

Towards a sustainable system for animal traction technology transfer: experiences from Kilimanjaro Region, Tanzania

by

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Abstract

The Mifipro (Mixed Farming Improvement Project) animal traction programme started in 1985. Within five years animal traction technology had been well adopted in an area where it was previously unknown. The programme embraces training of farmers and their oxen at village level, follow-up through farmers' groups, training of village ox trainers and government extension workers, and the provision of veterinary and maintenance services. Much emphasis is placed on the system for transferring animal traction technology, for example through integration with government extension services. However, the sustainability is very much determined by the extent to which farmers can manage the system themselves, and thus by the services available to them. To achieve sustainability, a farmers' network has been established with farmers' groups from the extension programme as its basic unit. This network is to play a coordinating role in introducing animal traction services to farmers.

Introduction

Animal traction has been used in Tanzania for several decades. According to Kjarby (1983), about 600 000 oxen are used for work and 15% of the crop land is cultivated by oxen. However, application of animal traction is mainly limited to distinct areas, such as the southern highlands, and initiated by settlers or special projects. Attempts to work towards a consistent development of animal traction technology are still in their early stages. The Mixed Farming Improvement Project (Mifipro) is one of the projects engaged on promoting animal traction technology. It is concerned mainly with introducing a systematic approach to the transfer of animal traction technology at farmer level, with a clear emphasis on its sustainability.

When Mifipro began in 1985, animal traction was an unknown phenomenon in the project's working area (the eastern lowlands of Mwanga District, Kilimanjaro Region). This area is classified as semi-arid, with an annual average rainfall of 600 mm distributed over two rainy seasons. However, irrigation from natural streams descending from the mountains enhances the opportunities for crop production.

From the perspective of crop production the area comprises six different agro-ecological zones distinguished by soil type (black clay, red loam-sand) and water availability (permanent irrigation, unreliable access to irrigation, solely rainfed). Most farmers have fields in several agro-ecological zones.

Agriculture is the basic source of livelihood for nearly everyone, sometimes supplemented by other sources of income such as government employment, fishing, livestock raising and small businesses. Consequently the availability of labour outside the family is very limited. Major crops are maize, beans, rice, cassava and, where permanent water sources are present, coconut palms and fruit trees. Important cash earners are livestock, fishing and rice.

A survey conducted in 1989 showed that roughly 60% of households own livestock. Most households have fewer than 20 head of cattle, although herds of more than 100 head do occur. Free grazing is the prevailing system, with little or no investment.

The area is relatively isolated, accessible by only two roads which are often impassable during the rainy seasons. Government services are poorly developed, as are marketing, input supply and repair facilities. The area experiences an increasing inflow of people from the highly populated mountain areas, in search of arable land. As a result, tension between crop and livestock activities is rising and farming intensity tends to increase.

The animal traction programme

Although commercialisation of agriculture never reached the stage where it could trigger the development of animal traction (in contrast to the case in several West African countries), and farmers were hesitant for cultural reasons to use animals for work, other conditions in the area were conducive to the introduction of animal traction. Therefore an oxenisation programme was started in 1985. The major elements of the programme are described briefly below.

Raising awareness

Although farmers acknowledged that labour was a main constraint, they were not aware that animal traction could be a solution. Cultural factors were denying the possibility of using animals for work. Demonstrations on-farm, and an initial individual approach, broke down the cultural obstacles reasonably quickly.

Training of farmers

On request, farmers and their oxen (in sessions of 7–14 pairs) are trained within their villages. Intervention by the project is kept to a minimum level. Farmers have to bring their own oxen, build a temporary shed for training, look after their own animals and provide an assistant during the time of the training. Implements and materials are supplied by the project on economic terms and veterinary services are provided by project staff. The training takes about five weeks during which project trainers live in the village. Until 1990 attention was focused on oxen. Recently the project has widened its scope to include donkeys.

Follow-up of trained farmers

After completion of training, farmers are asked to organise themselves into groups. Project technicians visit the groups on a regular basis (every one or two weeks) to give advice, check the animals and provide additional training. Normally these groups evolve from special animal traction groups into general agricultural groups where a broad spectrum of matters, such as crop production, soil conservation, livestock management, irrigation, etc, can be discussed. Through a participatory extension approach actual problems of farmers serve as a starting point for further training, during which attempts are made to achieve a synthesis between the farmers' knowledge and newly introduced ideas.

Training of village trainers

From each training group, one or two farmers, proposed by the others, are selected and brought to the project site to be given further training in animal traction technology. This training is usually given in two sessions of four to five days each. These farmers then have the task of assisting their fellow farmers to train their animals. This assistance is based on a financial agreement between the village trainer and the farmer.

Training of government extension workers

The project conducts regular training sessions for government extension workers and agro-mechanisation staff, to upgrade their knowledge and skills and to help them address farmers' animal

traction problems. In addition, extension workers are trained in participatory extension skills to enhance an open dialogue with farmers.

