

Animal traction technology in Malawi: potential and constraints

by

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Abstract

Soon after independence in 1964 the Government of Malawi embarked on tractor mechanisation in two areas of the country; the enterprise was a failure due to low utilisation. The government then changed its policy to promoting the use of draft animal power. Malawi's economy is based on agriculture, which makes the largest contribution to GDP, with the smallholder subsector accounting for the bulk of it. Animal draft power has the potential to increase agricultural production by overcoming labour limitations. The promotion of draft animal power is, however, constrained by small land holdings and a shortage of draft animals, implements and spare parts. Although credit is available to individual farmers, those with smallholdings (ie, the majority) have difficulty in obtaining it because they are deemed not to be viable risks. The promotion of the use of cows for draft could go some way towards improving the availability of draft animals.

Introduction

Malawi covers an area of 11.8 million ha, 20% of which is water. In mid-1988 the population was estimated at about 8 million, with almost 85% of the people living in rural areas and deriving their livelihood from farming. A preliminary analysis of the 1987 census suggests an annual growth rate of 3.5% over the 1977–87 period, implying that the country's population will double in about the next 21 years (Economic Intelligence Unit, 1988). The age distribution of the population is such that 19.5% of the people are less than five years old and 44.6% are below the age of 15. The population density ranges from 10 to 292 people per square kilometre with a national average of 85 people per square kilometre (Statistics, 1987).

With few exploitable mineral deposits, Malawi's most valuable resource is land. Because of the favourable climate, the land is potentially highly productive, with the result that agriculture is the

backbone of the Malawi economy, accounting for 34.4% of Gross Domestic Product in 1991. The agricultural sector is declining because of faster growth in other sectors, but still accounts for the highest proportion of export earnings (90% in 1991) and wage employment (46% in 1988), apart from employing the majority of the population (85%) residing in rural areas, who derive their livelihood from farming (Planning, 1991).

The agricultural sector

Malawi's agriculture is dualistic, production being derived from two subsectors—estates and smallholders.

The estate subsector farms freehold or leasehold land, mainly under private management, and produces estate-type crops (burley and flue-cured tobacco, tea, sugar, tung oil and macadamia nuts) which constitute the bulk of Malawi's exports, accounting for some 90% of agricultural export earnings. Occupying 6.7% of the land, this subsector is administered through the Ministry of Agriculture, but largely through specialist departments and organisations.

The smallholder subsector comprises some 1.3 million farm families occupying over 80% of the land which they hold under a customary tenure system. Smallholder farmers operate mainly at subsistence level and supply the bulk (85%) of the country's food requirements. Maize, the dominant crop, is grown on 75% of cropped land; groundnuts, root crops, cassava and pulses are also planted in significant quantities. Fire-cured and sun/air-cured tobacco, hybrid maize and cotton are the main cash crops. Farm size averages 1.1 ha, with 55% of farms being smaller than 1.0 ha and 95% being smaller than 3.0 ha. This subsector accounts for about 80% of total agricultural output (World Bank, 1987).

Smallholder production is achieved almost entirely with the aid of family labour. Although labour is not considered a constraint for most farmers, labour shortages do occur during land preparation and

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harvesting periods on relatively larger holdings. Levels of technology use are very low; virtually all cultivation is done by hand hoe. Only 4.9% of households own draft animals, only 3.5% own animal-drawn plows and only 2.0% own animal-drawn ridgers. The use of improved packages is also low; in 1980 only 6.3% of households applied fertiliser (MoA, 1984). Very few farms have adequate storage facilities, and significant post-harvest losses occur. The majority of farmers have very low cash incomes, estimated at 300 Kwacha in 1984/85 (US\$ 1 ≈ 5 Kwacha), of which about 80% was from crops and livestock and 20% from off-farm activities (World Bank, 1987).

Agricultural development strategy

Because of the overwhelming importance of the agricultural sector, the Government of Malawi has adopted a development strategy which gives priority to improving agricultural productivity, with the aim of:

- maintaining self-sufficiency in food staples
- diversifying production
- expanding agricultural exports
- improving rural incomes.

The estate subsector has been left largely in private hands, with government assistance limited to providing a favourable investment climate. This has involved considerable transfer of customary land to estates in areas suitable for production of flue and burley tobacco, moderate tax levels and a deliberate low wage policy (Spurling et al, 1982).

In the past, attempts were made to improve smallholder productivity through restricted but expensive and management-intensive integrated development projects based on four intensively settled and potentially highly productive areas. These projects were the Lilongwe Land Development Programme and the Lakeshore Rural Development Project in Central Region, both of which commenced in 1968; the Shire Valley Agricultural Development Project in the Southern Region, which started in 1969; and Karonga Rural Development Project in the Northern Region, which began in 1972. In other traditional farming areas there was a gradual improvement of extension, land husbandry and farmer training, augmented by special activities and programmes, such as ox training and dairy development (MoA, 1984).

In the mid-1970s, with the realisation that the expensive major projects could not be replicated throughout the country within a reasonably short period, the concept of a National Rural Development Programme (NRDP) emerged. The

NRDP was formulated to provide a more extensive level of service, through relatively less capital intensive rural development projects than the major projects, to the whole smallholder subsector within a 20-year period. The programme was designed to increase smallholder production levels by expanding and increasing the efficiency of delivery systems, with particular emphasis on agricultural services such as extension, credit, marketing and input supply (MoA, 1977).

