

RESEARCH AND EXTENSION LINKAGE - THE CASE OF KENYA

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(The views expressed in this paper are those of the author
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ABSTRACT

It has been a widely accepted fact that in most developing countries including Kenya, there is a gap in the technology generation and dissemination process which often leads to non adoption of recommendations. In order to improve the extension services the Government of Kenya has introduced the Training and Visit approach. To make the research process more efficient in generating appropriate recommendations for the target group of farmers, OFR/FSP process has been accepted and will be integrated into the research process in Kenya. They also have recognized the need for strengthening the linkage between the various actors namely the researchers, extensionists and the farmer in deriving recommendation. Recognizing the complementarity, this paper discusses the possible coordination and linkage mechanism that could be established within the existing administrative structure of Ministry of Agriculture and Livestock Development which will improve the technology development and dissemination process. OFR/FSP by involving researchers, extension workers as well as farmers, in deriving recommendations provides a natural link.

1.0 INTRODUCTION

Many developing countries are now restructuring their research and extension network to meet the needs of small farmers. Development practitioners generally agree there is a gap between research and extension in the technology innovation process. Attention is now focused on improving the generation and dissemination of technologies, ensuring effective linkage among farmers, extension workers and researchers. In order to improve the extension services in Kenya, the GOK has adopted the Training and Visit approach to extension. In addition, agricultural research has been need-oriented towards definite goals rather than towards the customary disciplinary interest. To make the research process more efficient in generating recommendations appropriate for farmers, on-farm research with a farming systems perspective (OFR/FSP) will be integrated into the research process in Kenya. The major task is to ensure the establishment of strong linkage to maximize limited research and extension resources while providing the services required by farmers. This paper discusses a linkage mechanism that could be established within the existing administrative structure of the Ministry of Agriculture towards improving the generation and dissemination of technology.

2.0 KENYAN AGRICULTURE

The Republic of Kenya has a land area of 575,000 km², with varied climatic conditions. The country has many contrasting agricultural systems. Current population is around 19 million and is growing at a rate of 3.9 percent per year. 90 percent of this population lives on 27 percent of the arable land, with population densities of 200 per km². Of the total land area, 18 percent is of high and medium potential and 82 percent is semi-arid or very arid. A major proportion of the land is therefore suitable only for livestock.

Kenya's economy is predominantly agricultural. Agriculture accounts for 34 percent of GDP and provides over 50 percent of export earnings (mainly coffee and tea), as well as nearly all domestic food supplies and the raw materials for Kenya's industries. With the continued sub-division of large, group-owned farms, the proportion of land owned and operated by small land holders is increasing. Small land holders currently account for an estimated 75 percent of production and 85 percent of total agricultural employment. Although small landholders consume most of their production, at the aggregate level they play a crucial role in commercial production of both export crops and domestic food and cash crops.

Maize is the major staple food and dominates the cropping pattern (over 1 million ha, most of it grown by small farmers). Pulses (beans) are probably second to maize in terms of planted area.

Wheat is the second most important cereal crop and is grown mainly on larger farms (over 20 ha). Sorghum and finger millet are the main cereal crops in marginal areas. Traditional insurance crops such as cassava and sweet potato are also important in many farming systems. Rice is a minor crop and is grown only under irrigation. Sugar cane is grown both on large estates and by small land holders. Coffee, tea, and pyrethrum, formerly grown primarily on large farms, are now the principal cash crops grown by small farmers produce about 60 percent of the marketed production of coffee, 35 percent of tea, 45 percent of sugar cane, 45 percent of maize and almost all the marketed production of rice, pulses, cotton and pyrethrum. Tobacco joined the agricultural products export list in 1984. Many horticultural products are also produced in Kenya, and a significant proportion is exported.

