculture. In 1966, CONEX was broadened to cover white and African farmers and much of the mistrust of the compulsive period subsided. But in 1969, in response to pressure from settlers, the administration put CONEX officers serving tribal areas under a separate institution, the Department of Tribal Agriculture (DTA). African leaders protested the re-attachment of the DTA to the Ministry of Internal Affairs and demanded its return to the MOA. In 1978, however, the DTA was placed under the Ministry of Rural Development under the name Department of Agricultural Development (DEVAG). Finally, in 1980 DEVAG was returned to MOA, where it evolved into its current form the Agricultural Technical Extension Service (AGRITEX) (Kennan 1980, Personal Communication). 2/

E. The Colonial Legacy

7. The overall legacy of agricultural extension in the colonial period is one-way communication and top-down hierarchical organizations. These attributes, well suited to the colonial extension objectives, are of little value in the post-independence period in which extension has a much broader mandate. Nevertheless, two common extension strategies of the post-independence period are direct

1/ Another example of coercion is that of the early cooperatives in Cote d’Ivoire. From 1945 through the early 1960s, there was increased emphasis on encouraging the "natural dynamism" of local people through the formation of cooperatives. But the setting up of the cooperatives as close to coercive. They mainly focused on supplying seeds and fertilizer, storing the harvest, and building a common fund as a protection against bad harvests (Elliot, 1974, p. 5). Local elders serving as representatives of their villages to these Mutual Societies of Rural Production, which included French administrative and technical officials working in the area, did not speak French. Eventually revolts occurred in some areas as cooperative members who claimed they did not benefit from the organizations, refused to pay their dues.

2/ Nigeria also had many different organizational forms for extension. From 1893 to 1920, the British used an individual contact approach to deliver messages about export crops and government regulations. In 1921, a unified Department of Agriculture was established with resulting improvements to the extension service: specific extension objectives were formulated and the need for training was recognized. In the 1940s, the extension service was segmented by province. The Ministry of Agriculture was established in 1952 with an Extension Service Division; parastatals took over input supply and other services, and "production inspectors" took over regulatory duties (Akinbode, 1982).
reflections of this colonial legacy: the "general" extension strategy and the "commodity-based" strategy 3/. The general extension strategy, common in the British colonies, assumed that "useful, practical, and relevant technical information was available in the Ministry of Agriculture and that the appropriate function for agricultural extension was to transfer that technology to farmers" (Axinn, 1988, p. 58). The strategy was usually administered from the top down by the Ministry of Agriculture or other relevant ministries. It used a one-way communication approach that relied on field agents to carry out demonstrations and farm visits, offered a limited array of standardized technical information, and targeted relatively successful farmers. Versions of this strategy are still in use in many countries in East Africa, including Tanzania, Malawi, Zambia, and Kenya. 4/

8. In British colonies, Veterinary and Agriculture Departments in the Ministry of Agriculture or Animal Husbandry were responsible for implementing the general extension strategy. Field staff were deployed at the district, division, and subdivision levels to carry out demonstrations, organize meetings with groups of farmers, and work individually with progressive farmers. The strategy focused on agricultural and livestock production. Little attention was given to input supply, marketing or other rural development issues (De Wilde, 1967). 5/

9. Commodity-focused extension strategies are common to many countries in Africa. The commodity-based extension strategy focuses on one crop, provides multiple services (information, input supply, and marketing) under one administration, and may be managed and financed by a specific commodity organization, or served by staff seconded to such an organization by the government. 6/ The main weaknesses of this approach are that it requires difficult inter-agency coordination, tends to neglect other enterprises in the farming system and may not facilitate the adaptation of messages to specific needs if a set package is used in diverse areas. In French-speaking Africa, the commodity-based strategy is usually implemented through a contractual relationship between quasi-private providers of extension services and governments. 7/ After independence, numerous French-speaking African countries employed French organizations to carry out extension programs on a contract basis. These organizations were normally supported by the French government and managed by French nationals. The companies providing extension services typically focus on one major commodity. Often many different commodity-based organizations exist side-by-side. When Cote d'Ivoire became independent in 1960, there was an extension service for virtually every commodity sold in significant volume (DeWilde, 1967, p. 182).

