

# IMPLEMENTATION OF AGRICULTURAL TECHNOLOGY TRANSFER IN TANZANIA: THE EXPERIENCES OF ADP-MBOZI

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## ABSTRACT

*This paper describes the implementation of agricultural technology transfer in the Agricultural Development Programme, Mbozi (ADP-Mbozi) in Tanzania. The first section of the paper gives a brief historical overview, as well as information on the project area. The project's overall aim is also mentioned. The second section gives the main objectives of the project, and the third section describes the different stages in the agricultural policy as it has developed over the years. In the fourth section the achievements of ADP-Mbozi are listed. In the final section the constraints experienced in relation to research and training are described and proposals are put forward about the possible role of research in non-governmental organization (NGO) projects.*

## HISTORICAL OVERVIEW

The Agricultural Development Programme, Mbozi (ADP-Mbozi) started in 1985 as a cooperative project between three parties: Community Development Trust Fund (CDTF), a national non-governmental organization (NGO) in Tanzania, Cooperation in Development International Building Organization (COOPIBO, a Belgian, non-governmental volunteer organization), and Mbozi District Council. The funds for ADP-Mbozi are channelled through COOPIBO and provided by the Belgian Ministry of Development Cooperation, (NCOS, a consortium of Belgian NGOs), and Mbozi District. The first five year plan allowed for a funding period of seven years and it is anticipated that the next funding period will be for approximately five years. COOPIBO sends personnel as well as funds. Over the project implementation period, the role of COOPIBO's staff is decreasing, changing from one of coordination to one of advising. Key technical staff advise on several projects in a particular area. For example, in Mbeya Region, where COOPIBO has three similar projects, advice is provided on technical aspects, in such areas as agriculture and management. In future the advisors and key technical staff may be Tanzanians. Usually, funds are provided for ten years, after which time the projects are intended to be handed over, either to Farmers Associations or to Trust Funds, although some support may still be available. Throughout the time that COOPIBO is present, preparations are made for the eventual handing over. Means of organizing and training farmers, and stimulating them to form farmers' associations, are investigated so that, if possible, the project can be handed over to a farmers' association that has been started up during the project period.

COOPIBO has been working in Tanzania since 1978. At present it is supporting seven development projects: two in Mwanza District (Tarime and Missungwi, where the main activities are rural housing); two agricultural projects in Kilimanjaro Region (Hedaru and Kigonigoni); and three agricultural projects in Mbeya Region (Mbozi, Ileje and Mbeya Rural). All the agricultural projects have a similar approach, although the activities may differ, for example irrigation activities are involved in Kigonigoni and Ileje and Hedaru, but not in Mbozi.

### ADP-Mbozi area

The ADP-Mbozi project is in Mbozi District, which is one of the six Districts of Mbeya Region. Mbozi District covers an area of 9,583 km<sup>2</sup> and has an estimated population of 330,146 habitants living in some 150 villages. At the start of the programme in 1985, it was intended that after a two year pilot project in one ward, the project would expand to another three or four wards to cover some 7000 ha of maize after five years. By 1988 it had become clear that such heavy investment in so few wards would be inappropriate and the Board agreed to extend the project to cover four divisions. Each division was to have one farm service centre, coordinating input supply, agricultural extension and support activities. Each division has approximately 25-30 villages. In January 1992 it was decided that ADP-Mbozi should cover all divisions in Mbozi District. At present ADP-Mbozi is working in five divisions: Vwawa, Ndalambo, Iyula, Igamba and Msangano. The last division, Kamsamba will be added in 1994.

### Aim of the project

The overall aim of the project is: 'To provide an effective contribution to increased food security in Tanzania. To this end, the villagers in Mbozi District will be consulted in a participatory way to see how production for their own use and surplus production can be improved. As the main producers nowadays are the individual farmer producers, these will be the target group of the project, which will concentrate on the weaker groups, being small farmers and women'.

## OBJECTIVES OF THE PROJECT

Agricultural activities are the backbone of the project. Much attention has been paid to developing policies that will be sustainable in the future. The agricultural objectives are as follows:

1. To reach the farmers we will have to use a participatory approach, starting from her/his actual situation, called the farming system.
2. To give advice which is within the scope of our target group we will have to use a 'resource efficient agricultural strategy'.
3. To strengthen the farmers role, to give them access to the services developed with them and for them, and to make the intervention sustainable in the long run, we will have to organise farmers.