Smallholder cattle farming predominates with about 1 million cattle owners. Sheep and goats are kept by over 50% of all smallholders, and chickens are found on almost every farm. The smallholder sector produces over 75 percent of the total milk output, and 65 percent of total beef

production, as well as substantial amounts of eggs, poultry, mutton and goat meat. About 50 percent of this is consumed at home. Livestock farming is becoming commercialized through the introduction of high-yielding grade cattle, the adoption of high-yielding arable fodder crops like bana/napier grass, and improved management of natural pasture.

Both crops and livestock play a crucial role in the agricultural economy of Kenya. Given the country's limited land supplies and rapidly growing population, the Government of Kenya is making every effort to increase agricultural production, especially food production.

3.0 CURRENT RESEARCH - EXTENSION ORGANIZATIONAL STRUCTURE

The Ministry of Agriculture and Livestock Development (MALD) has two main departments: the Veterinary Services Department and the Agricultural Department. Both are supported by a strong administrative department as well as a development division. The organizational structure of the Department of Agriculture is presented in Figure 1 and is headed by the Director of Agriculture. He is assisted by a Deputy Director and seven Operational Divisions at Headquarters. The country is divided into 8 provinces and 41 districts. The districts are the Primary Administrative Units in Kenya where development efforts are focused.

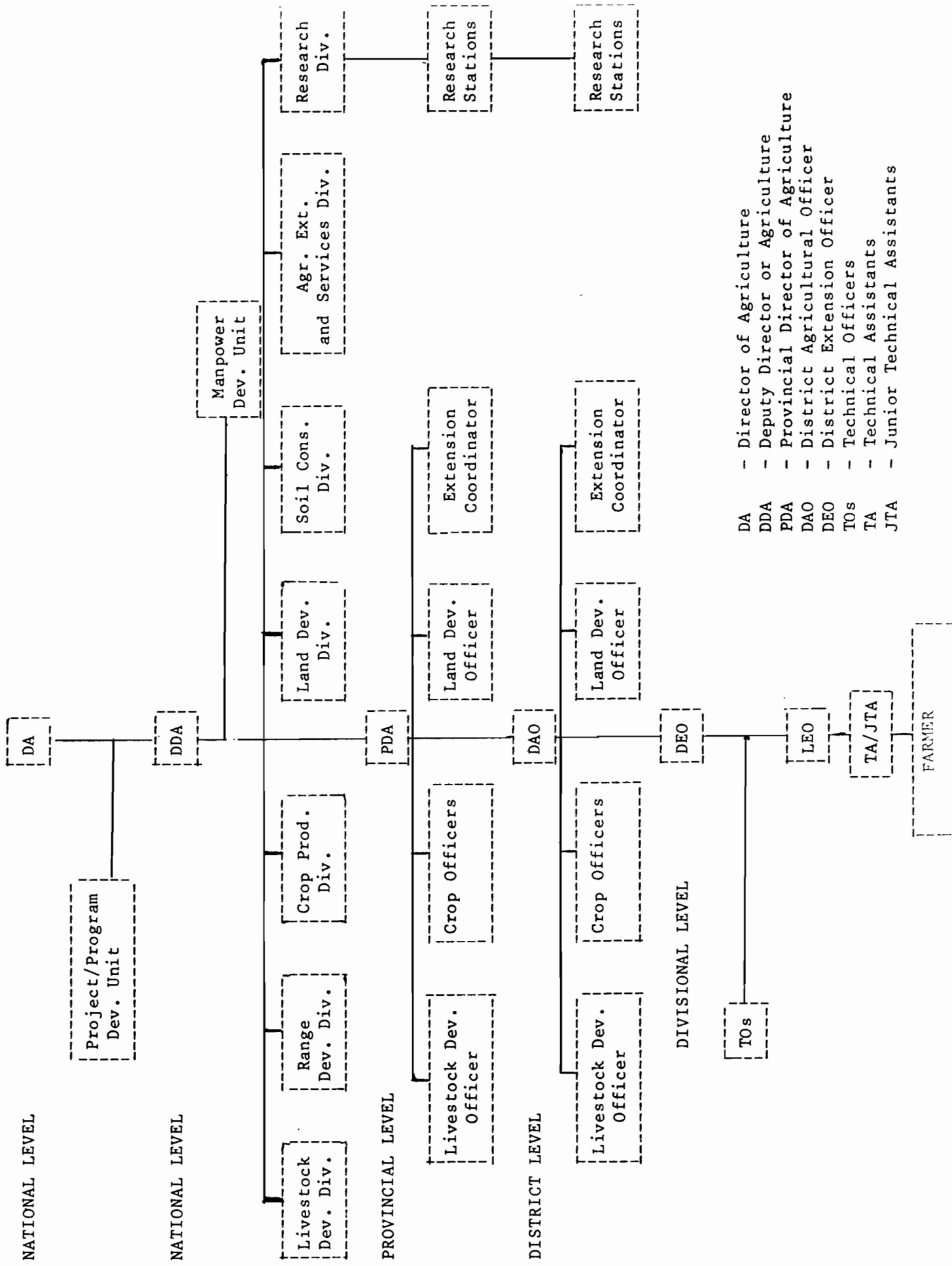
Development Planning should be carried out primarily at the District level where Government activities in various sectors are put together into District Development Plans. Although district focus is the ultimate aim, a considerable amount of planning is still being carried out at the Provincial and National level due to a shortage of personnel at the District level.

