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Animal traction in Zambia: status, progress and trends 1991



Report prepared by

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Summary

Background

A five-year investment plan for animal traction in Zambia had been prepared in 1985. In 1990, it was decided to review the progress made since that plan, and obtain a new picture of animal traction in the country. To achieve this, a three person team visited all provinces during a four-week period in late 1990. The team comprised an international specialist in animal traction, the national Animal Draft Power Coordinator and his counterpart. They contacted over 200 people, including Ministry of Agriculture officials, staff of development projects and financial institutions, farmers and manufacturers. Site visits were made to farms, workshops and factories. Many published and unpublished documents were reviewed. Questionnaires were issued to all agricultural extension units (camps) through provincial and district offices to obtain estimates of draft animals and implements.

The initial findings of the mission were presented to a meeting in February 1991 attended by Ministry of Agriculture officials, staff of animal traction development projects and representatives of aid donors. Part 1 of this report presents an overview of animal traction in Zambia and discusses some key issues raised during the mission and the follow-up meetings. Part 2 of the report summarizes some of the key observations of the field visits, drawing heavily on the information supplied to the mission by people working in the provinces.

National animal traction status

About 240,000 draft animals are employed in Zambia, with 120,000 plows, 30,000 ridgers, 20,000 cultivators and 5,000 planters. About 60,000 sledges and 30,000 animal-drawn carts are also used. Nearly all work animals are oxen. Observations suggest that draft cows are increasingly being used, particularly within four-animal teams, but no data are available on the numbers of female animals employed in the different provinces. The national population of donkeys is low: only about 1500 donkeys are used for packing and carting. There is growing interest in the potential for employing donkeys.

The status of animal traction varies markedly between provinces and districts. The distribution of work animals is illustrated schematically in Map 1.

Animal traction in the north of Zambia

In Northern, Luapula, Copperbelt and North Western Provinces, where annual rainfall exceeds 1100 mm,

fewer than 10,000 draft animals are employed in total. Constraints include limited ownership of cattle, small numbers of steers, lack of knowledge of animal traction and extensive farming systems based on shifting cultivation. In some northern areas, trypanosomiasis severely restricts cattle keeping, but the spread of other diseases in the north of Zambia is often limited by the low population density of cattle.

In much of the north, animal traction is increasing steadily from its very low level, assisted by development projects and by farmer migration. As the technology is quite new, support services (including implement supply and repair) are poorly developed. Few animal-drawn carts are available, but farmers who have been assisted to obtain these have found them highly profitable. Farmers' ability to invest in animal traction is determined largely by credit availability and by marketing opportunities. Animal traction for cultivation and transport is likely to rise noticeably in these areas provided efficient crop marketing systems can be developed.

Animal traction in the west and south

In the west and south of the country, cattle are common in the tsetse-free zones, and animal traction has been used for many years. Areas exist where 90% of farmers employ draft animals for cultivation and transport. Not all farmers own work animals, and the proportion of farmers hiring or borrowing animals can be high. In these areas, traditional sledges are widely used, being more affordable than carts.

Overall, animal traction is increasing in the west and south as cattle populations continue to multiply and to expand their range. Cattle and work oxen can now survive and work in areas, such as Kaoma, that previously presented critical tsetse challenges. In these areas of introduction, training and support services may be needed. Elsewhere in the west and south, the main constraints appear economic, with the need for improved crop marketing opportunities to justify further investment in animal traction. Institutional credit is seldom available to assist farmers purchase draft animals and implements. There are also supply constraints, as present systems for the supply and distribution of implements and spares are only adequate along the line of rail.

Tsetse flies still restrict the keeping of cattle in many areas. In the Southern Province (and further north along the line of rail) the tick-borne "corridor disease" has been causing significant mortality within herds in the traditional sector. Corridor dis-

ease increases the risk involved in owning draft animals and also reduces the supply of steers. The disease may lead to a temporary fall in the number of working animals, and to an increase in the employment of work cows, as available females are used to replace lost work oxen.