3/ A variation of this strategy is the package program.

4/ Although the Training and Visit approach has been applied in several of these countries, it has not yet had sufficient impact on this "general" strategy. This will be discussed in detail in the section on T&V.

5/ British agricultural officers had a wide range of duties, however, including managing such public works projects as building dams (Peberdy, 1990, personal communication). Masefield (1972) provides a good overview of the colonial extension service in the former British colonies.

6/ Many of the organizations set up to manage the production of cotton in West Africa and of other cash crops, established single crop extension structures as part of multiple service organizations.

7/ The French language has no word that can be easily translated into "extension." But several French concepts describe different aspects of extension. "Vulgarization" refers to the distribution of inputs, explanation of new techniques, supervision of their implementation, and preparation of some marketing arrangements. "Encadrement" is the framework surrounding the cadres—or field staff—carrying our vulgarization. But the role of Subject Matter Specialists is not included in encadrement.
10. Rice production in Cote d'Ivoire in the 1970s is an example of a successful commodity-based extension strategy in the French-speaking sphere. Organized by the Technical Assistance Society for the Modernization of Agriculture in Cote d'Ivoire (SATMACI), the rice program had two phases: (i) disseminating seeds, fertilizers and new techniques to peasants growing upland rice to increase production and reduce rice imports; and (ii) encouraging farmers to shift rice production from rainfed to irrigated lowlands. The program supervised peasants closely, provided them with inputs, assured them markets and guaranteed them a relatively high fixed price for rice. As a result, production increased rapidly. Yields were boosted because of the combination of incentives: an attractive technical package, timely and reliable supply of appropriate inputs (including information), good prices, and assured markets. Commodity-based extension for rice and cotton has been less successful when the rice and cotton must compete with relatively more profitable crops such as cocoa and coffee (Elliot, 1974). Although typically associated with Francophone Africa, commodity-based extension existed in English-speaking Africa as well. In Nigeria during the 1960s separate commodity divisions and units for export crops were established, leaving common field crops to general extension. Successful commodity units were characterized by: (i) decentralized decision making; (ii) staff highly motivated in training and paying claims; (iii) timely and sufficient supply of inputs; (iv) adequate infrastructure; and (v) highly receptive clients (Akinbode, 1982, p. 48). For any commodity-based extension strategy, the profitability of the commodity makes it possible to sustain the expensive structure of intensive farm visits and input distribution. This strategy is unlikely to be appropriate for commodities with a low profit margin or for those produced primarily for home consumption.

II. EXTENSION IN THE POST-INDEPENDENCE PERIOD: BROADER MANDATES

A. Introduction

11. In post-independence Africa, the state dominates agriculture. It generally provides extension services and credit, controls the provision of inputs, and buys marketed output. Although many African countries gained independence nearly thirty years ago, extension still reflects colonial methods. Post-independence participatory extension systems have not always been realized as planned. Independence in Africa led setting broader mandates for extension and development

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8/ Prices often provide strong motivation for farmers to participate in commodity-based schemes. For example, in Cote d'Ivoire’s Savanna region in 1967, a farmer growing the traditional mix of crops (yams, paddy, cotton, maize, groundnuts, etc.) could make CD$64.59 with an average holding of 0.92 ha. Harvesting one hectare under the smallholder cotton scheme would have earned a CD$116.27 cash surplus (Blume, 1970).

9/ Because of the relatively high costs of the commodity-based strategy, it is most appropriate when all these necessary factors to ensure high productivity are in place. In Cote d’Ivoire, for example, the full-blown commodity-based strategy was implemented only in areas with irrigation. Where rainfed rice was grown, SATMACI sold inputs but provided no advisory services.

10/ Pre-independence governments always relied on direction and compulsion; even today African governments, in their impatience to get things done, tend to fall into the same trap (De Wilde, 1967, p. 162).

