

Animal draft power in Zambia: constraints to development and possibilities for improvements

by

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Abstract

This paper discusses some of the constraints to increased use of animal traction technology in Zambia. Most smallholder farmers in cattle-keeping areas have the skills necessary to train and handle their work animals, but this is not the case in non-cattle-keeping regions where animal traction is a new technology. In all areas, poor producer prices do not provide farmers with enough income to invest in animals and implements. Nor are existing credit facilities adequate to overcome this problem. The government's 1985 five-year investment plan, aimed at improving the use of animal traction, covers such areas as research and development, training, implement supply, and information and documentation.

Introduction and background

In common with most other countries in eastern and southern Africa, agricultural mechanisation in Zambia is mixed. All forms of farming power (human, animal and tractor) are available, but the extent of their use is determined by traditional background, economy and availability.

Traditional background has played a major part in the development of farm mechanisation in Zambia. The southern part of the country, comprising Southern and Western and parts of Central and Eastern Provinces, has a long history of cattle keeping, and farmers here are familiar with the training of draft oxen and the handling of some ox-drawn implements: they have been using oxen for their farming operations since the 1930s when white settler farmers started coming into the country. These farmers used animal traction on their own farms with the help of local labourers, but the spread of the technology to Zambian smallholder farmers was quite limited. Moreover, farming is not a traditional occupation in some regions, and people's preferences for other occupations, such as hunting, fishing and mining, slowed the rate of

adoption of animal traction. In other areas, however, the technology spread rapidly.

In 1985 the government decided to encourage the use of animal draft power technology as a means of increasing agricultural production. A five-year animal draft power investment plan was drawn up (MAWD, 1985), and several programmes were initiated, some in conjunction with the donor community, others run solely by the government.

Present status of animal draft power

Cattle are the principal source of animal draft power in Zambia. The technology relies mainly on oxen, although recently cows have been used to a small extent. Local indigenous breeds are used in cattle-keeping areas. Where there are few cattle, there have only been limited transfers from areas of cattle surplus due to veterinary restrictions and high transport costs. The use of other animals, such as donkeys, is minimal, but could increase as farmers start to believe that donkeys can survive adverse conditions, such as drought, better than cattle.

About 240 000 draft animals with 120 000 animal-drawn mouldboard plows, 30 000 ridgers, 20 000 cultivators, 60 000 sledges and 30 000 carts were in use in Zambia in 1990 (Starkey, Dibbits and Mwenya, 1991). The plow is clearly the most popular implement, mainly because plowing is the main activity in parts of the country where animal power is used. However, many farmers also use their plow for preparing ridges and for inter-row weeding, even when ridgers are available; some farmers consider the ridger to be too heavy for the animals and the operator, especially when turning at the ends of the fields, while others prefer a plow because it is cheaper than a ridger. However, the use of ridgers is increasing, particularly on crops such as groundnuts. Ridging is a common practice in maize fields during the first weeding.

Animal power distribution

The distribution of animal power in Zambia varies between and within provinces (Starkey, Dibbits and Mwenya, 1991: see Map 1 and Table 1). Southern, Eastern, Central and Western Provinces, where animal traction has been used for many years, have higher cattle populations than other provinces, and about 8–10% of the cattle are trained for work. By contrast, in areas where the cattle population is lower and animal traction has been introduced only recently, far fewer (3–4%) of the available cattle are trained; in these areas government intervention has been necessary to facilitate animal training.