## THE PROJECT'S POLICY

As several agricultural COOPIBO projects are functioning in Tanzania, each project trying to develop its own policy, it was considered necessary in 1988/1989 to gather together the experiences of individual projects and develop a comprehensive policy for all COOPIBO's projects in Tanzania. This would make it easier to learn from each other's experiences, organise exchange visits and prevent every new project having to re-invent the wheel.

From this exercise, some basic philosophies were developed (Peters, 1990). In the philosophy of COOPIBO, the basic organisational unit is the farmer's household. Within that household decisions are made concerning the agricultural goals and practices, in what is called the farming system. This farming system is subject to changes, which are basically determined by the farmer's household in response to the development of other factors. We can make a rough distinction between factors inherent to the farmer's situation, that is, internal factors, and those that are external. This can be summarised as shown in Figure 1.

Central to the diagram is the farmer and his/her family. They are the ones who finally decide how the agricultural system will look, because they are the ones who have to do the work. However their

decisions are influenced by factors inherent in the farmers situation and by many external factors. How all these factors influence what the farmer is actually doing on the farm can be called the *logic of the system*. If we talk of *agricultural development* it means that changes have to take place in the agricultural system. If we want these changes to be sustainable they have to be implemented voluntarily, by people who are part of the system, that is to say, by farmers. People from outside can induce these changes. They can do this by influencing the decisions farmers take concerning his/her agricultural system. This can be done by working on the external factors that affect the farmers, so making the farmers more efficient and also bringing the outsiders closer into contact with the farmers.

