



Animal Traction in Zambia, Kenya and Tanzania

Impact, constraints and experiences



Historical and present constraints to the use of animal traction in Zambia

by

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Abstract

In Zambia the development process in farm mechanization has been disturbed by importations of foreign ox-drawn implements. Importation was not linked to any training of local blacksmiths, and no farmer-blacksmith links were developed to allow ox-drawn implements to be developed or to be repaired. Historically extension was geared towards techniques used by the large-scale commercial sector.

The lack of high quality, locally made implements is a constraint to animal traction development. This is due to lack of proper designs, lack of appropriate steel and taxation policies which favour imported implements. This, together with export dumping of ox-drawn implements by donors, makes manufacturers very reluctant to invest in research and development. In some areas there are shortages of cattle, and in others lack of credit. Donor-assisted projects do not always help the situation in the long-term.

The policy and strategy of the Zambian Government with regard to mechanization is now geared to animal traction and the smallholder farming community. The National Animal Draft Power Development Programme is working to solve the various constraints.

Introduction

In Europe, until farm machinery was produced by industrial enterprises, both the producers and the users of agricultural tools and implements lived in the same community and had about the same level of education. Technical problems were very well understood by both blacksmiths and farmers who could therefore easily communicate about desired

modifications of tools and implements. When production was taken over by industrialized enterprises and farm machinery became more sophisticated, most blacksmiths became dealers and became mainly concerned with repairs. They became less involved with research and development work, which was taken over by manufacturing companies and universities. Despite the new system, many good ideas relating to implements still come from farmers.

The situation in Zambia is very different, as developments in farm mechanization has been dominated by an invasion of foreign farm machinery. The phase of gradual evolution of mechanization level for small farmers was omitted. Thus where ox-cultivation was introduced, the technology could not immediately be supported by the blacksmiths or taken over by the local farmers. The gap between locally available technology and imported technology was too big.

There has been a decline in large-scale maize production in Zambia because of its low return to capital and the ever-increasing costs of both the imported machines and fuels. However there has been a steady increase in the use of oxen as a source of farm power. The numbers of oxen used for farming increased from 79,300 pairs in 1980 to 89,500 pairs in 1984 (Sindazi, 1987).

Present mechanization policy

The policies and strategy development of the Zambian Government with regard to farm power and mechanization, through the In-

terim National Development Plan (1987-88), are as follows:

- to equip farmers, especially smallholders, with an affordable farm power system which will enable them to expand their operations;
- to intensify the promotion of animal traction instead of tractor mechanization and to terminate subsidized tractor hiring schemes;
- to encourage local manufacture of agricultural tools and implements and at the same time to discourage importation of similar tools; to develop rural workshops;
- to incorporate animal traction activities into the Agricultural Engineering Section of the Ministry of Agriculture and Water Development at all provincial and district levels;
- to provide increased direct support to main institutions dealing in animal traction programmes, including the university and colleges.

The strategy of the Interim Development Plan includes the following:

- supply of sufficient ox-drawn equipment;
- more repair facilities for farm machinery at village level;
- training of blacksmiths and other rural artisans;
- supply of adequate and quality ox-trainers to all provinces;
- increased availability of credit;
- increased availability of foreign exchange for the importation of steel to be used in the manufacturing of agricultural tools and implements (NDP, 1987).

Constraints to animal traction

Unbalanced development in the past

Until the beginning of this century, agricultural practices had changed very little in Zambia. It had a static production system, in balance with its needs. The local blacksmiths made the hoes, axes, knives and weapons needed. The people did not only live from

what they produced from the land but they also collected and hunted a lot of their food on the local forest (Jonsson, 1985).

Animal traction was introduced by the earlier European settlers but all inputs, like hand tools and plows, were imported. At that time there was no infrastructure for local production. The local craftsmen were not involved in the development of these imported products, and repair was beyond their skills. Some of the settlers were blacksmith-farmers and took care of basic repairs. Consequently the skills of the local craftsmen were slowly dying.

The white settlers developed their mechanization in line with industrialized countries by importing tractors and implements. In some areas, such as the Southern Province, animal traction was adopted by Zambian smallholders who were cattle keepers by tradition and who lived near the European farmers. Unfortunately in Zambia there was no development of blacksmith-farmers into industrial entrepreneurs capable of making more complicated machinery. Nor did blacksmiths become dealers who took care of repairs, or set up distribution networks for the implements and spare parts. This development in agricultural engineering technology and infrastructure simply never took place.