About half of the country's trained oxen are located in Southern Province, which also contains about half of the national cattle population. Although not all farmers own oxen, in some areas about 90% of farmers use draft animals for cultivation and transport. The highest concentration of trained oxen is found in Monze District (30 000) followed by

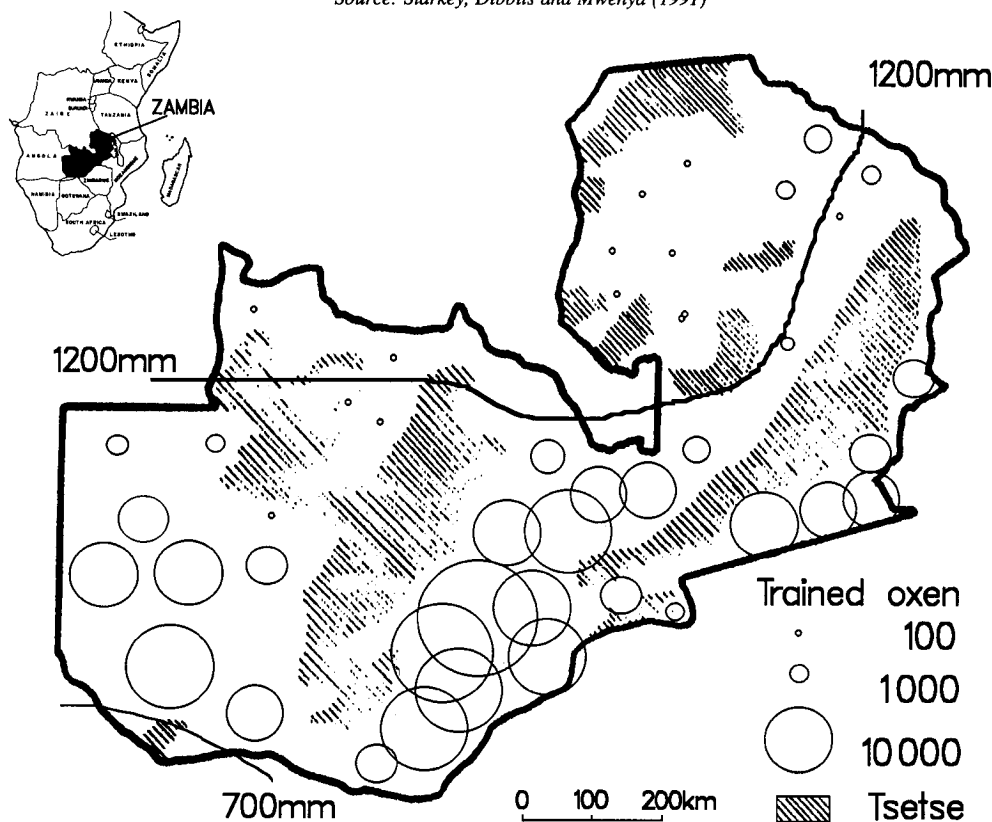
Table 1: Cattle population and trained oxen distribution in Zambia, 1991

Province	Cattle population	Number of trained oxen	% trained oxen
Southern	1 081 200	105 000	9.7
Eastern	273 600	32 500	11.9
Lusaka	89 500	5 200	5.8
Central	483 400	40 900	8.5
Northern	102 600	3 600	3.5
Luapula	10 800	500	4.0
Copperbelt	65 000	2 400	3.7
North Western	59 400	2 000	3.5
Western	512 800	50 000	9.7
Total	2 678 300	242 100	9.0

Map 1. Schematic presentation of the numbers and distribution of work oxen in Zambia.

The numbers of work oxen are represented by circles. The size of each circle is approximately proportional to the number of trained oxen in that area. The shaded areas on the map are considered to be of relatively high tsetse challenge. The map also indicates broad rainfall zones by giving the approximate positions of the 1200 mm and 700 mm isohyets

Source: Starkey, Dibbits and Mwenya (1991)



Namwala (18 000) and Kalomo (15 000). In these areas most farmers train their own animals.

Constraints to increased use

The present state of use of animal traction is far from optimal. Constraints to the increased use of this technology include:

- the poor state of the national economy
- low producer prices
- inadequate credit facilities
- lack of technical knowledge by most farmers and extension workers
- inadequate research and demonstration of animal traction technology
- poor supply and marketing of animal traction implements.

Most promoters of animal power technology in Zambia, and the farmers themselves, agree that poor producer prices, especially for maize, the major crop grown by smallholder farmers, is one of the main factors contributing to farmers' inability to adopt animal traction technologies. Growing maize appears not to be profitable. Use of such technologies as animal draft will only be attractive to smallholder farmers if they are paid handsomely for their produce, as this will enable them to increase their financial resources and undertake investment in animals and implements.