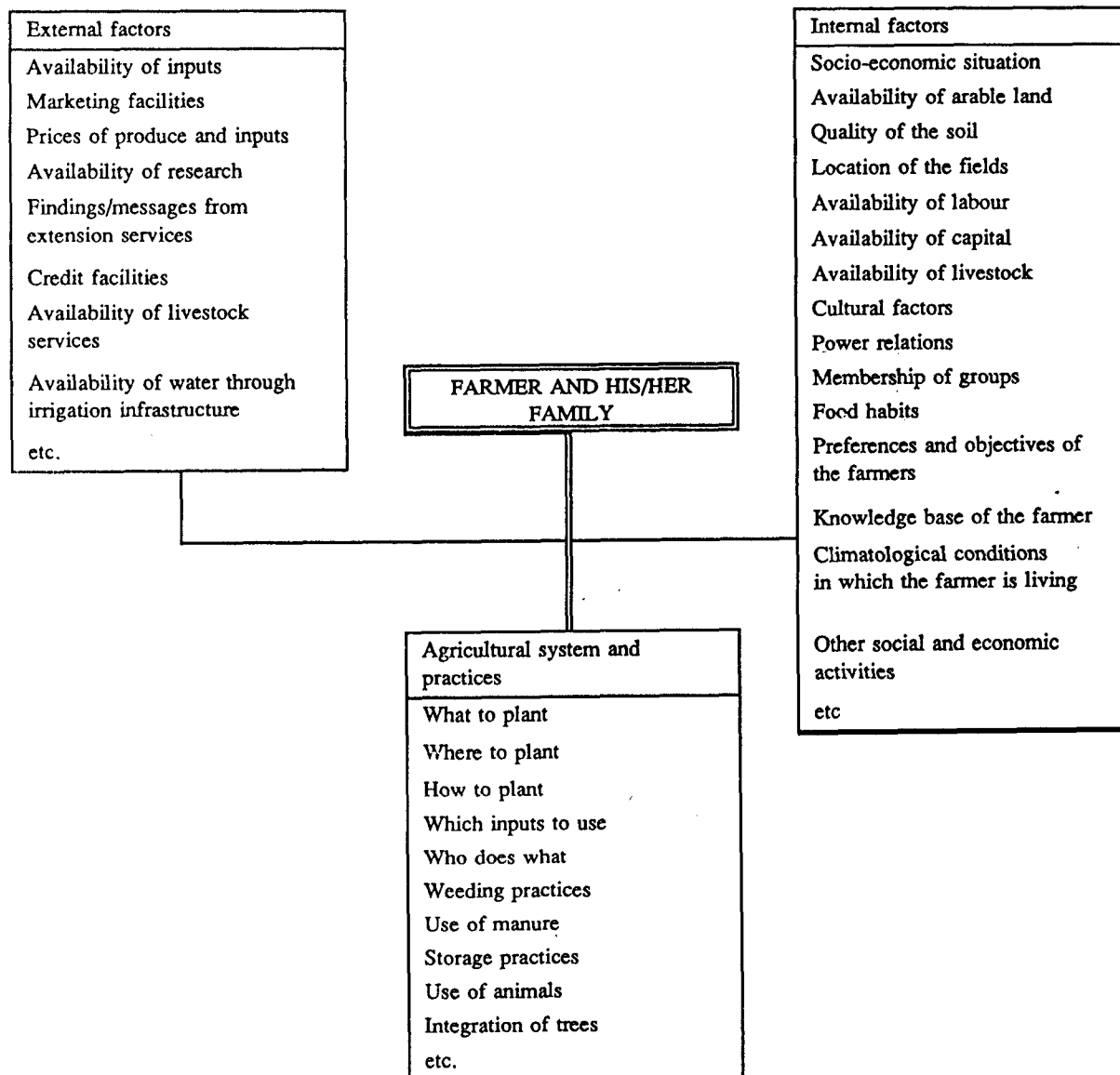


Figure 1. Factors affecting the smallholder farming family unit

### Target groups

COOPIBO's and hence ADP-Mbozi's target groups are *resource poor subsistence farmers*. In general they do not have easy access to resources such as capital, information, good quality land and water sources. Often they are not reached by, and are not able to exert power on, the organisations which are meant to render them services. *This target group is not homogenous*. A distinction can be made, for example, between farmers who have cattle and those who do not, those who are growing a cash crop and those who are not. *Women form one specific target group*, characterised not only by gender but also by access to resources and by the decision powers they may have.

**Working with groups.** Taking all this into account it is clear that working with individual farmers will not lead to farmer organization. Another approach is needed for this to happen. *The functional group approach* seems to be the most appropriated. It is based on the following arguments:

- Groups increase the number of farmers that can be reached by one extension worker;
- Groups are a good way to enhance discussions among farmers and to stimulate farmer-to-farmer exchange
- Groups are the first steps towards organizing farmers, and thus providing them with power.

**Resource efficient agriculture.** Having seen the characteristics of the target group and the socio-economic situation of the country has strengthened our conviction that we have to invest in *resource efficient agriculture*. The target group has limited access to resources. Money to buy fertilizers or other inputs is not often available, credit facilities are out of reach of the poorer section of the country, and few subsistence farmers are able to face the risks inherent in the use of external inputs or are able to use more than very limited amounts.

Resource efficient agriculture implies an efficient, optimal, use of inputs already available in the existing system and thus available to the target group. Existing resources are very diverse. They can include the human resources, that is the farmer and his/her experience and knowledge; the manure produced by cattle that are an element in the system; the efficient use of fertilizers and pesticides if they are already fully integrated in the system; the increased supply of information to the farmers about other resources such as green manure, and about other husbandry practices such as rotation, intercropping, and the integration of nitrogen fixing trees and shrubs.

**Participatory approaches.** Participatory approaches should be used not merely as a slogan, but in all activities involved in the project. Farmers should be involved in developing the activities since it is they who are to benefit. The participatory approach begins with a *problem solving strategy*, which involves working with the farmers, and taking into account such things as their experiences, the logic of the agricultural system they have developed, and their objectives. Thus farming system research (FSR) could be an important element in involving farmers in the development of possible strategies. From FSR a first definition of problem areas can emerge. After the definition of problems an *assessment of the problems* is done. Objective oriented project planning (OOPP) techniques are used and farmers are involved in assessing the problems, finding the solutions and developing activities. Each activity is broken down into stages to help ensure the farmers' participation (van Toor, 1991). Examples of such activities include the introduction of agroforestry, ox mechanization and, of course, farmers' groups in the villages.