3.1 Agricultural Extension

The Department of Agriculture is responsible for all agricultural extension service except for tobacco and tea. Providing extension services for the latter is the responsibility of Kenya Tea Development Authority. BAT Kenya Limited provides extension services for tobacco.

Kenya is currently using the Training and Visit approach to provide extension services. This is a management system based on a systematic program of farm visits and staff training to communicate technical recommendations to farmers. Under this system, contact farmers are selected and systematically visited by front line extension agents. The system also attempts to equip junior extension staff with changing extension messages on a bi-weekly training schedule, followed by tight supervision to ensure that they work with specified contact farmer on a rotating schedule.

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT
ORGANIZATION OF THE DEPARTMENT OF AGRICULTURE



- DA - Director of Agriculture
- DDA - Deputy Director or Agriculture
- PDA - Provincial Director of Agriculture
- DAO - District Agricultural Officer
- DEO - District Extension Officer
- TOS - Technical Officers
- TA - Technical Assistants
- JTA - Junior Technical Assistants

farmers on a rotating schedule. Staff of the National Research network are used to enhance the professional knowledge of middle level staff through monthly workshops where field-level problems are discussed. A continuous flow of technology relevant to farmers' needs is key to the success of the Training and Visit system.

The proposed organizational structure of the National Extension Program is presented in Figure 2. This does not cover the livestock sector. At the national level, the Head of Agricultural Extension and Specialist Services Division Coordinates the activities and has day-to-day responsibility for the National Extension Project. At the Provincial level, the Department of Agriculture is headed by a Provincial Director of Agriculture (PDA), who coordinates all activities, including agricultural extension and training in the districts under his jurisdiction. He is assisted by the Provincial Extension Coordinator (PEC), who organizes the training of district staff and monthly workshops, and the Provincial Crop Officers (PCO) who are responsible for planning and implementing the bi-weekly training sessions.

The Provinces in turn are divided into a number of districts headed by a District Agricultural Officer (DAO) who is responsible for all agricultural and training

