The challenges of animal traction in Tanzania

by

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Abstract

After almost a century of activities related to the development and use of animal traction in Tanzania, many farmers are no closer to adopting the technology. What is more disturbing is the realisation that neither the farmers nor the government are near to finding lasting solutions to many pressing problems confronting the use of this technology in Tanzania.

This paper identifies the major challenges facing the technology of animal traction, including constant wavering in government policies and support towards agriculture in general and animal traction in particular, low adoption of the technology and institutional matters. It is argued that most of the challenges facing animal traction in Tanzania are a result of national policies that have given too little attention to the needs of smallholder farmers. Current government practices on economic recovery programmes reflect a shift of priorities away from the agricultural sector. The paper concludes that the challenges facing animal traction in Tanzania can be overcome if agriculture is regarded as the leading sector in the national economy and enough support is provided for its development.

Introduction

As the twenty-first century approaches, it is becoming more obvious that the agricultural sector is not given adequate attention as Tanzania's key economic sector. Statements such as "agriculture is the backbone of the country's economy" are no longer the popular slogans they used to be in the 1960s and 1970s. This is reflected in the current government's shift of policy emphasis to issues such as trade liberalisation and privatisation.

With the formal introduction of a market economy to Tanzania and the foisting of harsh economic reforms, the agricultural sector which was, until the time of the Economic Recovery Program (ERP - 1986), very much underdeveloped, has been left to slump into a technological quagmire.

The Economic Recovery Programme *inter alia*, has meant a drastic cut in government expenditure in various sectors of the economy (including research, development and training). Consequently, the needs of resource-poor farmers are gradually and 'conveniently' forgotten by decision makers. As the government reduces its commitments to agriculture-related activities, the development of animal traction is left in the hands of individual farmers and some donors who may not be able to address all the pertinent issues concerned with its development. This situation raises concern. How do these changes impinge on the development of animal traction? How will agriculture be returned to the centre of development policies in Tanzania?

A brief political economy of animal traction in Tanzania

In order to understand the challenges that face animal traction in Tanzania, it is imperative to put its development within the context of the changing political economy. Animal traction as a production tool is closely related to the policies, strategies and changes that have characterised agricultural production in Tanzania.

The period from 1884–1918

German colonialists continued, intensified and diversified the various uncoordinated attempts and experiments that were started by the missionaries in pre-colonial times to harness animal power for production and transportation. The earliest attempts to use animal power were for transport. These included experiments such as the use of zebras, elephants, horses and camels. Results were disappointing due to diseases and inefficiency of some of the animals for example, elephants were slow and could not carry more than what 28–40 porters could transport (Koponen, 1994). Camels were good in dry desert-like conditions but useless in moist climates. Nonetheless, some encouraging results were achieved with oxen and donkeys.

In 1876–77, the London Missionaries tried to use ox-wagon transport across Tanzania to Ujiji on Lake Tangyanika. The results were not reassuring because all the oxen were lost on the way due to overstrain (Koponen, 1994). After the construction of the roads, experiments on ox wagons produced encouraging results. By 1903, wagons drawn by six oxen became a common sight in Tabora, Mwanza, Dar es Salaam and Lake Nyasa. They were used more extensively in Arusha were Boer settlers began regular ox-wagon traffic to the coast and to Uganda. Nonetheless, oxen were used only on roads that were free from tsetse flies. The most reliable beast of burden continued to be the donkey and the mule as it was in the pre-colonial days.

Alongside transportation, experiments on animal power in production were also undertaken as part of the campaign to increase production. For example, in Dar es Salaam, an Asian company owner used camel-powered machines in the manufacture of oil (Mascarenhas, 1966). However, most hopes were placed on the ox plow, although opinion amongst colonial officers was not convergent. Whilst some officers believed the plow could revolutionise agriculture in Africa, others were more sceptical. Among those who took a more sanguine view were the British Church Missionary Society who believed that the means to "regenerate Africa were the Bible and the Plough" (Koponen, 1994). Some missionaries went even further and argued that the introduction of the plow would reduce the incidence of polygamy (Koponen, 1994).

Others argued that African farmers could quinituple their yields by exchanging the hoe for the plow. Officials decided "the replacement of the primitive hoe cultivation with the plough must be considered the most important means of opening up Africa since the railway" (Koponen, 1994).

Other colonial officers were sceptical about the plow. Koponen (1994) quotes Stuhlman, who was then responsible for the Amani Research Station, calling the campaign for the ox plow as Utopian, and saying that it was based on the imperfect understanding of the dynamics of hoe cultivation. In his view, hoe cultivation was not inferior, but merely different. Stuhlman warned that Germans should not imagine that they could overthrow such a system in a few years.

These views influenced the way in which animal traction was introduced. The first attempts to introduce it were scattered, but in the early 1900s efforts to spread the use of the plow gained a measure of continuity as the colonial office decided to promote it. Plows were distributed to missionaries and European farmers and to some "intelligent natives".