**Organization of farmers.** The most important role of external organizations like COOPIBO is to encourage the process of the setting up of *farmers' organizations* (NGOs). These should be organized and controlled by the farmers so that they really represent the interests of the target group. In practice, COOPIBO, by means of its various agricultural projects is already organizing farmers in the villages in relation to extension. The farmers' groups at village level, organized around the transfer of technical

agricultural information are used as the basis for grassroots organizations, which in future can participate in the decision-making bodies of, for example, farm service centres. The structure can be envisaged as shown in Figure 2. Experience has shown that it is possible to organize farmers around the objective of increasing agricultural knowledge. Once the groups are formed, farmers from the group can be selected to go for training. This training concerns agriculture, but the objective is also to build up background information so that farmers can start reflecting on what they are actually doing in the field, and on the improvements suggested by the extension services. These farmers will then act as a link between the extension services and their fellow farmers, acting as animators. A chairperson needs to be elected for the group, to help the group function and to represent the group to outsiders at a higher level. The functioning of the different groups can be discussed at village level, as can the linking of the demands of different groups to the relevant people and institutions. The chairpersons need to be trained so that they can represent their group members' interests properly.

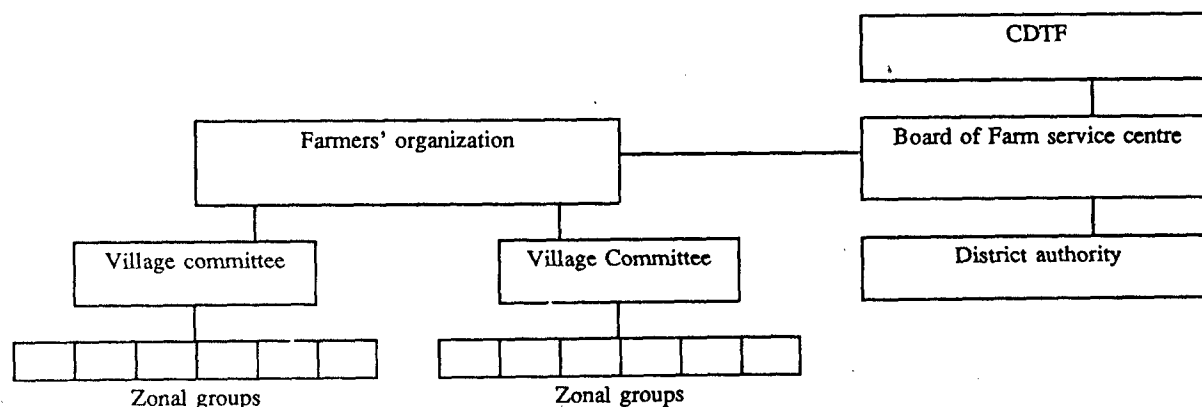


Figure 2. A farmers' organization and its linkages

Village extension workers. There is no doubt that the development and implementation of an agricultural policy cannot be done by one organization or project on its own. The policy just described has been developed by COOPIBO in collaboration with ADP-Mbozi, the respective district agricultural departments and other institutions. District and village extension officers have been closely involved in the implementation of the policy and its activities. Village extension workers play a very important role and it is therefore recognised that attention should be given to their training and further education. Training can be provided by the project itself, and/or by other institutions, such as South Research (based in Belgium).

#### ACHIEVEMENTS OF ADP-MBOZI

ADP-Mbozi began in 1986 with agricultural activities. It was started with farm systems research (baseline surveys, field visits and in-depth-surveys) in several wards in Vwawa and Ndalambo Division (ADP-Mbozi, 1987a, 1987b, 1988a, 1988b, 1988c). FSR was chosen as the method of research because it considers the entire farm and its internal and external influences. The aim of the research was to gain an accurate insight into the farmers' way of working and their reasoning behind it. The research came up with proposals for improving crop productivity (Table 1). Some activities to convey these ideas to the farmers were undertaken on the level of the farm service centre (demonstrations and trials). In some villages in the working area individual farmers were approached to work with the project and to become contact farmers. These farmers came for some training, although an appropriate syllabus had not yet been developed. Existing groups were also invited to come for training on agricultural extension. The approach was not fully worked out in advance, and at the time it was not completely clear what we wanted to achieve. Hence, the initial results were discouraging.