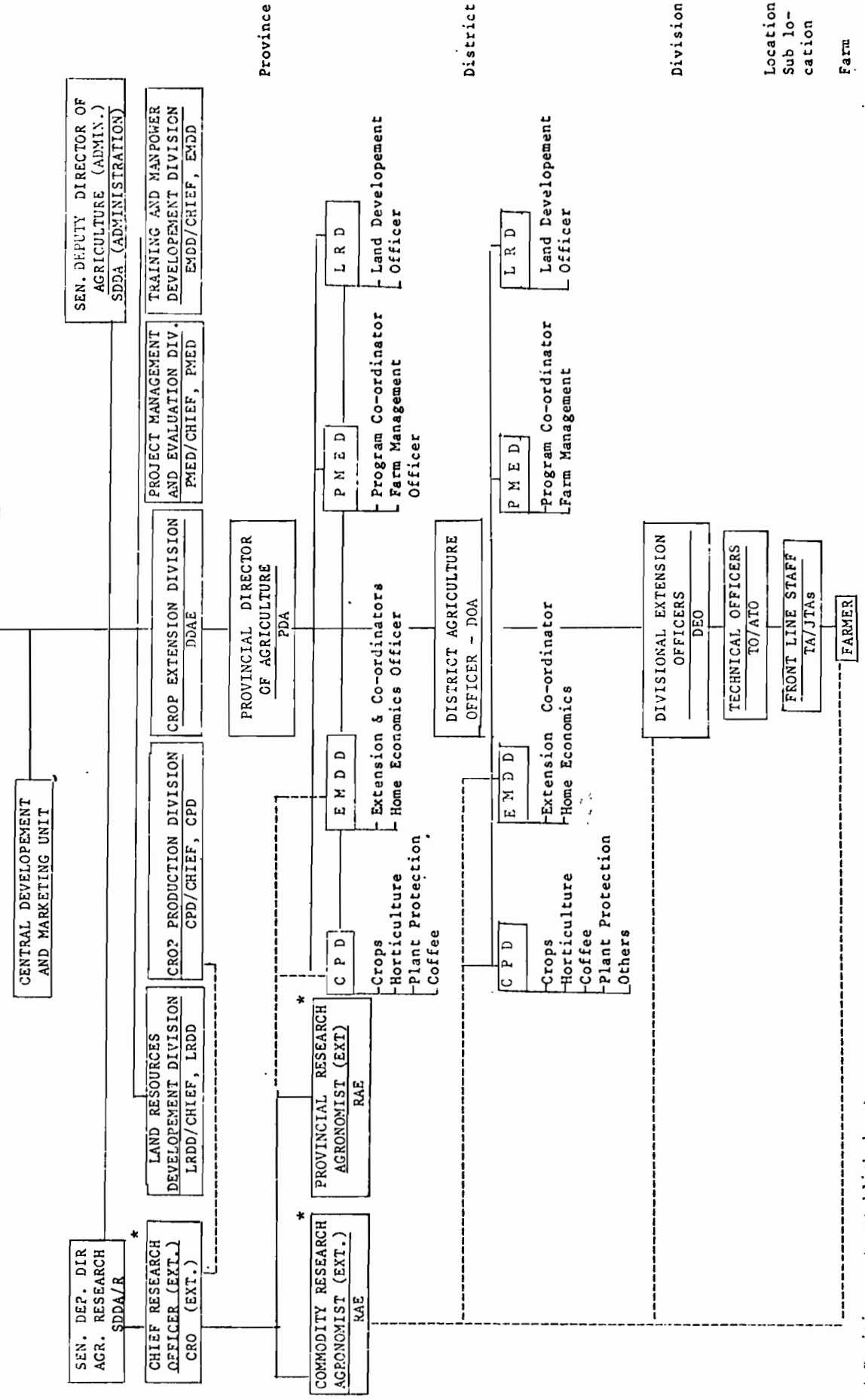
TABLE 2

PROPOSED ORGANISATION OF THE NATIONAL EXTENSION PROGRAM KENYA

MINISTRY OF AGRICULTURE AND LIVESTOCK DEVELOPMENT
DEPARTMENT OF AGRICULTURE

LEVEL

National



* Positions not established yet.

operations in a given district. The DAO is assisted by a number of Agricultural Officers (AOs) who would normally provide regular training, continued technical guidance and supervision to the field staff. With additional training the AOs will become subject matter specialists (SMS). They normally spend one-third to one-half of their time on field visits, and the rest training and participating in monthly workshops. The District Extension Coordinator (DEC) will play a crucial role in supervising staff and organizing training. Each District is divided into a number of divisions each one of which is headed by a Divisional Extension Officer (DEO), normally a diploma holder, who directly supervises the front line staff; the technical assistant (TA), and the junior Technical Assistant (JTA). The technical officer (TO), operating at the divisional level, guides and supervises the TAs and JTAs. Once every two weeks the TAs, JTAs and AOs will receive intensive training. The system is designed to provide the required training and mobility to front line staff.