For planning and implementation of the NRDP, the country is divided into eight Agricultural Development Divisions (ADD): Karonga and Mzuzu in the Northern Region; Kasungu, Lilongwe and Salima in the Central Region; and Liwonde, Blantyre and Ngabu in the Southern Region. The ADDs are divided into two to five Rural Development Projects (RDP) which are in turn divided into Extension Planning Areas (EPA). The EPAs are supposed to have similar natural resources such as soils, topography, temperature and rainfall, and hence are used as basic units for planning purposes. The Ministry of Agriculture is the parent ministry responsible for planning, implementing and administering the NRDP.

Some experiences with smallholder mechanisation

From independence in 1964 the government accorded great importance to improving rural incomes. As the major occupation in rural areas was agriculture, and as labour shortage appeared to be the main factor limiting agricultural production, the government adopted policies to increase smallholder production by introducing mechanisation packages. A tractor hire service for cotton farmers was introduced in one district in 1965–67, but it was a failure: high charges compared with those for hired labour, and delays in providing the service because of poor logistical planning (the service radius was larger than was practicable), led to low utilisation rates, and the service was uneconomic. At the same time, aerial spraying of cotton was also introduced. This too was unsuccessful because of high hire charges and farmers' unwillingness to cooperate with their neighbours for ease of spraying. Around 1967 the government abandoned its mechanisation approach and shifted to promoting the use of draft animals, mainly oxen (Gemmill, 1971).

A German-aided project, the Central Region Lakeshore Development Project, had a farm mechanisation unit at its inception in 1968, with the responsibility of providing tractor hire services to settlers in rice schemes within the project area. For a

number of reasons, mainly the cost of tractor hire, the policy of providing tractor cultivation was modified to only providing the service to open new rice land for smallholder rice groups for the first two years, after which they were expected to acquire work oxen for land preparation. The policy was successful between 1973 and 1978, but the rapidly increasing cost of fuel and spare parts raised the hire charge to a level beyond the reach of many farmers, and the demand for the service is now virtually nonexistent. It was later decided to phase out the tractor hire service, and emphasise the promotion of ox cultivation (Mwinjilo, 1985).

To facilitate ox cultivation the government established ox-training teams and centres throughout the country, and instituted the provision of draft animals and implements on credit, with a repayment period of three to seven years.

Potential for draft animal power use

Oxen are the main source of animal draft power. Cattle are found in all districts of the country, although they are absent in some areas with high population pressures and tsetse infestations.

About 13% of households own cattle but only about 5% own oxen (MoA, 1984). A survey of the use of animal draft power (Mwinjilo and Kasomekera, 1989) showed that the major uses were tillage, transport of farm produce and other goods and transport of water (in that order). The relative importance of these different operations varied from area to area. The survey also showed that, on average, 62% of owners of draft animals hired out their animals for plowing, 18% for ridging/weeding and almost all for transport. The use of animal draft power is therefore not restricted to owners of draft animals. Use of draft animals for weeding is limited because there is no weeder/cultivator on the market in Malawi suitable for weeding between ridges; weeding is therefore a major constraint on relatively large holdings.

Mwinjilo (1987) reported that lack of farm power was limiting smallholder crop production because labour requirements were inadequate during critical periods (planting, fertilising and weeding). But the use of draft animals and animal-drawn implements reduced crop labour requirements; this resulted in improvements in labour productivity which, coupled with improved inputs, led to improved land productivity through improved yields.

Constraints to increased use of animal draft power

Draft animal power is not yet very widely used in Malawi. The major problems put forward include limited land availability, poor access to credit, inadequate supply of equipment and spare parts, and animal diseases (Mwinjilo and Kasomekera, 1989; Mwinjilo and Ng'ong'ola, 1990).

Land is a major constraint to the majority of farmers due to population pressure, which is reflected in the distribution of holding sizes. The 1980 National Sample Survey indicated that 24% of households farmed less than 0.5 ha, 55% less than 1.0 ha and only 5% more than 3.0 ha (Statistics, 1984). Most smallholder farmers have low incomes and so cannot buy draft animal power packages with their own funds. The government has credit facilities for the purchase of such packages, but these are available only to individuals who can show ability to service the loan. It is estimated that a farmer needs to farm at least 3 ha in order to be able to service a loan package for draft animals and implements. Thus only 5% of households would qualify for government credit to purchase a draft animal power package.

The supply of draft animals is limited because of competition with the demand for beef. This has resulted in the government's Department of Animal Health and Industry being the main supplier of oxen from its few livestock centres. Distribution outlets for implements and spare parts are located mainly in urban centres and major rural centres, which are far apart. Even in these centres, low turnover rates of these items make them very unattractive lines to stock. Farmers therefore often have to travel long distances to buy implements and/or spare parts.

Tsetse infestation and trypanosomiasis are prevalent in some areas of Malawi. Vaccination against the disease is available, but farmers cannot afford to vaccinate whole herds. In one area there are frequent outbreaks of foot and mouth disease; because this is the major cattle rearing area of the country, these outbreaks have had a devastating effect on the supply of draft animals.

Conclusion

The potential for increased use of animal draft power exists in Malawi as long as measures can be taken to overcome the identified constraints. Nothing can be done to increase the sizes of land holding, but group ownership of draft animal power packages would ensure a large serviced area and therefore assurance of loan repayment. Credit

administrators have indicated their willingness to lend to groups but they are cautious because their own performance is measured by levels of repayment.

There is also a need to look at different types of equipment suitable for different areas of the country and various cropping systems. With increased use of draft animal power, turnover of spare parts would increase and distributors would be more willing to stock these items.

Finally, the use of cows for draft work could help to increase the supply of draft animals, especially for cattle owners who do not have oxen. Research on the implications of using cows for draft work is urgently needed.

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