

Improving animal power utilisation in Malawi: the work of the Animal Power Utilisation Project

by

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Abstract

Most countries in southern Africa have distinct wet and dry seasons, and optimum tillage time is limited to the first 23 days after the rains start if high yields are to be achieved. Timeliness in completing basic land preparation before planting is very critical on smallholder farms where labour bottlenecks occur because farm operations are done by hand. Farm size is therefore limited by how much land a farming family can till. It is difficult to mechanise small farms in Malawi using motorised equipment because of the cost, the size and location of fields and the farmers' lack of technical knowledge. The use of animal power on these farms seem more appropriate. This paper describes some project efforts to improve animal power utilisation. It includes details on training of staff, farmers and animals, testing of new equipment, organisation of revolving funds for supply of drugs and spare part distribution.

Introduction

Most Malawian farmers cannot use motorised equipment on their farms because of the high cost of the equipment and the lack of technical expertise and spares. Motorised mechanisation is also a major problem for the country as a whole because the import of equipment and oil causes a drain on foreign exchange. In a situation where agricultural operations are carried out by hand labour, animal traction technology offers a better alternative for increasing production.

Many advantages of using animal draft power in Malawi have been identified. For example:

- the cost is within the reach of most farmers because the animals and equipment are readily available in the country
- the technology fits very well into existing farming systems, allowing mixed cropping and involving all members of the farmer's family, including children
- the animals appreciate in value with time (except for donkeys), so the farmer can get many years' work from his animals and still sell them at a profit
- farmers can understand the technology, or can be trained to do so in a short time

- animal power is faster than hand labour
- animals and their equipment can be hired out, thus earning income for their owners
- working with animal power involves less drudgery than hand labour.

The common draft animals in Malawi are oxen and donkeys. They are used in agriculture and forestry for plowing, harrowing, ridging, carting and logging. There are several problems with using draft animals (Kumwenda, 1987), including:

- inadequate numbers and types of animals
- poor training of animals
- lack of trained personnel at grassroots level to encourage adoption and pass on skills and information to the users
- poor animal management
- pests, diseases and high mortality rates
- inadequate feed and water
- uncertain supply of equipment and spare parts
- lack of suitable equipment
- poor harnessing techniques
- shortage of land and poor terrain.

The Government of Malawi has recognised the need for farm mechanisation as a means of increasing agricultural production, and the important role that animal power can play in such a development. This recognition is reflected in the country's *Statement of Development Policies 1987–1996* (Government of Malawi, 1987), which states that the supply and training of work animals will be emphasised and that priority will be given to the training of farmers on how to use implements. It was as a result of these policies that the Animal Power Utilisation Project was established in 1986, with assistance from the Food and Agriculture Organization of the United Nations (FAO). The general objective of the project is to develop agricultural production and improve the living standards of rural people in Malawi through the enhanced and improved use of animal power, particularly for crop production and farm transport.

The specific objectives of the Animal Power Utilisation Project are to:

- review current knowledge, understanding and extent of draft animal power utilisation in Malawi, as well as constraints to the development of this technology
- strengthen the technical capacity of the Ministry of Agriculture, and other relevant organisations and institutions, to evaluate requirements for agricultural mechanisation through tractorisation or oxenisation, and to promote the use of animal power in the country where and when appropriate
- assist the Ministry of Agriculture to establish an operational research capacity for the development of appropriate training and support for institutions and organisations engaged in the use of animal power in the country
- promote liaison and communication within Malawi concerning all aspects of animal power utilisation
- identify draft animal power equipment from other countries for production and use in Malawi
- improve the availability of alternative draft animals in Malawi
- establish an effective spare parts distribution system at the rural artisan level
- establish an effective drug distribution system at the veterinary assistant level
- train government and other staff, and farmers, in the use and maintenance of draft animal technology.

The primary beneficiaries of the Animal Power Utilisation Project are smallholder and estate farmers who can use animal power to intensify agricultural production and reduce tractor costs.

Rural communities will also benefit: ox cultivation will reduce the drudgery of hand hoeing, and animal-drawn transport will lessen the burden of headloading farm inputs and produce. Women in particular will enjoy the benefits of using appropriate farm and transport equipment.