Inadequate credit facilities are another constraint to increased agricultural production by animal traction farmers. Although financial assistance has been provided by some lending institutions, such as Lima Bank, Zambia Cooperative Federation Finance Services and some commercial banks, support has not been adequate and there is evidence that many farmers have had to rely on their own resources to purchase inputs, including animal-drawn implements.

Lack of technical know-how by some extension workers and farmers, mainly in areas where animal traction is being introduced, but also in traditional animal traction areas, is yet another constraint to the spread of this technology. The technical training of extension workers in smallholder mechanisation techniques seems inadequate to enable them to advise smallholder farmers effectively. Until recently the agricultural education and training curricula at technical colleges and the university have included little on animal traction. As a result, graduates from these institutions lack skills in animal traction technology and are not very useful to farmers who have no knowledge of how to train and manage draft animals, and how to operate the animal traction implements.

Poor distribution of animal traction implements is generally agreed to be another hindering factor to improving agricultural production through the use of draft animals. Manufacturers and importers of

Plowing in Southern Province of Zambia



Photo: Paul Starkey

animal traction implements are concentrated along the railway line between the Copperbelt and Livingstone (see Map 2) which covers only some parts of four of the nine provinces. The distribution networks of these organisations are mostly based on provincial cooperative unions which are located mainly in the provincial capitals. These unions are supported by district unions which are in close contact with farmers and are expected to know their farmers' needs. Although the district unions may know what is needed, they often cannot satisfy the need because the provincial union does not have adequate stocks of implements or inputs or cannot distribute the stock because of financial or administrative deficiencies. Supply of spare parts is another problem: most Cooperative Managers seem to concentrate on provision of complete implements rather than on spares.

Cattle diseases have also played a major role in determining the level of use of animal traction technology. Constant outbreaks of diseases, particularly in Southern, Western, Central and Eastern Provinces, have reduced the numbers of animals available for work, and consequently some

farmers are wary of investing in cattle (including oxen) because of the economic risk. However, cattle diseases are less prevalent, and so have not yet posed a big threat, in areas where animal traction is a new introduction.

Proposed solutions to constraints

Increased use of animal traction will depend largely on the positive growth of the national economy, and especially on reductions in inflation and interest rates. With reduced interest rates, coupled with a free market economy, farmers will have the incentive to invest in animal traction.

The 1985 five-year investment plan contained several solutions to animal traction constraints, especially in the areas of research and development, training, implement supply and information and documentation. The investment plan has been implemented since 1987. Sufficient research results are not yet available in a form that extension workers can understand and take to the farmers. The Magoye Animal Traction Research and Development Project worked on equipment testing and the development of tillage systems. Formal test

Map 2: Zambia showing districts and provinces and the "line of rail" from Livingstone to Lusaka and the Copperbelt