The pilot project was started in 1982. By 1985 the Training and Visit system is expected to cover 30 out of the 41 districts. The program concentrates its efforts on main crops, focusing on the introduction of recommended farm practices in soil conservation, crops, home economics and animal production. The extension services in Kenya are also engaged in on-farm trials.

3.2 Agricultural Research

The Scientific Research Division (SRD) is responsible for research in the Department of Agriculture. The Department is also responsible for commodity research stations for coffee and tea, but these operate as non-profit research foundations under the direct management of respective Commodity Statutory bodies. The National Irrigation Board operates in the same way, but without a separate formal organization.

Under the provision of the Amended Science and Technology Act of 1979, the Kenya Agricultural Research Institute (KARI) was created to operate as a semi-autonomous parastatal research institution under the Ministry of Agriculture. KARI was expected to eventually combine the research services of the MALD and the Ministry of Natural Resources with those of the former East African Community to form a comprehensive research organization. It was also expected to provide national coordination, execution and management of research in agriculture, livestock development and forestry. These roles have not been fully realized. KARI is presently limited to the foundation formerly under the East African Community: the East African Agricultural and Forestry Research Organization (EAFRO) and the East African Veterinary Research Organization (EAVRO).

The DA is formally responsible for the research activities in MALD. Day-to-day responsibilities are delegated to the Director of Research (DOR). The MALD controls eleven National Commodity stations, seven regional stations and about twenty substations and major trial sites. To date, research activities are pursued along the traditional commodity and disciplinary approach. The station-based researchers are physically isolated from their clients and commodity-oriented national and regional mandates. Technical scientists have neither the mandate nor the support to look at farmers' problems.

3.3 Operational Weaknesses of T & V Approach

The weaknesses of the T & V approach in an African context have been discussed (Morris 1984). However, I will elaborate so as to indicate the effect that the OFR/FSP process will have on improving the performance of the T & V system.

- i) The assumption that an effective network for generating technology already exists strongly limits the applicability of T & V. Without the on-farm advantage of easily perceived benefits, it will be difficult for the extension service to select appropriate recommendations. In turn, the contact

agents will soon lose interest if the recommendations they promote are ill-chosen and unpopular.

ii) As mentioned earlier, the T & V staff are also involved in some on-farm trials. Their starting points are the current recommendations, which are assumed to be appropriate to the target groups of farmers. In the pilot area for example the extension messages in maize included the following:

- a) achieving a plant population of 55,000/ha compared to the usual 20-30,000
- b) even plant spacing
- c) seeding in furrows at a depth of 4-5 cm, rather than the usual method of seeding in holes 10-15 cm deep
- d) timely weeding and ridging during weeding
- e) improved pest control
- f) split application of fertilizer.

These are all good management practices, but they are not entirely adopted by farmers. There are definite reasons for this. Given the limited resources and multiple objectives, the farmers often adopt some strategies and compromises on others, thus under-exploiting the recommendations potential. This is not given due consideration in developing the recommendations. It is

important to realize that poor husbandry from a technical angle is often good management from the farmer's point of view.

- iii) The T & V system is based on target area, but not target groups. The same target area may have more than one target group which may require different recommendations.
- iv) There is no explicit mechanism for identifying and prioritizing the farmers' problems in the target area.
- v) Front line staff don't include the systems perspective in their approach, and are therefore often unaware of the full economic implication of the messages that they are carrying. In the long run, if the messages are not adopted by farmers then the front line extension staff's morale may drop and much effort will have been wasted.