Rural artisans will have an opportunity to increase their business by repairing animal-drawn implements and participating in spare part distribution networks.

The country in general will benefit through:

- increased crop production resulting from improved timely tillage techniques and the use of animal manure, and leading to food self-sufficiency
- reduced cost of tractor operated schemes in both agriculture and forestry. Tractors require

imported spare parts and fuel, and the foreign exchange saved by their reduced use can be used to buy other commodities

- reduced mortality rates of working animals through vaccinations against diseases
- increased opportunity for individual investment in animal power equipment and spare part production and sales
- reduced environmental degradation. Animal power is an ecologically appropriate technology.

Project achievements

Testing of alternative equipment

Several implements were obtained from abroad, for testing to see if they offered better alternatives to implements already manufactured in Malawi. The implements obtained were the Sebele planter from Botswana; wooden plows from the Philippines; a combined plow, ridger and toolframe from The Netherlands; a plow from Mozambique; and damscoops from Zimbabwe.

After testing, the Sebele planter was not recommended for use in Malawi because it could only plant on flat ground (it is recommended to plant on ridges in Malawi). Furthermore, it had no depth control and no marker, and the metering mechanism only worked with uniformly graded seed (large seeds blocked the metering mechanism and soft seeds, such as groundnuts, were damaged).

Wooden plows from the Philippines were unsuitable for upland work because they could not withstand the forces encountered in plowing such soils. There was also worry that wooden plows might encourage deforestation and the skill of making curved wooden frames was not available locally. It is now planned to have these made of iron, with a few modifications. It has also been decided that fast wearing parts be made detachable. Testing of these will continue on rice schemes.

The combined plow, ridger and toolframe made by Rumpstad of The Netherlands was made of very hard steel to resist wear. Testing showed that this implement could not be used in Malawi without modification, but even if its performance could be improved, Malawian farmers would not be able to buy the unit as its price is more than twice that of locally made implements.

The "Safim-type" plow from Mozambique is similar in every aspect to the ones made by Agrimal in Malawi. Damscoops were successfully used by farmers in the north and central fisheries project for making fish ponds.

Table 1: Numbers of work oxen and implements owned by farmers in the different Agricultural Development Divisions of Malawi in 1989

	<i>Work oxen</i>	<i>Plows</i>	<i>Ridgers</i>	<i>Cultivators</i>	<i>Ox carts</i>	<i>Harrows</i>	<i>Toolbars</i>
Karonga	20 750	3 317	438	24	372	4	—
Mzuzu	18 494	8 698	6 037	151	1 881	—	—
Salima	1 880	590	839	82	816	—	—
Kasungu	12 696	2 095	3 175	48	5 352	12	5
Lilongwe	16 041	1 740	1 507	191	8 883	9	5
Liwonde	788	641	430	74	561	—	9
Blantyre	414	148	126	22	239	—	—
Ngabu	1 260	458	189	16	631	—	—
Total	72 323	18 047	12 741	608	18 735	25	19

Alternative draft animals

Table 1 shows the numbers of draft animals and implements in Malawi. There are not enough draft animals in the country. Efforts have been made to produce steers on government farms and sell them to farmers, but the numbers produced have always fallen short of requirements.

An attempt was also made to increase the number of donkeys in Malawi by importing animals from Botswana (Kumwenda and Mateyo, 1991). But of the 250 donkeys ordered, only 42 had been imported by June 1991. The others, when given the Dourine test, were found to be seropositive, and they were kept in Botswana pending investigations of Dourine prevalence in Malawi. Tests on 73 Malawi donkeys showed that the disease does not exist in Malawi, and so the veterinary authorities have banned the import of the remaining Botswana donkeys.

In 1988 the Republic of China offered to send 10 water buffaloes to Malawi, for research at one of the Chinese assisted agricultural irrigation schemes. An expert would accompany the animals for a few years and would train local staff and farmers on all aspects of husbandry and draft utilisation. Study tours are foreseen for staff to go and learn about the use of water buffaloes in China. The importation has so far not materialised because the Department of Animal Health and Industry is afraid of importing new diseases.