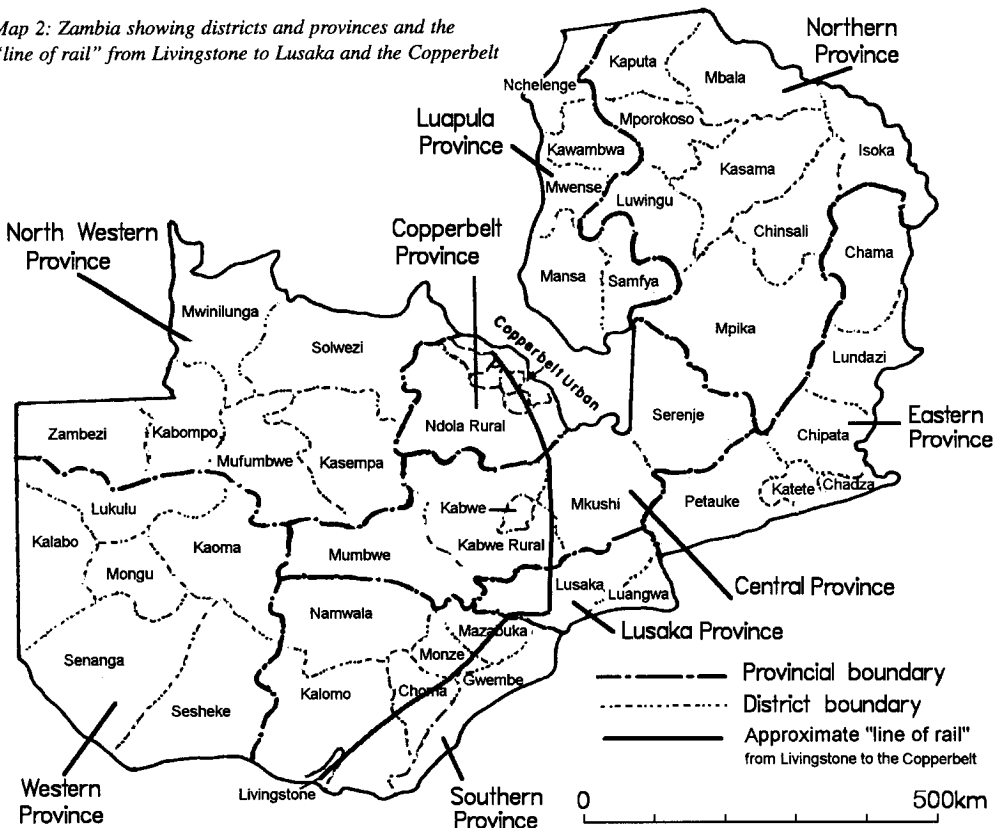




Photo: Paul Starkey

Oxen pulling grass mower at Palabana Animal Draft Power Training Centre, Zambia

procedures for animal-drawn carts and animal-drawn plows have been established and test results have been communicated to the manufacturers for improvements in design.

The Palabana Animal Draft Power Training Project has developed an animal traction technology training curriculum for agricultural development staff (suitable for governmental and non-governmental organisations). Several in-service courses have been conducted for extension workers. An outreach programme has been developed to support trainees and provide technical advice to other animal traction institutions.

In order to improve the information and documentation situation, a National Animal Draft Power Coordination Unit was established in the Department of Agriculture. The unit's main activities include animal traction problem identification, setting of priorities to support policy makers, and providing technical advisory services.

On the question of poor supply of animals, it has been suggested that small, privately owned breeding herds be established in areas with low cattle populations. This solution is believed to be more sustainable than the transfer of animals from areas with surplus cattle. This idea is already being implemented in Luapula Province using Finnish technical cooperation (Finnida). Private traders are being encouraged to specialise in the purchase of young steers for sale.

Trypanosomiasis, and tick-borne diseases such as East Coast Fever, are the major cattle diseases in Zambia. Some measures to control the tsetse fly population through the use of insecticides, and tick-borne diseases by regular dipping, are being undertaken by the Department of Veterinary and Tsetse Control. However, the government's

introduction of a dipping fee has discouraged some farmers from treating their animals. Farmers seem not to understand the economics of the government's move, and so proper farmer education should be intensified if the situation is to improve.

The problem of implement supply and distribution could be minimised if private traders realise the profitability of the animal-drawn implement business. What is needed is coordination between the various importing and manufacturing organisations and the establishment of an efficient distribution network.

Conclusions

The majority of farmers (80–90%) in most parts of Zambia are smallholders who cannot afford to own a tractor or use tractor hire services for their agricultural work. Animal traction has been acknowledged by many to be very relevant to these farmers, and will continue to provide the best alternative for farm mechanisation. Although the technology has been confined mainly to cattle-keeping areas, efforts are being made to extend this important innovation to areas in which animal draft use has not been a tradition. In both cases application of the technology has some limitations. Unless issues suggested in this paper are tackled effectively, improving animal traction technology in Zambia will be a very slow process and will depend largely on farmers' own ability to invest.

References

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