Animal traction in central and eastern Zambia

The situation in central and eastern regions is mixed. There are areas of long-standing animal traction use, and others with little animal power. Constraints are mainly economic and associated with limited opportunities for profitable marketing of crops. In some areas where tsetse exist, few cattle are available and animal traction knowledge and support services are very limited.

Economic and social issues

Most recent adopters of animal traction have been supplementing available hand labour. In so doing, they have usually increased their total production by extending their total cultivated area. This has increased manual labour requirements for weeding, as few farmers weed with draft animals, particularly in the early years of adoption. Around provincial centres and along the line of rail, animals have sometimes replaced tractor ownership or tractor hire services that have become unavailable or unaffordable. On several commercial farms, animal power is used to complement tractor power, particularly for transportation.

The profitability of animal traction depends largely on the profitability of crop cultivation. Many farmers have had great difficulties marketing their produce and receiving timely payment. The problem has been greatest for maize, so farmers have tended to increase their cultivation of cash crops such as sunflower and soya. Improvements in purchasing arrangements for maize, rice and other commodities would almost certainly stimulate investment in animal traction. All farmers and development projects experience problems due to high inflation and interest rates.

Gender differences in the use of, and benefits from, animal traction generally reflect prevailing rural traditions. Most owners and users of work animals in Zambia are men. Boys are commonly expected to tend work animals. Although it is not very common for women to plow or help to control working animals, this may be increasing. In the Western Province, up to one third of households are headed by women, but if they own oxen these are generally looked after and worked by male relatives. Projects and training institutions in several areas of the country are increasingly trying to involve women in animal traction.

Implements and implement manufacture

Farmers appear generally satisfied with the common "Safim" designs of plow: about 12,000 - 15,000 are purchased each year. About half of these are made in Zambia by Northland and Gameco and half are imported from Zimbabwe. Farmers seem quite tolerant of manufacturing defects, such as those observed in past years in Northland plows. This may be partly attributable to the limited choice that farmers have had. Northland, which used to have a virtual monopoly, ascribed its problems to "jobbing" techniques, old equipment and subsidised competition. Zimbabwe plows have a good reputation, and appear to be the most popular plows available. A large consignment was imported in 1985, with EC assistance.

A Dutch-financed scheme was initiated in 1984 in which the government-backed firm "Lenco" assembled plows manufactured by the Dutch firm Rumpststad. The first plows were assembled in 1985, but the initial 4450 plows were widely judged by the farmers to be too heavy. Sales were very slow. Lenco subsequently assembled a lighter design of Rumpststad plow, using components imported with SIDA assistance. Sales remained low and Lenco resorted to selling them at below cost price. With further Dutch assistance, workshop machinery has recently been installed at Lenco to allow it to manufacture (as opposed to assemble) Rumpststad-designed plows and a range of other implements.

Several smaller manufacturing initiatives have been undertaken by firms and projects. A large consignment of lightweight Italian plows and ridgers was recently imported for use in the Southern Province. Initial test results and the reaction of farmers suggest that the plows may be too weak and of unsuitable design. One of the ridgers appears to have potential as a weeder.

Animal-drawn transport

Simple animal-drawn sledges are widely used in the west and the south. They are cheap, easy to maintain and can be dragged along sandy paths and roads. Sledges have limited carrying capacity and animal-drawn carts appear to offer greater social and economic benefits. In some areas they have proved effective and economically attractive for transporting maize and rice. Some provincial cooperative unions are actively encouraging ox carts for maize transport. In comparison with other countries in Africa, the number of ox carts owned in Zambia is low, and the animal-powered transport sector appears underdeveloped.

Most animal-drawn carts in the country are made from scrap vehicles. Various "appropriate technology" designs with wooden wheels and bearings have

been developed and promoted. Among the organizations involved have been University of Zambia Technology Development Advisory Unit (TDAU), Kasisi Mission (Lusaka Province), North Western IADP and Katopola Agricultural Engineering Centre (Eastern Province). Diffusion has been very limited and few such carts have been used by farmers for long.