11/ Bromley (1988) observes that "upon independence, the first mandate of the new rulers was to protect the small producer from the arbitrary and capricious actions of the economically powerful. We now have a system in which the small producer is at the mercy of the arbitrary and capricious
in general. Although some clearly perpetuate colonial methods, others attempt to move in new directions -- particularly toward increased local participation.

B. Community Development and Integrated Rural Development: the 1950s to the 1970s

12. During the 1950s, the dominant objectives of development were to directly transfer technology (and ideologies) from the "developed" world to "developing" countries. The community development (CD) and diffusion of innovations ideologies dominated development efforts of the 1950s and early 1960s. CD is based on the concept of local people helping themselves to improve all aspects of their community and lives. 12/ It was a "non-revolutionary" method of promoting change that assumed that local people would identify their needs in cooperation with CD workers and develop self-help programs to promote rural development (Staatz and Eicher, 1990; Williams, 1967). The first major community development program was initiated in India in 1952 followed by programs in the Philippines, Indonesia, Iran, and Pakistan. At the height of the community development movement, more than 60 countries in Asia, Latin America and Africa had national or regional community development programs or projects. Under the community development ideology, extension staff functioned both as the motivators for change and the mechanism of technology transfer. Community development agents addressed all the needs of the rural community -- not just agricultural issues. 13/ In Africa, community development staff often did not replace agricultural field staff but worked alongside them and addressed broader development issues. 14/

13. Unlike the colonial extension strategies, community development strategies intended to mobilize local participation, use bottom-up input in program planning, improve linkage between ministries, and broaden both extension offerings and targets. Many different extension strategies focusing on participation have followed CD. The concept that is fundamental to all is the involvement of farmers in seeking answers to their farming problems, using resources accessible to them (Axinn, 1988; Compton, 1989).

14. Although community development agents still work in rural Africa, the CD approach to rural development was abandoned for three main reasons (Holdcraft, 1982, p. 209). First, the necessary power sharing and integration of activities encountered strong resistance within ministries. Much of the resistance to mergers between technical departments came from the extension divisions, leading to actions of bureaucrats".

12/ The ideas underlying CD in an international context arose from such British activities as mass education (in its colonies) beginning about 1920. The term was first used by the British in 1948 at a colonial conference on African administration. Many American advocates of community development maintained that its central purpose was to develop stable, effective, democratic nations and that it was carrying out an important objective of American foreign policy (Holdcraft, 1982, p. 208).

13/ India's mandate for its CD and national extension program laid out the following objectives: "to assist each village in planning and carrying out an integrated, multi-phased family and village plan covering agriculture, village crafts and industries, health services, education for youth and adults, recreation, housing, special programs for women and youth" (Government of India, 1957).

14/ For example in Botswana, Tanzania, Kenya, Malawi and Nigeria.
serious problems with field coordination of development activities. 15/ Second, real participation was difficult to achieve. Local CD agents were accustomed to the colonial style of staff client relations and identified with the local elite; instead of enabling people, they directed them. As a result, local people did not identify with the programs, making success impossible. Third, the too-rapid expansion of successful pilot projects made it necessary to depend on large numbers of poorly trained staff. All these problems have continued to plague agricultural extension, despite changes in strategies.

15. The early 1970s brought a shift in the focus of development thinking, from overall economic growth to "meeting basic needs" (RRDC Bulletin, Nov. 1978, p.14) 16/. The basic needs ideology, together with the integrated rural development (IRD) approach, incorporated the community development emphasis on a broader social mandate for development activities -- including extension. The failure of the direct diffusion of innovations through extension to transform Africa's rural sector was followed by increased "micro-level research on agricultural production and marketing, farmer decision-making, the performance of rural factor markets and nonfarm rural employment" (Staatz and Eicher, 1990, p. 15). Although agricultural extension alone was clearly not the solution to Africa’s agrarian crisis it continued to be an important part of development projects. The IRD projects of the 1970s had problems similar to those of the CD projects of the 1950s: overly rapid expansion and excessive complexity. These problems made them "difficult to implement and replicate over broader areas" (Staatz and Eicher, 1990, p. 20). Agricultural extension during this period was still primarily based on the two major colonial strategies: general and commodity-based. For specific projects, however, new extension strategies focused increasingly on participation by, and cooperation with farmers cooperatives and associations, reinforcement of Farmer Training Centers, and closer involvement with community development workers and home economics agents.