**Table 1.** Proposals for activities for improving crop productivity, resulting from farming systems research exercises conducted in 1986 and 1987, executed by ADP-Mbozi

	Households with less limited means	Households with limited means
1. Land quality/soil fertility	Importance of improved fallow Crop rotation Intercropping Ridges for food-crops	Importance of improved fallow Crop rotation Intercropping Organic fertilizer, cattle manure Ridges for food-crops
2. Hybrid maize seed	Timely supply of different varieties in sufficient amounts	Timely supply of different varieties varieties in sufficient amounts Savings scheme: one acre package
3. Fertilizer		
a. Cattle dung		Storage Composting Information about application Supply of wheelbarrows
b. Chemical fertilizer	Timely and sufficient supply Savings scheme; ½ acre package of inputs Product and application information Importance organic fertilizer	Timely and sufficient supply Product and application information Importance of organic fertilizer Savings scheme
4. Plant protection		
a. Pre-harvest	Sanitary measures Crop rotation Early planting Intercropping Seed treatment Promotion of natural pesticides	Sanitary measures Crop rotation Early planting Intercropping Seed treatment Importance of natural pesticides
	Timely supply of suitable pesticides and product information	Timely supply of suitable pesticides and product information
b. Post-harvest	Timely harvesting Hygienic storage facilities Alternatives for pesticides, e.g ashes	Timely harvesting Hygienic storage facilities Application rates of pesticides in storage
5. Husbandry	Optimum planting distance  Ploughing after harvest	Optimum planting distances Ploughing after harvest Marejea as a suppressor of perennial weeds
6. Labour	Borrowing ox-teams	Training oxen Supply of ox-drawn implements Diversify ox-mechanized agricultural practices Promote renting-out of ox-teams
7. Transport	Incidental support for road and bridge improvement	Supply of wheelbarrows Supply of ox-carts Incidental support for road and bridge improvement
8. Extension	Specific attention to strategies for reaching this category of farm household	Different agricultural extension approaches and messages

In June 1988, ADP-Mbozi organized an extended evaluation of its agricultural activities. Further extension of the working area of ADP-Mbozi made it necessary to look for better strategies. The discussion centred around the matter of whether the results of the farming systems research had fulfilled the objectives. It appeared that some of the objectives were fulfilled: a good insight was obtained into the farming systems used, and it was possible to produce a set of recommendations for the three distinct categories of farmers. It was further suggested that the extension activities of ADP-Mbozi should focus mainly on the preliminary phase of FSR, on raising general awareness about specific topics relevant to the project area, on setting up contact farmers in the villages, and on the evaluation of trials and demonstrations at the farm service centres. The extension activities should be integrated within the district extension framework, but in each division an extension worker from the district should be asked to coordinate the extension activities.

The recommendations coming from the FSR suggested that activities for improving crop productivity had to be developed and solutions should be compatible with a sustainable agriculture. Evaluation should give priority to the integration of trees, intercropping, rotation, the use of manure and on-farm seed selection. The role of chemical fertilizers should be studied, as well as the possible consequences for the input supply system of the project. The role of ox-mechanization within the framework of the extension approach and in relation to aspects of soil fertility and labour should be re-examined.

Improvements to ploughing, planting/weeding and transport should be the main priority. Overall, it was agreed that the FSR exercise as it was designed and executed, had been instrumental in obtaining appropriate information, making contacts with the farmers and initiating the extension activities, but the evaluation seminar, with an external expert present, really helped the project to define its approach and from there determine priorities, as the activity list developed from the FSR was too extensive to be implemented all at once.

Before the seminar FSR and extension had been seen as two separate elements, the first only providing the information needed by the second. The involvement of farmers and extension workers during the first two year phase of the project was limited to providing information. The information was collected by the project staff and, in the baseline survey, by teachers. Once the project staff came to know the area better, and the farmers to know the ADP-Mbozi staff and how they functioned, a greater farmer participation was possible. Even so, it became clear that the project activities were not geared towards real participation of the target group. In addition the activities developed did not take into account the farmers' knowledge and experience, and women were not reached at all. Again advice was sought from outside on: how to achieve better participation; how to introduce more resource-efficient agriculture; and how best to organise farmers.

In 1989 the policy described in the previous section was developed. COOPIBO and South Research assisted in policy development. The starting point from then onwards became the farmers' problems at village level, and together with farmers, solutions were sought to the problems. Proposals were broken down into a series of steps in order to reach the objectives, as summarised in Tables 2 and 3. Important elements were:

- the starting of groups on a voluntary basis by farmers;
- the training of the secretaries (link farmers) of the groups;
- the training of the chairpersons of the groups on organisational matters;
- the training of village extension workers, so that they could guide the village groups on such matters as resource efficient agriculture and organisation of the groups;
- the implementation of resource efficient agriculture trials and demonstrations at farm service centres and in farmers' fields.