Pest disease and animal management

Following the discovery that drugs and vaccines were in short supply in some parts of Malawi, drug revolving funds were created in those Agricultural Development Divisions (ADD) which were severely affected. These funds, which are controlled by the divisional veterinary officer at each ADD, are used to buy drugs and vaccines which are then sold to

farmers: the revenues from sales go back to divisional veterinary officer. The most common drugs purchased are antibiotics, wound healing drugs and dewormers.

Two ADDs, Karonga and Ngabu, both have a high cattle population and drugs were previously in short supply. Each of these ADDs has received drugs worth about 11 000 Kwacha (approximately US\$ 2200). Despite problems at the start, Ngabu has managed to increase its revolving fund by 50% over a 10-month period, whereas Karonga has doubled its fund in just over eight months. A recent project evaluation mission recommended that similar drug revolving funds be set up in all the ADDs.

Distribution of spare parts

One of the reasons why spare parts are in short supply in rural areas is that most of the implement manufacturers are based in Blantyre in the Southern Region, and only a few have branches in the other two regions. Other reasons include the seasonality in demand for these spares, and the method of producing them. Large distributors are allowed to collect implements and spares on credit, while small ones are not yet allowed to do so. Yet the small distributors are the ones most suitably located for distribution. The Animal Power Utilisation Project investigated the possibility of establishing the revolving fund in all the ADDs but after detailed surveys it was concluded that such work would better be done by those institutions already in this business, such as Chipiku Stores, Peoples Trading Centre (PTC), Agricultural Development and Marketing Cooperation (Admarc) and individual entrepreneurs.

Review of knowledge and constraints

Detailed surveys have been carried out to examine some of the problems of animal draft technology in Malawi. For example Kasomekera and Mwinjilo (1989) investigated animal power utilisation in Malawi; Liuma (1989) studied the involvement of women in animal power utilisation; and Ashburner (1989) did a survey on local equipment produced within the country. A national workshop to discuss these findings was held for policy makers, manufacturers, researchers, distributors and extension personnel.

Phase I of the Animal Power Utilisation Project (August 1987 to February 1989) was, among other things, focused on staff training and on the identification, through national surveys, of problem areas in draft animal technology uptake. Special attention was given to the role of women in the uptake of the technology through a three-day national workshop held in Lilongwe in 1988. This was followed by a two-month consultancy on the involvement of women in animal power utilisation in Malawi (Liuma, 1989).

In Phase II of the project (March 1989 to April 1992), staff and farmer training, and research and development of appropriate types of implements and farm carts, have continued, and particular attention has been paid to the health and production of draft animals. Apart from training 3117 field extension staff and farmers in draft animal technology, the project has organised the following:

- short courses in the UK and The Netherlands for six participants
- a national seminar on "Mechanical and animal power strategy development"
- one fellowship (which terminated in June 1991 due to the death of the fellow)
- a study tour to India and the Philippines for two participants
- a local study tour to Chikangawa for 96 ox trainers from all ADDs
- training courses in ADDs

Future work

Although the Animal Power Utilisation Project has been successful in solving some of the farmers' problems, there is need to continue this work in future.

There is need to provide facilities for draft animal hire, both in the upland farms and on irrigation schemes. These would replace power tillers, which are difficult and expensive to run on irrigation schemes.

Training of animals and farmers should be a continuing process so that any new techniques, equipment or information can easily be relayed to the farmers.

There is a need to improve feeding and management of work animals by emphasising maintenance and supplementary feeding, good harnessing techniques and handling of animals.

Research and development is needed on new equipment, especially the weeder and planter which are not yet available to farmers.

Conclusion

Draft animal power is an intermediate technology that is cheap, technically easy and socially acceptable to many farmers. This technology can definitely increase the productivity of farms and ease the burden of carrying heavy things on the head and shoulders. If animal draft power is to be successful, continuous attention should be paid to animal health, feeding, ready availability of equipment and spare parts and providing farmers with credit to buy the package.

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