16. One of the most well-known integrated rural development projects in Africa was the Chilalo Agricultural Development Unit (CADU) project in Ethiopia. CADU was a comprehensive rural development project initiated in 1967 with the support of the Swedish International Development Authority (SIDA). It used an extension strategy that diffused innovations through model farmers. The project focused on small areas and invested intensively in vehicles and in inputs such as rural infrastructure, credit, and seed multiplication. 17/ In 1974, CADU was expanded to cover the entire Arsi region and became the Arsi Regional Development Unit (ARDU). Under ARDU, extension staff were all multi-purpose rural development agents (RDAs). RDAs' activities ranged from literacy campaigns, political education, and youth organizations to promoting changes in farming from single cash crops to crop and livestock mixtures suited to each area. The coordination and supervision of field staff and resources management were decentralized to the District level. 18/

15/ Holdcraft (1982) points out that local coordination succeeded when all technical extension personnel and community development workers were supervised by a district administrator rather than by the representatives of their technical ministries or the national community development agency (p.222).

16/ "Basic needs" -- at a minimum -- refers to the essential requirements of every individual for food, shelter, clothing, and access to essential services such as safe drinking water, sanitation, transport, health, and education.

17/ CADU utilized the equivalent of 41 million U.S. dollars in 17 years (1967-83) on approximately 600,000 ha of arable land, covering some 93,000 households ($397 per household).

18/ However, "ARDU's multi-purpose extension agents reached only a small percentage of Arsi's farm population. The multi-purpose agent concept did not turn out to be appropriate as field staff did
But just as in IRD or CD projects, extension activities of CADU/ARDU were expanded too rapidly for existing field and managerial staff to handle. A key lesson is that extension field staff cannot perform effectively if they are given little support and yet expected to carry out a wide range of duties.

C. **Increased Food Production: the 1970s through the 1980s**

17. The "basic needs, growth with equity" approach of the 1970s increased the emphasis on food production to decrease dependency on imports. In 1974, the World Food Conference brought together representatives from 145 countries to set a global mandate to increase food production. The number of international agricultural research centers (IARCs) increased. This led to new objectives for extension. Cash crop and commodity-based extension strategies were in many cases broadened to include food crop production; and in connection with farming systems research (FSR), extension's role expanded to include a larger needs assessment and feedback role and stronger links with research (such as participation in local adaptation of technology). This new mandate required changes in essential elements of the extension system; for example:

(i) Target groups had to be broadened to include women and other limited-resource farmers.

(ii) Two-way communication approaches had to be tried and improved.

(iii) New offerings had to be provided (information gathering services rather than merely extending information; messages addressing the entire farming system, not just food crops).

(iv) Changes needed to be made in internal and external organization (new job descriptions and training methods were developed with increased emphasis on linkages with research and between MOAs and other ministries).

The commodity-based extension systems have had difficulty achieving the same level of performance in promoting food crops as they did in cash crops. A recent World Bank study of cotton production in Burkina Faso, Cote d'Ivoire, and Togo found that extension performed well for cotton but poorly for food crops (World Bank, 1988). Farmers surveyed in these countries were less satisfied with technical assistance and the credit system for food crops. 20/ 21/

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19/ For example, "by 1973 it was estimated that the extension agents were spending up to 50 percent of their time facilitating the provision and collection of credit" (Cohen, 1987, p. 93). These activities not only limited time for real extension activities but also affected the relationship between agent and farmer.

