

# The promotion of animal traction and weeding technologies in Mbozi, Tanzania

by

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## Abstract

*The Agricultural Development Programme, Mbozi, is an integrated agricultural project working in 96 villages in Mbozi District, Tanzania. The aim of the project is to increase food crop production by Mbozi smallholder farmers in a sustainable way. Draft animal power is a component of the programme and animal-drawn weeding is being promoted.*

*Farmers' groups have been set up. These allow large numbers of farmers to be reached by a limited number of extension staff. The groups also encourage exchange of experiences between farmers and help to build up farmers' organisational skills so they can make efficient use of the services provided to them.*

*Poor weeding is considered the biggest constraint to increased maize yields in the Southern Highlands of Tanzania. Mechanised weeding is the best solution towards overcoming the labour shortages.*

*Several services are provided at the divisional Farm Service Centres, including training, building of ox carts and sales of implements such as ox plows, cultivators and ridgers. Farmers are shown how to use weeding yokes and how to weed with cultivators, ridgers and plows.*

## Introduction

The Agricultural Development Programme, Mbozi started in 1986. It is an integrated agricultural project working in 96 villages in Mbozi District, Tanzania. The aim of the project is to increase food crop production by Mbozi smallholder farmers in a sustainable way. The first stage of the project was research into the farming systems in the area.

## Farming systems research

Farming systems research carried out in Mbozi in 1986/87 revealed two main problems in agriculture: decreasing soil fertility, and labour

shortage at certain periods in the year, especially during planting and weeding. The main reason was that most farmers grew several crops (maize, beans, groundnuts, millet, etc) at the same time. Some farmers also grew coffee, which had a high labour demand for management, harvesting and processing.

Although about 50% of the farming households in Vwawa Division owned cattle only 15% of cattle were used for primary soil preparation and for transport using sledges constructed locally. It also appeared that the risks of holding cattle were quite high due to a high death rate of calves from prominent diseases such as East Coast Fever, lumpy skin disease and black quarter. Witchcraft was also mentioned as a cause of animal death. Veterinary services were poor and medicines were often not available or very expensive. The use of local medicines was limited. Poor housing and feeding of the animals also contributed to a high death rate.

Owning oxen only for work was not regarded as very economically attractive as they were not greatly used (some plowing and pulling sledges). Cattle did, however, have a high social and cultural value. They were seen as a security especially in case of sudden expenditure such as illness in the family or a funeral, and for dowries. Cows were preferred for milk production and reproduction and were more respected by farmers. It was also observed that farmers used rough methods in training their animals. Very rarely did families bring their animals together at one farmer's centre for training, as they feared that witchcraft might kill their animals. Sharing animals was not very common, although lending a pair among family members happened frequently.

Taking care of the animals and working with them was currently perceived as a man's job, as cattle were owned by men. However, the

culture was changing slowly to consider how women could practise partial ownership.

In most of the surveyed villages local ox trainers were available. They trained animals at the owners' farms, pulling logs and obeying commands.

### **Mbozi Agricultural Development Programme draft animal policy**

Following the farming systems research the Agricultural Development Programme Mbozi proposed the following mechanisation policy.

The role of ox mechanisation should be defined in relation to all aspects of soil fertility including transport of organic matter to the field, incorporation of organic matter under ridges, use of improved farmyard manure (stored in a pit or heap) and compost.

The role of ox mechanisation should be defined in relation to labour constraints and improvement of crop husbandry, stressing:

- timely and proper soil preparation, including plowing and harrowing twice – the first time to prepare the seedbed for the weeds and the second to kill the germinated weeds and prepare the seedbed for maize
- timely and proper preparation of open furrows for planting, using plows or cultivator
- the advantages of planting on ridges, and simultaneous incorporation of organic matter leading to high yields
- the importance of weeding.

Poor weeding is considered the biggest constraint to increased maize yields in the Southern Highlands of Tanzania. Mechanised weeding is the best solution towards overcoming the labour shortage problem.

At all stages the role of women should be taken into account: women should be the foremost beneficiaries of the eventual reduction of workload as they are the main actors in the food production process.

Ox mechanisation and animal health care should be topics in the general agricultural courses for link farmers and extension workers at FSC training centres; the fully ox-mechanised demonstration farms should be used for training and spreading the technology.

#### ***Extension policy and training practices***

The ox-mechanisation policy should be part of the general project's village extension and organisation policy. Link farmers are trained in

general agricultural methods and 'resource efficient agriculture'.