Demonstrations at village level

In order to intensify the application of animal traction, especially for more complicated activities such as planting and weeding with oxen, demonstrations are organised within the villages, using the farmers' own oxen and potential alternative implements supplied by the project.

Support services

Apart from providing training and supplying implements (plows, ridgers, chains) at cost price, the project operates a modest workshop where, for example, ox carts are manufactured. Complete axles are obtained elsewhere while the bodies are built and assembled at the workshop. Repair facilities are also available. Recently a basic veterinary centre came into operation, facilitating proper diagnosis and treatment of animal diseases: these services are provided on economic terms.

General impact of the programme

A survey conducted in 1990–91 to evaluate the impact of the programme (Vanderschaeghe, 1991) showed that between 1985 and 1989 a total of 140 farmers were trained, 102 by the project and 38 (with their oxen) with the assistance of village trainers or neighbouring farmers. This represents about 7% of all families in the working area, or 9% of the families who own cattle.

Of the farmers who were trained during this period, 92% are still using their oxen for traction purposes, indicating a high level of continued adoption of animal traction technology. Of the farmers who have adopted animal traction, 7% had no cattle prior to the training; they obtained their oxen either by buying surplus animals from others or by inheriting them from their fathers "in advance". Some 32% of the farmers now have two or more pairs of oxen.

The fact that about a quarter of the trained farmers have trained their animals without direct assistance from the project indicates that the comprehensive approach in the training programme has resulted in a certain degree of self-reliance with regard to the adoption of animal traction technology. However, there seem to be differences in the application of animal traction depending on how the farmers were trained. Among the village trained farmers, relatively more use animal traction for transport purposes (95%), and fewer use this technology for field activities (24%) compared to their project trained counterparts (80 and 56%, respectively).

This partly reflects the fact that the use of animal traction for field activities requires a higher degree of skill and knowledge, both for the farmer and for the animals, compared to pulling carts. Apparently the spontaneous expansion of animal traction could not attain this quality aspect sufficiently.

Of all the 140 farmers trained, about 84% (118) use oxen for pulling carts. Fewer than half (66) use them for field activities and mainly for land preparation and planting; weeding with oxen is still poorly developed.

The introduction of animal traction for transport has definitely proved a success. This is especially true among women, who reported that ox carts substantially reduce their work burden for such tedious tasks as collecting water and firewood and ferrying the harvest from the fields to their home. Ox carts are also used for taking produce to the market and for various other, often income-generating, jobs. Incomes of 75 000–150 000 Tanzanian shillings per year (equivalent in 1991 to about US\$ 750–1500) from renting out an ox cart have been recorded in villages with a low density of ox carts. As animals and equipment are mainly owned by men, men are also the main beneficiaries of this income.

Impact at farm level

All farm operations are carried out with single-purpose implements—mouldboard plows, ridgers and ox carts. (Tine cultivators are also used, but their numbers are very small and so their impact has not been evaluated.) The evaluation survey (Vanderschaeghe, 1991) showed that the labour input per hectare was considerably reduced by using animal traction. For example, for maize cultivation, doing all operations manually (from land preparation to transport of harvest) required a total of 16.6 workdays/ha (1 workday = 7 hours). Using a plow alone, a plow plus an ox cart, and a plow plus ridger reduced the labour requirement to 13, 12 and 9 workdays/ha, respectively.

This reduction of workload offered farmers several options for improving their farming. Some farmers chose to increase the area they cultivated, while others opted for a diversification of their income sources.

Another benefit of a reduced labour investment during land preparation is that farmers are better able to prepare fields located in different agro-ecological zones. At times of unfavourable rainfall (either too much or too little) they can easily shift their attention to the zone most suited to the

current circumstances and by doing so increase their food security.

As the period between two consecutive rainy seasons is very short and rainfall is unpredictable, it is of vital importance to harvest the first crop as quickly as possible and to prepare the land again for the next rains. Animal traction increases the chance for timely execution of these field operations.

Reflections on the approach

The Mifipro animal traction programme has succeeded in introducing animal traction technology into an area where it was previously absent, and within a reasonably short period. This success can be attributed to the adoption of a comprehensive approach, comprising elements of training, follow-up and demonstrations, linking animal traction to general extension activities on crop production via farmers' groups, as well as the provision of veterinary, livestock and maintenance services—all of which are considered to be vital for successful animal traction projects (Pingali, Bigot and Binswanger, 1987).

On the other hand, several shortcomings were observed; some of these are related to operational elements of the programme, while others are of a more structural nature, taking into account the ability of farmers to sustain and regenerate the system of animal traction technology transfer.