20/ Of the farmers surveyed, 91% were generally satisfied with (CFDT) performance on cotton, 85% found input distribution to be very satisfactory, and about 70% felt collection and marketing of seed cotton (including credit) was satisfactory. Regarding food crops, only 55% claimed better yields due to CFDT technical assistance, 22% said food crop yields decreased, and 47% were unhappy with the credit system for food crops (World Bank, 1988 pp. 87-88).
18. During the mid-1970s it became apparent that generating appropriate agricultural technology for resource-poor farmers required a better understanding of the conditions and constraints under which they operated. FSR was devised to take a holistic view of all the complexities of the farming system: soils, plants, animals, implements, farm workers, and environmental influences which are all managed by the farmer to produce output according to his or her preferences or aspirations and using available inputs and technology (CGIAR/TAC, quoted in Tripp and others, 1990). Under an FSR strategy extension plays an important role not only in disseminating technology but also in helping to adapt technologies to local conditions. Successful implementation of the FSR strategy requires strong linkages between research and extension. The farming systems approach is based on program planning and adaptive research focus being controlled jointly by local farm men and women, agricultural extension officers, and agricultural researchers. "The purpose is to provide extension personnel (and through them farmers), with research results tailored to meet the needs and interests of local farming systems conditions" (Axinn, 1988, p. 91). Senegal provides a good example of the FSR extension strategy. The nation has a history of on-farm research (or "action" research) culminating in the "Unites Experimentales", which helped researchers and extensionists to better understand the structure and organization of small family farms (Bingen and Faye, 1987). For African agriculture, the 1970s brought a better understanding of local farming systems and rural society, but little progress was made in improving production, especially of food, in rainfed areas. The green revolution had not yet come to Africa.

D. The 1980s: Improved Extension Organization and Management — "Training and Visit"

19. In the early 1980s, the focus of overall development strategy shifted from the micro level toward the policy environment, economic growth and the macroeconomy. The 12 IARCs that had been in existence for a decade or more had little measurable impact; it seemed that more was needed than just new technology. FSR took on a bigger role in development programs, and increased attention was given to strengthening national research and extension institutions. In 1980, the International Service for National Agricultural Research (ISNAR) was formed to support national agricultural research systems in developing countries. The scene was ripe for a new extension strategy, and the Training and Visit system (T&V), which had originated in Asia, was introduced in many African countries.

20. The original version of the T&V system has as its basic tenets professionalism, a single chain of command, clear job descriptions (including only extension communication activities), regular fortnightly training sessions with Subject Matter Specialists working closely with research scientists, regular farm visit schedules, and the use of contact farmers to diffuse information to other farmers (Benor et al. 1974 and 1977). In terms of the basic elements of an extension system outlined in this paper (see annex 1), T&V can be described as follows:

\[21\text{ In Cameroon, the national extension service in theory has a mandate to cover a wide variety of topics, such as agriculture, forestry, animal breeding, marketing, infrastructure, living conditions, and training of farmers and extension staff. Nyemba (1987) reviewed the actual performance of extension in the central and south provinces of Cameroon in 1982-83 and compared it to the broadly stated mandate. He found that field implementation was narrowed to a focus on cash crops (coffee and cocoa); little support went to smallholder production of food crops or other rural development issues.}\]

\[22\text{ FSR in Africa began with Collinson’s work with wheat in Kenya in 1976; these activities were supported by the International Wheat and Maize Improvement Center (CIMMYT). One of the major applications of FSR by the IARCs, of which CIMMYT is one, was to incorporate into commodity-based research a farming systems perspective in order to devise technologies that would suit the needs of resource-poor farmers (Tripp and others 1990).}\]
(i) It has an internal organization and management structure similar to the "general" strategy, with little provision for local accountability.

(ii) Its external organization includes links with research through the SMSs and researchers' attendance at extension training, but none with formal educational institutions or farmers' associations.

(iii) Its interaction is based on regular, direct communication with (primarily) contact farmers. Feedback is solicited from farmers, but not normally at the needs assessment stage. 23/

(iv) It targets mainly farmers in areas that are irrigated or in high-potential rainfed areas.