4.0 CURRENT EXTENSION AND RESEARCH LINKAGE

The extension services in any country should ideally transfer the improved crop and livestock technologies generated by the National Research System to farmers. Extension should also provide feedback from the farmers to the researchers. Researchers should respond to this information through the extension services and should develop and perfect the technology for easy adoption by farmers. Research products are futile unless they are

adopted by the farmers, and extension can do little if appropriate recommendations are not generated by researchers. Thus, research and extension should be well coordinated and strongly linked.

In Kenya the Research and Extension Division are in the same department, and it has been taken for granted that information could automatically flow from one division to the other. This, however, has not been the case, resulting in the 'research-extension gap'. Realizing this, researchers and extension workers recently convened in a week-long workshop to discuss 'Bridging the Gap'. One mechanism for bridging the gap was the Provincial Research Advisory Committee (PRAC; currently PAREAC). PRACs were set up in each province to provide a forum where researchers, extension workers and farmers could meet to evaluate research results and propose new areas for research.

One positive effect of the T & V approach has been bringing together researchers and extension workers on a more regular basis. Extension workers, now realize that a two-way discussion will be enhanced if they are trained in specific areas so that they become effective Subject Matter Specialists.

However, the linkage between the Research and Extension staff is still very weak. Station field days and Research

Station Bulletins (prepared with the assistance of the Agricultural Information Centre) are the major vehicles for disseminating technical knowledge to the extension services and the farming community. On-station research is not derived from the problem identified by the extension staff. The T & V system proposes four levels of linkages:

- (a) Researcher participation at the monthly training workshop,
- (b) Research Extension Liaison Units in six Regional Research Stations (one in each province included under the project) and at six major commodity stations,
- (c) The Provincial Research and Extension advisory committees (PAREAC)
- (d) The Chief Research Officer Extension (CROE) Headquartes will coordinate the research extension liaison units and focus exclusively on improving research linkage.

Only two of these levels are currently operating. The Chief Research Officer Extension, and the Research Extension Liaison units are not yet established. PAREAC meets once a year, and

without collaboration at the lower level, it is very difficult to have any meaningful interaction at the Provincial level. The only additional mechanism that is functioning at the moment is the participation of the researchers in the monthly meetings. Even this is running into serious problems due to;

- (a) shortage of research staff to cope with the expansion program
- (b) frustration by the research officers due to lack of active participation by the field officers in these workshops.
The flow of information is in one direction only
- (c) financial constraints facing the stations.

Thus, needless to say, though the T & V system was expected to strengthen the linkages between research and extension, the current mode of operation suggests that there is still room for improvement.

5.0 INTRODUCTION OF ON-FARM RESEARCH WITH FARMING SYSTEMS PERSPECTIVE : (OFR/FSP)

Recently Research and Extension Administrators unanimously agreed that the OFR process should be part and parcel of the Research and Extension activities in Kenya. OFR/FSP is the research conducted in farmers field with his participation for near term technology generation for a specific target group. They also agreed that the OFR process plays the following major roles:

- a) Identifying which output from past technical component research is most relevant to local farmers present needs, and if necessary, adapting it to fit their particular circumstances.
- b) Feeding back unsolved technical problems to commodity and disciplinary team, thereby providing a mechanism for setting priorities for on-station research based on observed farmer needs.

- (c) Linking farmers, researchers and extension workers in the final development of technology in local on-farm situations. it provides an empirical test for the technology under the farmers environment; the farmers contribute to the specification of design parameters (bio-technical, managerial, and economic), and both farmers and extension staff are nvolved in evaluating the technology.

- (d) It provides guidelines for policy formulation by identifying the non-technical problems that might hinder a given technology's adoption rate.

Further suggestions included giving research stations with National and Regional mandates a wider brief to address the critical farmer problems in that area. This moves towards Morri's suggestion (1984) that each major research station should be assigned a surrounding target area over which it has special responsibility for direct extension advice. This would help ensure that research scientists focus on the actual problems and constraints of their local production systems.

5.1 Organization of OFR

Kenya's plans for OFR are detailed in here.