The Zambia Co-operative Federation is the main distributor of ox-drawn implements and spares. Planning has not always been satisfactory and so the ordering and supply of implements and spares has not always been adequate.

Until 1976 Zambia relied completely on the importation of ox-drawn implements. It was a jobbing company in the Copperbelt, working for the mining industries, which started producing ox-drawn implements by copying a design from neighbouring countries. This was a sad development in the sense that the company had no agricultural engineering expertise and therefore was not able to contribute to further developments. Communication with farmers was almost impossible; the manufac-

Categories of farmers	Number		Estimated crop area		Average crop area per farm (ha)
	in country	%	(000 ha)	%	
Commercial and medium-scale farmers with more than 20 ha under cultivation <i>Level of mechanization: own tractors</i>	2 708	0.6	220	18.9	81.4
Emergent (small-scale commercial) farmers with 5 to 20 ha under cultivation <i>Level of mechanization: hire tractors or own/hire oxen</i>	38 429	8.7	203	17.3	5.3
Traditional/peasant farmers having 5 or less ha. <i>Level of mechanization: hand hoes or hired oxen</i>	395 021	89.7	714	61.1	1.8
Institutional farms under organizations such as family farming schemes, settlement schemes, prison farms <i>Level of mechanization: own or hire tractors or oxen or handhoe</i>	3 332	1.0	31	2.7	9.3
Totals	440 490	100	1168	100	

Source: 1985/86 Crop Forecasting Survey by Planning Division

turer had no expertise in developing farm machinery and the farmers had little help from the extension staff to get their messages across to the manufacturer.

Research, training and extension

Research

The Farm Machinery Research Unit (FMRU), at the Magoye Research Centre, was established in 1970. It was initially supported by British technical assistance (Intermediate Technology Development Group, ITDG) for the evaluation of various categories of farm equipment. In 1982 all external technical assistance came to an end. Between 1982 and 1987 the testing programme of this unit was limited, due to lack of support. In 1987 a project called "Animal Draft Power Research and Development Project" started at the same centre. This project is now concentrating on applied tillage research, and the testing and improving of ox-drawn implements.

Professional staff

There are six Zambian professional agricultural engineers who have been trained abroad. They fill key positions in the Ministry of Agriculture and the University of Zambia (UNZA). The Department of Agricultural Engineering of UNZA is still at the stage of being built up, and is presently unable to carry out research in animal traction. The first students in agricultural engineering (B.Sc.) are expected to graduate in 1991. They should also be exposed to practical experience before they can be fully involved in research and development work.

Extension staff

The Extension Branch of the Department of Agriculture administers extension services as well as the Agricultural Engineering Section. The Agricultural Engineering Services in the provinces are headed by a Provincial Agricultural Engineer (of B.Sc. level training), assisted by District Agricultural Engineers (of diploma level). The two Zambia Colleges of

Agriculture, in Monze and Mpika (certificate level), and the Natural Resources Development College in Lusaka (diploma level), are the three institutes in Zambia which train extension staff. Until recently, the training in agricultural engineering at those colleges was geared towards techniques used mainly by the large-scale commercial sector. Little emphasis was put on training in practical skills (Jansen, 1987). The extension staff trained in East Germany did not learn techniques relevant to the Zambian small farmer. There has been very little guidance for Provincial and District Agricultural Engineers due mainly to lack of experienced manpower at provincial level.

Local production of implements

Zambia has the capacity to manufacture all its hand tools and animal-drawn implements, if raw materials were available. Lack of availability of correct grades of steel is compounded by the fact that finished agricultural machinery products are exempted from duty while raw materials (steel) for industrial and agricultural products have duty imposed on them. This results in the imported agricultural equipment being cheaper than the products which are locally manufactured, hence retarding the local manufacturing industry.

There is little incentive for manufacturers to invest in manpower (agricultural engineers) or research and development work. Yet this will be necessary if implements are to be produced to meet the needs of changing farming systems in Zambia. If local industry is unable to produce implements and ox-carts, these may have to be imported from neighbouring Zimbabwe.

Blacksmiths

Many ox-drawn implements are idle because of lack of repair facilities and spare parts. The demand for new plows could be reduced drastically if they were repaired locally. Therefore the government is very keen to train more blacksmiths in rural areas. This is a time-consuming programme. A professional black-

smith goes through a long learning process. Education is the first step. This has to be followed by practice under the guidance of an experienced foreman, particularly when the work goes beyond repair and maintenance. To speed up the programme, training should concentrate on the repair and maintenance of ox-drawn implements, and the blacksmiths should be affiliated to a distribution network like the Zambia Co-operative Federation (ZCF). Besides lack of experience, trained blacksmiths also face the same problems of lack of correct grades and sizes of steel. The latter problem could be solved through affiliation with ZCF.