Table 2. Main activities, and the steps involved, in implementing proposals for agricultural changes

Main activity	Principal objectives
General agricultural extension	Providing extension services <ul style="list-style-type: none"> <li>■ using participatory approaches</li> <li>■ to farmers groups</li> <li>■ on using resource efficient agriculture</li> <li>■ organising farmers at higher levels</li> </ul>
Agro-forestry	Providing extension services on agro-forestry <ul style="list-style-type: none"> <li>■ using participatory approaches</li> <li>■ to village committees</li> <li>■ to start tree nurseries by committees</li> </ul>
Ox-mechanization	Training farmers to use oxen and implements at village level <ul style="list-style-type: none"> <li>■ using participatory approaches</li> <li>■ to village ox-mechanization committees</li> <li>■ to improve the use by farmers of oxen and implements</li> </ul>

Steps involved in implementation		
Agricultural extension	Agro-forestry	Ox-mechanisation:
Mobilization	Mobilization	Mobilization
Groups start (several)	Committee starts (1)	Committee starts
Groups trained	Committee trained	Committee trained
Monitoring (groups meet)	Monitoring (committee starts)	Monitoring (committee starts)
Evaluation (several times)	Evaluation (end of season)	Evaluation (end of activity)

Demonstrations and trials support all the main activities.

When a project begins in a village, several 'mobilization' meetings are held to make farmers aware of the importance of forming groups. During these meetings the villagers are divided into sub-groups of older women, younger women, older men, and younger men, as each group has its agriculturally-related problems. Each group is given the task of discussing their problems, which are afterwards brought to the plenary meetings. If everybody agrees on the same problems, groups can be formed voluntarily by the farmers. Women are encouraged to start womens' groups. Each group selects its own chairperson, secretary and if necessary a treasurer. The secretary becomes the link farmer. The link farmer comes for three weeks, spread over a one year period, to the ADP-Mbozi training centre where she or he is taught about general agriculture, resource efficient agriculture and how to organise the group. This link farmer is then supposed to train his or her fellow farmers. During this initial training, the extension workers from the same village as the link farmers also attend the seminars. The extension worker then helps the link farmer to implement 'animation' tasks in the groups. Refresher days are organized regularly, and the village extension workers as well as the division extension workers of ADP-Mbozi, visit the groups. Once the groups have been functioning for a while, seminars are organized for the chairpersons of the groups, to train them in such matters as leadership skills, discussion techniques, and problem solving in the groups.

The chairpersons also have the important task of representing their group at a higher level, to 'pull down services', to act as an intermediary between the group and institutions and authorities. All chairpersons in the village meet regularly to exchange experiences, and to acquire new ideas. It is anticipated that in 1992/1993 a board will be established at farm service centre level, consisting of representatives of each of the villages where ADP-Mbozi is working.



Table 3. Steps in the agricultural extension approach

Actors	Needs	Final outcome
<i>Mobilization</i>		
Village extension workers	To be trained before mobilization starts on: What is ADP-Mbozi; different procedures; participatory approaches	Effective mobilization Different steps become clear to actors Output is satisfactory Extension workers trained
Own extension workers	To be trained and kept on the track	Farmers convinced of value of groups
Community Development workers and Village leaders	To be informed of their role	
Farmers	Good/correct information; why, what, etc.	
Agricultural section	Good planning to determine problems	
<i>Groups Start</i>		
Farmers	Start without involvement of ADP  Link farmers/chairperson to be selected by group, if not, restart. Find out why farmers did not start group	Groups start link farmers/chairperson elected by members
Village extension workers Division extension workers	Check whether groups started voluntarily Regular follow up Report at division meetings	
<i>Training link farmers (three week session spread over the year)</i>		
Farmers	To be trained  Develop syllabus	Syllabus appropriate for different areas  Farmers well trained (first week) Resource efficient agriculture clear to farmers (second week) Ox mechanization (third week) Implementation of resource efficient agriculture by farmers
All extension workers	To know the syllabus on resource efficient agriculture; organization of farmers; use of participatory approach Are messages correct for different agro- ecological zones Are messages adapted to the experiences of farmers Is there exchange with farmers on practices	Extension workers well trained Different actors know their role Evaluation system to measure impact
<i>Refresher days</i>		
Extension workers	Investigate problems of farmers	Programme ready for refresher days