(v) The content of interaction is limited mainly to information on selected crops. Little information is provided on livestock or on such subjects as mobilizing local organizations, supplying inputs, or marketing output.

In theory, the system includes feedback channels for both extension and farmers to researchers. At the fortnightly training with SMSs, staff are invited to discuss farmers' reactions and their own observations about the technical messages provided by research. Theoretically, the SMS acts as the liaison between farmers, extensionists, and researchers, delivers feedback, trains field staff, and works on adaptive research. But it has been difficult to realize these ideas in the field.

21. Part of the colonial legacy was the large number of government extension staff deployed in the field. Managing this staff effectively after independence was a serious problem. When independence came to many African countries, large numbers of expatriate middle-level managers left. The system of extension supervision continued, but it was handicapped by the lack of managerial skills required to make it work effectively -- particularly at the district and regional levels. The T&V approach which had been implemented as an extension personnel management system in Asia, addressed these problems through a strictly regimented management structure. Thus, the T&V extension strategy was introduced to Africa in an attempt to make existing extension systems more efficient and effective. T&V promised to bring about significant increases in African agricultural production at a low cost through frequent and regular visits of extension staff to individual farmers to deliver simple advice ("impact points") throughout the cropping cycle.

22. During the late 1970s, substantial research on extension was carried out at the Institute for Development Studies (IDS) at the University of Nairobi in Kenya. 24/ The collective wisdom of the IDS group is reflected in the extension chapter of the 1975 Second Overall Evaluation of the Special Rural Development Program in Kenya. The report lists the factors limiting extension effectiveness: performance of extension staff; the overall extension structure; mobilization of farmer participation in extension; and reaching less progressive farmers. Some of the specific recommendations made for improving extension and training were: (i) make average farmers the primary target group; (ii) concentrate extension activities on groups; (iii) make innovations as simple and appropriate as possible; (iv) increase the number of farmers attending Farmer Training Centers; and (v) mobilize farmers' groups through appropriate local mechanisms but never appoint group leaders through extension staff or administration. To improve staff efficiency, the report suggested

23/ In recent years work with groups has, however, become a common adaptation of T&V in Africa.

24/ The researchers included David K. Leonard, Niels Roling, Phillip Mbithi, Judith Heyer, Fred Chege and others.
that extension programs make specific work plans for extension agents, hold in-service training courses, and provide all field staff with bicycles. Some of these points are covered by the T&V strategy— notably, simplification of extension offerings, specific plans of work, and frequent regular training. However, many of these recommendations were not implemented and are being resurrected as "new ideas" in the 1990s. We will return to some of these points after further discussion of the experience with the T&V strategy in the 1980s.

23. Roling (1982) states that the T&V strategy in Africa has essentially reinforced the general extension approach. It does not attempt to pursue a broad extension mandate as did extension under the CD or IRD approaches to development. Nor does it attempt to facilitate local participation to improve agriculture and rural life in general. T&V tries to improve the effectiveness of existing extension resources through the systematic deployment and in-service training of field workers. The T&V strategy in practice suffers from weak feedback functions and poor implementation of the SMS role. SMSs tend to have unclear job descriptions, spend too much time travelling, and lack adequate training (Howell, 1982). Other problems that T&V exhibits in practice are a lack of trained managers, inefficient bureaucracies that have problems balancing program planning and organization and a general lack of attention to minor crops and marginal groups. The cost of T&V (or any intensive field coverage based on personal contact) is problematic for long-term financial sustainability.  