Export dumping

Shortages of ox-drawn plows in Zambia have led to importation of plows. These plows are exempted from import duty and sales tax, and are usually subsidized by the exporting countries, and therefore cheaper than the locally produced implements. In the past, excess importation of these plows (through the assistance of a donor agency) led to a standstill of one of the factories for more than one year.

Donor agencies

Donor agencies may disrupt the farm mechanization policy by making project proposals that are not in line with the national farm mechanization policy, but which are in line with the donors' own interests. For example, the importation of thousands of ox-drawn plows (as suggested by donors) without prior testing and without reference to the local manufacturing industry will harm the long-term plan of sustainable local production. One donor agency proposed to solve the present problems by setting up another factory, rather than helping solve the problems of existing factories. Some donor-funded projects fail in the long term because of insufficient communication and coordination with local extension officers. For example, donors help to develop a small area successfully but omit the provincial support network, so that prov-

incial headquarters are unable to give ongoing support due to lack of prior involvement in the schemes, or even lack of transport.

Scarcity of animals

The cattle population is not well spread throughout Zambia. There are relatively small numbers in Copperbelt, Luapula and Northern Provinces where farmers are not cattle keepers by tradition and trypanosomiasis risk is high. Other parts of the country, such as the Western Province, have a surplus of cattle but animal health regulations and the occurrence of CBPP (contagious bovine pleuropneumonia) can restrict animal movements. State farms are to be involved in supplying young oxen to farmers to support the National Animal Traction Programme. Other oxen will have to be bought from local or commercial farmers, but holding grounds for young animals will be established to enable farmers to buy oxen at a reasonable cost.

Animal diseases

The main diseases affecting health of cattle are East Coast Fever (particularly in the Northern Provinces) and other tick-borne diseases, corridor disease (particularly in Southern and Central Provinces) and trypanosomiasis, in those areas (about one third of the country) infested by tsetse flies. Some other animal health problems result from nutritional deficiencies. The Department of Veterinary and Tsetse Control Services is carrying out eradication programmes throughout the country, while the Animal Husbandry Section is intensifying extension and research on measures to improve nutrition.

Lack of credit

It has been proven that credit is an important instrument in the fast introduction of animal traction. The repayment rate has been higher for loans to small farmers using oxen than for loans to large-scale farmers using tractors. Banks are increasingly issuing loans for oxen and implements. When a donor supports such

loans by starting a revolving fund, the banks are often willing to ease the conditions relating to interest and repayments. The Zambia State Insurance Company lately started an insurance scheme especially for work oxen. This covers death by accidents and diseases with a premium of 4.5% of the value per year.

Conclusion

Although the policy and strategy of the Zambian Government with regard to farm power and mechanization is geared to the smallholder farming community there are still areas which need extra support. The demand of farmers for animal traction technology is very high. In the National Animal Draft Power Programme, research and training in animal traction technologies is being undertaken, as is blacksmith training. However production of good quality ox-drawn implements at affordable cost is still not possible due to the present pricing policy of imported farm machinery and imported steel for local manufacturing of implements.

Résumé

Le processus de développement de la mécanisation agricole en Zambie a été perturbé par l'importation d'équipements agricoles étrangers. Aucun programme de formation n'a été associé à ces importations. Aucune structure n'a été mise en place pour développer ou réparer les équipements. Le manque d'ingénieurs agricoles est encore très prononcé. Les programmes de vulgarisation s'orientaient davantage vers les techniques utilisées par les grandes entreprises du secteur commercial.

Les progrès de la traction animale sont limités par le manque d'équipements de qualité, l'utilisation d'aciers de qualité inférieure, des conceptions inadaptées, et une politique des prix favorisant les équipements agricoles étrangers. Dans une telle situation, renforcée par le dumping des matériels sur le marché, les fabricants zambiens sont peu disposés à investir dans la recherche et le développement. D'autres contraintes incluent le manque de crédits agricoles et la rareté du bétail dans certaines régions du pays. Les propositions de projet émises par les

organismes d'assistance entrent parfois en conflit avec la politique agricole du gouvernement.

La politique agricole actuelle du Gouvernement zambien est orientée vers le développement de la traction animale et le soutien de la petite exploitation. Le programme national de développement de la culture attelée (National Animal Draft Power Development Programme) tente actuellement de résoudre les divers problèmes et contraintes.

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