The basic composition of the OFR team will include an agronomist, a socio-economist and, where livestock is important, an animal production specialist. This group will

function as a unit from the station and with the assistance of the commodity-and discipline-oriented scientists. Each station will have an on-farm research advisory committee headed by the station Director. The DAO will be a member of this committee and will co-ordinate the OFR program at the District level. Work plans should be drawn up jointly between the OFR unit and the extension agents in the proposed target area, in consultation with the Station Director, District Agricultural Officer and the District Extension Officer. At the provincial level, the OFR activities will be coordinated by the respective provincial Directors of Agriculture; PAREAC, under the Chairmanship of the PDA, will be the forum for setting priorities. The PDA can thus be sure that these priorities are in line with the Government Development Plan. At the national level, activities will be coordinated by the Director of Research MALD and the Director of the National Extension Project. Considerable similarity exists between this structure and the T & V line of command. The authorities responsible for implementing both T & V and OFR/FSP at the provincial and district levels are the same, creating a natural link between research and extension.

5.2 OFR Process

The OFR process is well documented (CIMMYT, 1981). A

list of the steps involved is included here to facilitate discussion of the proposed linkage system.

i) Identification of Target Group of Farmers.

Farmers with similar production practices and for whom researchers see similar opportunities for the improvement of these practices, are grouped together by climatic, edaphic and socio-economic variables.

ii) Diagnosis of the Existing Production System.

This is carried out in three steps:

- a) Collection, analysis and interpretation of background information, i.e. farmer circumstances. Farmer circumstances are those factors which influence decision-making.
- b) Exploratory or informal survey.
- c) Formal or verification survey.

The objective here is to describe the current production problems and to identify the key production constraints and leverage points. The latter are equivalent to the impact points of the T & V system.

- iii) Identification and prioritization of potential intervention to the identified problems.

This is a systematic way of reducing large numbers of potential technical interventions. Interventions are evaluated for technical and economic feasibility and system compatibility, and is called "ex-ante evaluation". Potentially relevant solutions--i.e. those consistent with circumstances--to high priority problems are identified.

- iv) On-farm experimentation.

This is the actual design, implementation, management and evaluation of on-farm trials, done by the researcher, extension staff and the farmers. The experimental content is derived from a diagnosis of the system and from the available technical information. The type of experiment and management responsibilities depend on how confident the technical researchers are that relationships established by past research are applicable to local farms.

- v) Pre-production and production programme.

Here the improved technology is widely tested and recommendations are made for its diffusion. The

extensionist then assumes the task of disseminating the technology/technological component.

The continual interaction among farmers, researchers and extension staff fosters the development of a finished research product (recommendation) that is ready for dissemination. If the technology or recommendation is appropriate, the farmers involved will use it. And because the extension agent has been fully involved in developing the final product, he is comfortable in disseminating that technology.

6.0 COMPLIMENTARITY BETWEEN T & V AND OFR/FSP

As McDermott (1984) pointed out, the critical element in closing the gap in the technology generation process is for extension and research to broaden the scope of their respective programs until there is an overlap. The on-farm research process offers this overlap in technology generation.

- it provides an opportunity for both researchers and extension agents to identify critical production problems, and relevant solutions as well as to test the technology under farmer's circumstances.

- the extension agent is completely familiar with the

technology he is promoting.

- farmers play a key role as informants, observers, evaluators, and, if successful, as implementers to the technology. Farmer assessment is taken into consideration in deriving recommendations.

If OFR is properly institutionalized, extension services can play a crucial role in deriving recommendations. The T & V extension staff at the local level can participate in the following activities:

Diagnosis

- a) Identifying the target group.
- b) Identifying and understanding the priority problems.
- c) Defining and understanding farmers' immediate objectives.
- d) Identifying the innovations tried by the farmers and associated problems.
- e) Organizing farm visits for the OFR team during the diagnostic survey (TAs, JTAs).
- f) Organizing farmers' meetings to discuss the program.
- g) Interpret at farmer interviews where necessary.