24. T&V has become controversial in the extension community -- largely because of a perceived rigidity of structure and a focus on procedure rather than on increasing the relevance of technological messages and improving the methods of transferring these messages to farmers (World Bank, 1989, p. 9). The World Bank's extension support continues to focus on T&V but attempts to adjust the system to the needs of specific situations and to make extension projects more cost effective (World Bank, 1989). Hayward (1989) lays out four main principles for improving extension systems: (i) situation specificity; (ii) economic sustainability (with an emphasis on lowering recurrent costs); (iii) system flexibility; and (iv) participation (World Bank, 1989). The experience with T&V in the 1980s makes it clear that the ideas raised in the 1970s at IDS for improving extension's capacity to help overcome the agrarian crisis in Africa are still highly relevant today. There is still a need to reassess the overall extension structure, to reach less progressive farmers, to make average farmers (including women) the primary targets, to concentrate extension activities on groups, to increase the use of FTCs (which now require rejuvenation), and, most of all, to mobilize farmers' participation in extension through appropriate local mechanisms.

25/ World Bank-supported Extension projects tend to include financing for a relatively large portion of incremental recurrent costs.

26/ In 1988, US$492.1 million equivalent was in the process of being spent on 82 World Bank-supported projects with extension components in Africa (33 projects applied the T&V strategy). The total amount spent on agriculture between 1985 and 1989 was equivalent to US$19,441 million, of which 4.1% was related directly to extension.

27/ As Roling astutely observed concerning T&V, "the system seems to go a long way to rationalize the use of existing extension resources. The question is whether the method is really an alternative in the sense of reaching the mass of small-scale producers" (Roling, 1982, p. 106).
III. Summary

25. This annex lays out a basic review of the history of extension in Africa. It focuses on how extension strategies have changed as general development ideologies changed. The legacy of colonial extension is one of top-down hierarchical structures, one-way communication, and a focus on supervising efficient cash crop production. The general and commodity-based strategies are both remnants of the colonial era. The general strategy is usually administered from the topdown by MOA or other ministries, employs a one-way communication approach using field agents to carry out demonstrations and farm visits, offers a limited array of standardized technical information, and targets relatively successful farmers. The commodity-based strategy focuses on one crop and provides multiple services (information, input supply, and marketing) under one administration. Successful commodity-based strategies generally include a number of elements: good producer prices, appropriate technology, consistent extension, reliable input supply, and assured markets.

26. Independence brought a broadening of development mandates in general; extension was no exception. The community development and integrated rural development approaches both led to broader mandates for extension. CD, in particular, introduced the idea of local participation and thus the importance of clients' identifying with extension programs. The basic needs philosophy of the 1970s led to increased emphasis on cooperation between extension and research under the mantle of FSR. Many commodity-based strategies also began to broaden their mandates to include food crop production. In the 1980s attention turned toward the need to strengthen institutions and the T&V strategy was introduced in many African countries to improve the efficiency and effectiveness of existing extension programs. But the T&V system has yet to show that it has sustainable answers for providing efficient extension services to small-scale farmers, particularly in rainfed agricultural (and livestock) systems, and the search for more effective mechanisms for the generation and dissemination of new technology continues.
## AGRICULTURAL EXTENSION IN EAST AFRICA