Three seminars are conducted over a one-year period, the third one dealing with ox mechanisation. Thereafter a village can enrol itself for on-the-spot training. Normally five local ox trainers or ox users are selected per village for further training, and at least one of these should be a woman. Between the village and the project an agreement is made concerning the rights and obligations of both parties. They are then trained in more advanced techniques of steering, planting, weeding, use of single yokes and the making of different types of yokes. They form an ox-mechanisation committee in their villages, which is available to the farmers' groups for further demonstration and training.

The village must provide a training and demonstration plot because many people have yet to be convinced that it is possible to plant and weed with oxen. In their training activities at the village level, the committee members are supported by an upgraded trainer from another village and they can borrow the necessary equipment from the project for a certain period. After mastering all the techniques the trained committee members can act as trainers for other villages. In this way the role of the project is reduced to an intermediary providing linking whereby people with needs can learn from those having the knowledge; in this way the links between villages solidify and strengthen.

#### ***Equipment supply***

The promotion and distribution of the necessary equipment takes place via ADP-Mbozi's existing sales points and shops. At sales points equipment can only be ordered; in the shops the different tools are available and specific promotion meetings are undertaken.

Ox-weeding equipment is provided to interested village committees and groups on credit. A downpayment of 20% must be made and the remaining 80% must be paid at the end of the season. As availability of ox carts has been problematic over the past years these are now made at one Farm Service Centre workshop in collaboration with Mbeya Oxenization Project (MOP) which provides the axles. Despite this effort there is still a major shortage of equipment; this is a national problem which the project cannot tackle alone.

### ***Animal-powered maize mill***

The project started an experiment with a women's group, in a very isolated area, engaged in maize grinding using an ox-driven maize mill. The results were not good because the oxen did not perform well, and the output of the mill was below expectations.

### ***Donkeys***

Most soils in Mbozi are too hard to be plowed using donkeys. Most programme work is with oxen but donkeys are being promoted in Ndalambo Division and they are available in Msangano Division.

### **Weeding systems**

ADP-Mbozi is training farmers to weed with oxen because timely weeding cannot be accomplished with hand hoes. A pair of oxen can plow one hectare in 12–15 hours, but a farmer using a hand hoe takes 300–450 hours. A pair of oxen can weed one hectare in 7–10 hours, compared with 200–300 hours for hand hoeing. Most farmers obtain very low yields from their crops due to poor weed control right from land preparation. Proper use of ox implements leads to high yields and the three necessary weeding operations can be performed efficiently.

### ***Soil conditions***

When weeding with oxen the soil should be moist but not muddy. It is not good to weed when it is raining, as weeds may re-root. Sunshine is necessary to ensure that weeds dry out and die.

### ***Inter-row cultivator***

A farmer should use a long yoke so that oxen cannot destroy the crop. A pair of oxen should be well trained so that they can pass along rows and not destroy crops.

### ***Ridger***

This implement can also pass between rows thus burying weeds with the soil. It can also be used for making furrows at planting; making irrigation channels; harvesting potatoes and groundnuts; and covering fertiliser during top-dressing when making ridges for maize.

### ***Normal plow***

If other implements are not available a plow can be used for weeding, but a long yoke should be used so that the animal can pass

between rows. To weed well, the plow should be adjusted not to cut too deeply. Plows can also be used to make ridges. Ox weeding is good if crops are planted in lines (proper spacing) on flat land or small ridges which have been made using a ridger.

### ***Yokes***

The choice of yoke to be used depends on the operation to be carried out, the implement to be used and the between-row spacing. A short yoke is used for plowing, harrowing, pulling ox carts and weeding by using over-the-row cultivators, and also when weeding coffee fields using other cultivators. Long yokes are used for weeding between rows and also for making ridges (ridger/inter-row cultivators).

### **Results and conclusions**

In the initial years, ox mechanisation was not given priority as it was clear that only farmers with medium or large farms could benefit from it. A herd of five cattle was a minimum number in order for a farmer to have two bulls. Sharing of animals was not common in the area, and so lack of animals was an additional problem to lack of cash needed to purchase implements.

In the period 1987–1993 the project sold 113 ox carts, 275 plows and a few cultivators and ridgers, despite the fact that implement supply was a major bottleneck. In the period 1990–93 three-day seminars on ox mechanisation were held at the Farm Service Centre at which 450 farmers from 18 villages were trained in basic skills of ox mechanisation. Agreements were made with 11 villages, and ox mechanisation committees were trained in more advanced skills. As a result, 55 people have been trained in these villages together with 15 pairs of oxen.

An attempt has been made to reduce the risks of cattle raising, but the supply of medicines is insufficient, dipping is extremely difficult to organise and very little money is made available by the District for this purpose.

This brief outline shows how the draft animal power component has developed over a four- to five-year period and how it fits in the general approach of the project. More emphasis is being put on local institutions and services, such as village extension staff, district agricultural extension staff and the Mbeya Oxenization Project.