Access to animal traction technology

Animal traction technology is mainly only within the reach of farmers who have achieved a certain level of wealth, in terms of both capital and, more importantly, cattle. The opportunities to reach resource-poor farmers with this technology, considering the relatively high initial investment, are few. It remains an argument for debate whether this should be accepted as a reality or whether special programmes (credit facilities) or approaches (group ownership of oxen and implements) should be launched in order to give resource-poor farmers access to this technology. The experience of the Mifipro project shows that group ownership of oxen and implements is often not a viable solution because of technical reasons (farmers need the oxen at the same time) and social factors (preference for individual ownership, little responsibility towards equipment). Credit facilities should be linked with a saving scheme, based on sound financial management, in order to create a more permanent credit scheme. Preferably these credit/saving schemes should have a wider scope than just animal traction to allow money to be invested in activities which have the highest return to capital.

In order to give women access to animal traction technology, use should be made of female ox trainers. However, as women can often be considered as resource-poor farmers, the above-mentioned concern about this group is also applicable here.

Selection and training of village ox trainers

It is recommended that candidate village ox trainers should be selected from among farmers who have reached a more or less settled stage in their lives. Youths are often mobile and move to other areas in search of work. Furthermore their position relative to older farmers is sometimes complicated by social factors.

Village trainers need continuing training opportunities in order to maintain and upgrade their knowledge and skills and to enable them to offer services aimed at full-scale mechanisation of field activities. Therefore close follow-up of these trainers is needed.

Implements

Within the context of Tanzania, development and production of basic animal traction implements should be left to central institutions which are well equipped to do this work. Local projects should not go beyond the tasks of maintenance, assembly and carpentry work.

Maintenance services

The establishment of a central, economically-viable workshop for production and maintenance services is probably difficult in remote areas. Once it has been decided precisely which services are vital for a successful animal traction programme, a better way might be to consider how local craftsmen can be helped to provide such services right from the start, outside the organisation of the project.

Towards a sustainable system of animal traction technology transfer

Experiences in many countries have shown that the introduction of animal traction is more complicated than is generally thought. It requires a long-term perspective. Moreover, animal traction projects should be well integrated in a more general service structure for farmers. This can ensure that animal traction recommendations are adequately supported by other extension messages. In addition, available extension staff can be used in the operation of the programme.

Apart from this, the participation of farmers is a crucial element in the effort to provide farmers with the services they need. In other words, farmers

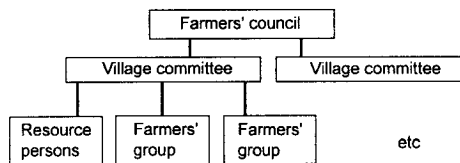


Figure 1: Present system of animal traction technology transfer in Kilimanjaro Region, Tanzania

should be in the position to obtain the services they need from respective institutions (whether government or others).

In order to realise these objectives, the Mifipro project has initiated the establishment of a farmers' network. As explained above, participants in ox-training courses organise themselves into a farmers' group after the training is completed in the village. Apart from these specific animal traction groups, other farmers' groups already exist and form the basis of the agricultural extension system. Extension workers, either from the project or from the government, visit these groups regularly. The group concept is useful not only because it can increase the efficiency of the extension services (wider reach) but also because adults seem to learn more easily when they are in a group. The element of empowerment of farmers comes from the union of the various groups. The present structure is outlined in Figure 1.

This structure consists solely of individual farmers; government structures are not involved. The farmers' groups are the units of the structure; at present about 40 groups exist. Leaders of the groups in one area (varying from three to five groups) are members of the Village Committees, of which there are presently 11 in the project area. Every committee elects its representative to the highest level, the Farmers' Council.

Various resource persons (such as nursery attendants engaged in production of tree seedlings for interested farmers, village ox trainers, etc) are available at village level. They are farmers who are trained by the project but who are coordinated by the Village Committees. The task of the Village Committees is to bring farmers and resource persons together when the former need any assistance from the latter. This offers several possibilities. The Committee can organise demonstrations or training for farmers who express interest in animal traction. If any assistance is needed from the project or from the extension service the Committee can address the issue to them. In case of structural problems the network allows for a flow of information to the highest level where solutions can be discussed. The

Farmers' Council can address the issue to any relevant institution. Presently the Council meets three times a year and it functions as an advisory body to the project. However, it could play this role to any other organisation. It is foreseen that the Farmers' Council could develop into a local legal institution representing the interest of the farmers.

Of course, such a network is not established overnight. The present network started to operate at the end of 1990 but a lot of work still has to be done to enable it to function effectively. All actors in the network have to be aware of their tasks and responsibilities and should have the skills to execute their tasks adequately. Here lies a challenging role for the project. Moreover, it requires a strong commitment by farmers at all levels towards the development of the area. This can only be retained if the system generates some clear benefits for the farmers, in the short as well as the long term.

In conclusion, the sustainability of the transfer of animal traction technology depends on many factors. An important factor which is often overlooked is the role farmers can play in managing the system. The experiences of Mifipro might contribute to the discussion on this aspect.

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