<table>
<thead>
<tr>
<th>Country</th>
<th>Cost of Current World Bank-Supported Extension Projects (Source: World Bank Staff Appraisal Reports)</th>
<th>Percentage of cost paid by country</th>
<th>Recurrent costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rwanda Agricultural Services Project 1990-96</td>
<td>Total project 17.0 (30.1) Families directly covered 168,000 Percentage of cost paid by country 10% Recurrent costs 2.98%</td>
<td>6.0 other donors: AFDB 1:400-1 9%</td>
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</tr>
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<td>Zambia Agricultural Research and Extension Project 1990-96</td>
<td>Total project 7.6 (38.8) Families directly covered 55,900 Percentage of cost paid by country 6.0 other donors: NORAD 1:400-1 13%</td>
<td>4.9</td>
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<tr>
<td>Uganda Agricultural Development Project 1985-90</td>
<td>Total project 37.2 (31.4) Families directly covered 47,000 Percentage of cost paid by country 21% other donors: IFAD 1:240 9.5%</td>
<td>3.0</td>
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</tr>
<tr>
<td>Burkina Faso Agricultural Support Services Project 1989-97</td>
<td>Total project 24.7 (4.9) Families directly covered 607,600 Percentage of cost paid by country 6% other donors: AFDB 1:350-1,000 49%</td>
<td>21.9</td>
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</tr>
<tr>
<td>Sudan Agricultural Research, Extension and Training in the Irrigated Sector 1986-94</td>
<td>Total project 20.5 (35.0) Families directly covered 300,000 Percentage of cost paid by country 42% other donors: USAID 1:40 1%</td>
<td>10.6</td>
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<tr>
<td>Somalia Second Agricultural Extension Project 1988-94</td>
<td>Total project 22.2 (26.7) Families directly covered 158,000 Percentage of cost paid by country 13% other donors: AFDB 1:731 3%</td>
<td>8.4</td>
<td></td>
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<tr>
<td>Cote D'Ivoire Agricultural Extension Project 1987-92</td>
<td>Total project 36.2 (38.5) Families directly covered 200,000 Percentage of cost paid by country 42% other donors: IFAD 1:111 75%</td>
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<tr>
<td>Cameroon National Agricultural Extension and Training Project 1991-97</td>
<td>Total project 18.59 (31.05) Families directly covered 700,000 Percentage of cost paid by country 23% other donor: Bi-lateral 1:300 9%</td>
<td>13.69</td>
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- **a/** The field staff are financed by different national bodies. **b/** This represents a recurrent cost reduction of approximately 3.3 million per year from the pre-project cost structure of donors and the government of Rwanda. **c/** US$14.2 million for research. **d/** Technical assistance represented 25% of total project cost. **e/** Other projects with extension are being added for Uganda. **f/** This is the total number in the project area. The T&V pilot will cost US$1.5 million and will cover 47,000 families. **g/** According to Mullen (1989), project funding for APNET was US$40 million for 1980-85 (USAID) and US$51 million for 1985-90 (World Bank, African Development Fund, EEC and FRG). The SAR only refers to the first two donors. **h/** Includes costs of training and some university support. **i/** 240,000 tenants on irrigated schemes. **j/** Only in a limited pilot area covering 615 tenants. Total cost for the two pilots covering 615 tenants includes: housing, training, office and audio/visual production facilities (1.5 million), vehicles and a/v equipment (1.2 million) and, fuel and vehicle maintenance (1.7 million). **k/** Extension and training. **l/** Only 400,000 farmers receive extension services.
Several recommendations based on Kenya's experience with extension projects may have broader application:

- For NEP II, the Government of Kenya has been requested to have the required evaluation papers prepared and approved ahead of time, by both committees concerned and by the World Bank, so that when funds are ready to be disbursed, purchases can be made immediately. This type of intensive preparation for project procurement should be used whenever lag time is expected to be a problem.

- Over the long term, the procurement process could be improved if Kenya's institutional structure were changed to a single committee system. The Ministerial Evaluation Committee could include members of the Tender Board and approve the final proposal in one step.

- It would be more effective to give District and Division officials the job of detailing required vehicle specifications (based on guidelines) and preparing as much of the required documentation as possible for submission to the National Tender Board. Bringing District staff into the process increases the pressure to speed things up, as they have the strongest incentive to get vehicles into the field quickly. Field supervision reports from NEP I in Kenya indicate that District staff are often able to disburse funds more efficiently than national officials.

- A demand-driven extension system backed up by strong farmers' organizations might be used to help pressure the procurement process to move faster. Additionally, if special interest groups are intentionally slowing the process, making the process more transparent may help; this might be done by opening it up to public scrutiny, publishing newspaper stories about it, and discussing it on radio.

- The incentives for staff in procurement to work quickly and correctly should be improved.

- A better system of accountability should be introduced between the Ministries of Agriculture, Livestock, and the Treasury. As Leonard (1987) pointed out, if the Treasury has clear proof that money is needed for extension transport, it will have a harder time cutting the budget in these areas, and pressure to carry out procurement rapidly will be backed up strongly with consistent financing.
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