Table 3. Steps in the agricultural extension approach (continued)

Actors	Needs	Final outcome
<i>Chairpersons of groups</i>		
Extension workers	To be trained on role of chairpersons  Content training for extension workers and chairpersons	Extension workers trained Syllabus for chairperson ready Chairpersons trained Regular follow up by extension workers
Chairpersons	To be trained Regular meetings with other chairpersons at village level Chairpersons participate in divisional meetings	Chairpersons organized  Chairpersons on farm service centre board
<i>Bi-weekly meetings of farmers</i>		
Link farmers/extension workers	What skills are needed for link farmers and extension farmers, and how can these skills become available to different actors, e.g. participatory and teaching skills; can group function on its own without extension workers  Train chairpersons on their role. Train link farmers on their role. What is needed to keep the groups lively ?	All actors know their role Curriculum development with different subjects and attractive to farmers Books and leaflets available Groups can function without extension workers
<i>Monitoring</i>		
Farmers	To be trained to give feedback to evaluate group functioning	
<i>Evaluation</i>		
All extension workers	To be trained in participatory evaluation techniques, to listen to what farmers say, and allow time for reflection/evaluation	Evaluation becomes routine Farmers do self-evaluate on Group functioning and implementing messages
<i>Resource efficient agriculture</i>		
Farmers	Exchange of ideas and innovative techniques	Resource efficient agriculture used by farmers
Extension workers	What do farmers do/ what are new innovative techniques available	
Agriculture section	Find out about new techniques, from farmers, UAC, UAC magazines, other sources	

At present ADP-Mbozi is working with the agricultural extension services in 18 villages in Vwawa Division, 9 villages in Iyula Division and 9 villages in Ndalambo Division. In October 1992 projects will begin in 3 villages in Igamba and 3 villages in Msangano Division. Every year between four and six villages are added in each Division. Some 168 farmers groups are now functioning, of which 34 are womens' groups. Each group comprises about 20 or 30 farmers. In 17 villages the chairpersons of the groups have formed a village committee on extension.

In 1991 when the first farmers' groups were established a system was developed to monitor the groups' agricultural knowledge. Twice a month at divisional level a meeting is organized with the extension workers concerned, some farmer representatives, the extension officer of the District Agricultural and Livestock Development Office (DALDO), and ADP-Mbozi staff. During these meetings problems are discussed and a programme drawn up for the coming period. Information from this level goes to the monthly agricultural section meeting of the project, where information from all the divisions is discussed and any necessary adjustments made. The extension officer from the DALDO is included in this meeting, and reports back to the office in the case of any problems involving extension workers.

In seminars on research extension activities much attention is paid to, for instance, crop rotation, intercropping, agro-forestry, use of green manure such as sunhemp, and use of compost. On the basis of the experiences of the farmers, and of other institutes and projects, demonstrations and trials are set up on these topics at the farm service centres of ADP-Mbozi. These centres are situated in different agro-ecological zones, and the crops which are grown are the ones which suit the area best. In Ndalambo, for example, these might include finger millet and sunflower, and the plots are worked by donkeys. In Iyula, maize and potatoes are grown and the farm is worked by oxen. These trials and demonstrations are used in the practical sessions during the seminars.

Some 200 link farmers have now been trained and several seminars and courses have been organized for village extension workers on resource efficient agriculture, participatory approaches, mobilization techniques, organization of farmers, ox-mechanization and agro-forestry.

From the external evaluation in November/December 1991, it was concluded that ADP-Mbozi has been successful in reaching the farmers at village level (South Research, 1991). With agricultural extension between 4500 and 5500 farmers have been reached. The activities are very well organized and take into account the knowledge of farmers. They are mostly well adapted to the farmers' situation. Recommendations for improvement were: more research should be done to differentiate the messages to the farmers in different agro-ecological zones; and that the project should develop agricultural messages which take into account the crops grown by women. The project is now addressing these issues. It is recognized that Uyole Agricultural Centre could be of great value in assisting the project.