A comprehensive series of on-farm tests of cart designs was recently carried out by Magoye. Carts based on steel axles, roller bearings and pneumatic tyres appeared most appropriate. This conclusion is supported by experiences of Muzama Crafts in North Western Province. When it introduced locally-made carts based on imported axles and tyres, adoption was rapid, and the use of animal-drawn transport increased rapidly in Kaoma and Zambezi Districts. Similar positive experiences, on a smaller scale, have been reported by Msokhocika Project, Eastern Province. Lenco, has been selling small numbers of technically good, but expensive carts. It has plans to market a cheaper ox cart, based on imported axles.

The bearing firm "SKF Zambia" recently attempted to meet the demand for locally-made steel ox cart axles. Its original hub design used ball bearings. About 2000 hub units have been sold, but various problems have been reported, and repairs are extremely difficult. SKF is therefore developing a new hub design, using roller bearings.

Research

Much recent research relating to animal traction has involved the testing and development of implements. The Regional Research Station at Magoye has been undertaking on-station and on-farm implement testing, with some replicated on-station trials. Several organizations have worked with ox carts, emphasizing practical development rather than objective research. Standardized methods for testing implements and carts have been developed at Magoye. They combine on-station testing with subsequent farmer evaluation. Such rigorous, objective testing should be valuable, particularly if carried out prior to product marketing. In practice, several recent donor-supported initiatives have imported and marketed implements without waiting for such testing.

Socioeconomic studies assessing the impact of animal traction on farming communities have been sponsored by projects in the Northern, North Western and Western provinces. Very few research findings relating to animal traction in Zambia have been published internationally or widely circulated within the country.

Training

Many provinces have small centres for training extension workers and/or farmers in animal traction. Artisanal training is particularly strong in the east. A national animal draft training centre has recently been established at Palabana. It will undertake in-service training and it is developing practical facilities, training methods and instruction materials. Several Zambians have benefited from training in animal traction in Zimbabwe, and a training manual for Zambia, based on Zimbabwe materials, has recently been financed by SIDA. The University of Zambia, the Natural Resources Development College and the Zambia College of Agriculture have been giving increasing attention to animal traction in their curricula, but all claim to lack good teaching materials.

Impact of research and extension

During recent years, the main impact of the extension services on animal traction has been in the areas of new introduction. In these areas, the long-standing extension messages on how to train draft animals and how to use basic implements appear to be useful to farmers unfamiliar with work animals. In other areas, where draft animals are widely used, there seem few, if any, recent examples of changes in animal traction technology attributable to the research and extension services. The range of implements used is still very limited, with most farmers using only a "Safim-type" plow, with its regulator removed. Although the research, extension and training services have various recommendations relating to animal management, yoking, implement use and diversified uses of animal power, there is little evidence of these being readily adopted by farmers already familiar with animal traction. A re-assessment of future animal traction research-extension needs in the light of farmer responses to existing recommendations appears necessary.

Liaison and information exchange

Information exchange between the various projects and agencies involved in animal traction varies considerably. Coordination and liaison at provincial and national levels is improving, but strategy formulation and information exchange would be assisted by the production of clear, candid and concise reports of research-extension findings and actual project experiences.

Outlook for animal traction

Draft animals are extremely important in Zambian farming systems and they already contribute significantly to crop production and marketing. It is likely that animal traction will continue to increase in most areas of the country, particularly if crop marketing

systems can be improved. While hoe farmers will continue to adopt animal traction, there is little chance that current animal-users will be able to adopt tractor power in the near future. At present, only a small proportion of farmers use animal power for weeding, although weeding is considered a bot-

tleneck. Further research-extension efforts in this area may identify the constraints and facilitate adoption. If suitable and affordable axles and wheels could be made more available, animal-drawn carts could increase significantly in Zambia, with many important social and economic benefits.

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 district. 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 position of the 1200 mm and 700 mm isohytes.
 The inset shows the position of Zambia in Southern Africa.
 Sources: Tsetse distribution after Müller (1986).
 Work oxen population figures from Tables 1-9 of this report.