On-farm Trials

- a) Selecting and arranging sites for field trials.
- b) Laying out the trials.
- c) Maintaining links with farmers.
- d) Organizing meetings at the trial sites for on-going evaluation and farmer assessment.
- e) Provide feed back on farmer assessment.
- f) Assist in field days and demonstrations.

Dissemination

Once the finished research product is handed over to the T & V staff for dissemination, they could provide feed-back to the researchers on new problems emerging from the field.

The research in turn provides a proven finished product that can be readily extended. The OFR process brings researchers, extensionists and farmers together in a local farming situation, making both research and extension efforts cost effective and productive.

7.0 PROPOSED WORKING MECHANISM

Different countries are taking different approaches to introducing the OFR/FSP into the research structure and in

creating the links among the people involved in developing recommendations. For example, both Zambia and Malawi are moving towards a two-tier structure, but in Zambia the Adaptive Research Planning Teams (ARPT) responsible for on-farm research are located in (but not directed by) the research stations. In Malawi however, they are located in the field and are administered by the Agricultural Development District managers.

Kenya is trying a different model; OFR/FSP will be a component of each research station, which will have an OFR team selected from its staff. At the national level, the OFR activities and T & V activities will be coordinated by the Director of Research and the Director of Extension and Specialist services. At the provincial level the PDA will coordinate both activities and PAREAC, which is chaired by the PDA, will provide a forum for linking the research-extension staff and the farmers. All the station directors, DAOs and DCOs are members of this committee. They must meet at least once each year to review the past research results and to look at the research priorities. The PDA's have a significant influence in prioritizing activities, being the functional administrative head. They can jointly plan the OFR and T & V activities.

The DAO will coordinate all activities at the District level. Districts are the focus of Development Planning and

much of the field activities are decided at the district level. It is proposed that the research stations should form the nucleus team, with the Director of the station/officer in charge as the chairman and principal contact. The District Extension coordinator will be a member of this team at the station level. There will be an OFR advisory committee, which provides for broader participation of the researchers in planning the activities of the OFR teams. The station's Research Advisory Specialist Committee can provide some input for the activities of the OFR team unit. The District Farm Management Officer is also a member of this committee at the District level, and he will closely interact with the OFR team during the diagnosis. The work plan shall be jointly drawn up by the OFR team and the District extension coordinator, in collaboration with the Director of Agriculture. Depending on the work plan, the District Extension Coordinator can allocate the Divisional Extension Officer and the front line staff to work with the team. The team can thus work with more than one target group at a time, enhancing the productivity of limited research resources. The appropriate SMS also can join in the planning and implementation. Once work plans are approved, a meeting should be held at the Divisional level to explain the programme to the TOs, TAs and JTAs.

Responsibility for trials that are trying to establish technical relationships will be in the hands of the

researchers, with strong participation by the appropriate SMS. The SMS and Divisional Extension officer will play key roles in implementing verification trials. On a day-to-day basis, the technical officer can supervise the trials. The OFR team members should see the trials as frequently as possible. The District Extension will determine the appropriate SMS and the level of participation of TAs and JTAs in trial implementation. The TAs and JTAs are also responsible for organizing farmer meetings at the trial sites for ongoing evaluation. This will be coordinated by the Divisional Extension Officer.

8. CONCLUSION

In conclusion, the Research and Extension Administrators and Policy Makers in Kenya are fully aware of issues on the dissemination of technology. They also recognize the need for a stronger linkage mechanisms among farmers, researchers, and extension agents. Every effort is being made to bridge this gap and to strengthen the linkage. The T & V approach and OFR/FSP have been introduced to the research and extension structure. Mechanisms are being established to fully utilize the complementarity between the OFR/FSP process for technology generation, and T & V approach for technology dissemination. OFR/FSP provides a natural link in the process of technology

generation and dissemination by involving researchers, extension workers as well as farmers, in deriving recommendations.

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