#### CONSTRAINTS RELATED TO RESEARCH AND TRAINING

During the past few years, ADP-Mbozi has tried regularly to involve the existing training and research institutes in Uyole and Morogoro in its agricultural activities. Examples of this involvement include the following:

- there has been a representative from UAC on the Board in order to establish a structural link with UAC;
- representatives from UAC have been invited to agricultural policy seminars and meetings;
- trial plans were discussed at UAC before and after implementation;
- a member of the UAC staff participated in an external evaluation of the project;
- one member of the UAC Training Institute participated in the training of extension workers in participatory techniques;
- ADP-Mbozi participated in the establishment of a network of farmers' organizations initiated by Sokoine University Extension Department.

Although this list seems to be extensive, several constraints were experienced in relation to research and training institutes. ADP-Mbozi wanted to address itself to small farmers and women, which led to the choice of resource efficient agriculture and participatory approaches which acknowledge the experience of farmers themselves. Research on the other hand, is still mainly based on seed improvement, and the resulting high yielding varieties need considerable external inputs, which are scarce, expensive and not easily accessible to small farmers. For researchers to come into close contact with small farmers and develop solutions to problems together does not seem to be so easy. The training of extension workers is still based on the package approach, which claims that scientific agriculture just needs the application of a range of steps and measures developed by research in order to improve production. The extension workers trained in this way then have to teach the farmers how to apply the packages in the proper way and sequence. This is the basis of the Training & Visit (T&V) system. For an extension worker to forget their role as a teacher, to listen to farmers and to become their student is difficult, since there is still the attitude that farmers are conservative, unwilling to change and not sufficiently well trained to be successful in agriculture. To take an example, the initial project proposal was based on sunhemp research done at UAC, but it appeared that farmers with limited land and labour were not interested in rotational cropping with sunhemp, the method being promoted by the researchers. The project itself had to try out different ways of intercropping, but it is not well equipped for this purpose. In the mean time research on sunhemp had stopped at Sokoine University of Agriculture, while results from all the trials at UAC were difficult to obtain. There are still many questions about sunhemp unanswered. Although at one time proposals for further trials were discussed with UAC, once the person concerned left, this line of communication broke down. For a project to develop scientific trials over a number of years on such practices as intercropping, alley cropping, agro-forestry species and techniques such as soil mulching, is almost impossible, so that sometimes poor quality advice is given to farmers.

### Proposals for improved relations

Of course, not all the problems are related with an individual institute. Projects in agriculture are many, with approaches varying from high input agriculture and a top-down approach, such as those of Global 2000 and the World Bank's T&V system, to resource efficient agriculture and farmer-first approaches. Is it possible for institutes with limited means to serve them all? The research agenda is strongly influenced by the Ministry of Agriculture which is still an advocate of high input agriculture and tractor mechanization. Although this approach produces good results in the short term, it is only accessible for large scale farmers. Projects, including NGOs, also have their weaknesses, because they are action oriented and need quick results to satisfy farmers' and donors' needs, work on a small scale, and have limited or no funds available for research. Even so, they have much valuable experience of the use of locally adapted participatory and empowering approaches, which could be tapped. Would it not be possible for UAC to bring projects and researchers together regularly to discuss, for example, subjects such as the participatory approaches to development in order to exchange experiences? It would not necessarily be a very costly exercise if done once a year, and if the preparation was shared by the participating organisations. It would be a stimulus for agronomists working in the field to present their findings from the farmers and for the researchers to disseminate their research findings. From such an exchange proposals could also come forward for collaboration on the implementation of trials under farmers' conditions. As a start, it would be useful for projects to be allowed easy access to existing research information in their subject areas, something which has been lacking up to now.

An interesting project is going on at Sokoine University of Agriculture at this moment, where over the past two years, different methods of bringing researchers, projects and farmers together have been tried. In a recent seminar to which farmers and projects were invited, it was proposed that a network of farmers' organisations should be developed. To date, some ten organizations and the farmers they are working with are involved, including ADP-Mbozi.

The syllabi of agricultural training institutes are changed only every four or five years, and still reflect a top-down approach. Could researchers not play a role in influencing these syllabi and expose

students to experiences of projects and to more participatory techniques, especially at UAC where training and research are on the same campus? Of course this would need a change in attitudes and a breaking down of institutional barriers, but as the example of Sokoine University shows, it is worth trying.

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