A more concerted state-directed attempt to introduce plows to African cultivators was made in 1910. This push came from Berlin as demand for agricultural produce from the colonies was increasing. By the end of 1910 plows and harrows were sent to almost all the district offices, and like previous efforts, the results were disappointing.

Animal traction failed to become established during German colonialism because (i) efforts to introduce it had been scant, unsystematic and poorly organised, (ii) draft animals were absent in some parts of the country, (iii) in some local areas, the plow was found to be useless or damaging to the environment and (iv) some social and economic factors imposed limitations on the adoption of the plow (Koponen, 1994).

The period 1919–1961

British colonial officers, like the Germans, also attempted to expand and intensify the use of animal power in production and transportation. Efforts that were put into the expansion of roads and railway transportation and marketing helped to increase the adoption of the plow. Transport enabled cash crops to reach the market, and the earned income was invested in plows. By 1945 plows were in use in areas that produced rice, cotton and maize for a wider market because they were cheaper to use than hiring agricultural labour (Iliffe, 1979; Kjærby, 1983; Sosovele, 1991).

After the war most of the ox-plow pioneers were shifting to tractors. Encouragement for the use of the tractors was provided by the colonial state through the promotion of large-scale farming projects. The tractor also became popular among African farmers in the cash-crop areas. The shift of interest to tractors was taking place when the use of animal power had not developed beyond pulling a few plows and carts (Sosovele, 1993). Animal traction therefore, continued to spread where its use was considered profitable and feasible. For example, in Sukumaland cattle and cotton provided

the basis for oxenisation to develop widely. The adoption was so high that the colonial office had to introduce the so called 'Sukuma Plough Rules' which confined plowing to heavy soils in order to control soil erosion that was caused by careless ox plowing and overgrazing.

Towards the end of the British colonial period, restrictions imposed on ox plowing were removed and the technology began to get encouragement from the authorities. However, neither an elaborate institutional mechanism nor a policy framework were provided in order to guide the development of animal traction more systematically. Consequently adoption was scant.

The period from 1961–1995

After independence, although the government appeared to favour animal traction, in practice it emphasised the use of tractors through policies such as the settlement schemes, mechanised block cultivation, villagisation, parastatal state farms and special donor-funded projects (Coulson, 1982; Sosovele, 1991). The period between 1961 and mid 1970s was thus characterised by stagnation in the adoption of animal traction. However, the tractorisation drive was difficult to sustain either by the government, the donors or individual farmers. Gradually, the government began to pay more attention to the use of animal traction. This was done through a combination of measures including campaigns, policy formulations (eg The Agricultural Policy, Agricultural Mechanisation Policy), infrastuctural support etc.

In 1970 the Ubungo Farm Implements factory (UFI) went into commercial production of ox plows, hoes and plow parts. Other manufacturers were also encouraged to step up production and distribution of their produce. By late 1984, the Mbeya Farm Implements factory (Zana Za Kilimo or ZZK) started with an installed capacity of 10,000 mouldboard plows per year.

Yet other measures which also contributed to an increase in the adoption of animal traction include projects funded by donors. These include Iringa Oxenisation Project with support from the European Union; Mbeya Oxenisation Project supported by the Canadian government; Tanga Oxenisation Project funded by German government and several others. The Iringa Oxenisation Project was successful in establishing ox-training centres (OTC) and introducing the farmers to implements other than the plow, However, because of financial limitations, and poor dissemination strategy, most farmers failed to adopt them and continued to use the plow in much the same way as before the project was started. Information about the Mbeya and Tanga oxenisation projects is scant, but these two projects attempted to focus on women users and weeding bottlenecks. The Mbeya Oxenisation Project has already been stopped.

On the economic front, performance from 1978 to the late 1980s was poor, culminating to a major crisis. As a response to the emerging crisis, the government adopted a Structural Adjustment Program (SAP 1983–1985). With regard to animal traction, the SAP policy meant, among other things, giving attractive producer prices to the farmers. In Shinyanga region, this led to a spontaneous rise in the adoption of ox carts for transportation of cotton from the farms to the markets (Sosovele, 1991). Overall, however, SAP policies did not help the economy to any great extent because they were hinged on foreign capital inflow which was not sufficiently delivered.

The failure of SAP, the sheer magnitude of the crisis and external pressure all combined to persuade Tanzania to adopt an Economic Recovery Program (ERP). The overall objective of the economic recovery programme was the gradual attainment of sustained growth in real incomes and output. Specifically, the measures undertaken included the following policy changes: trade reform; agricultural sector reform; monetary and credit policy reform; parastatal restructuring and private sector development and; civil service reforms (Bagachwa et al, 1995). There is no doubt that policy changes implemented on producer prices, crop marketing, input distribution and restructuring of the cooperative unions have stimulated and streamlined production. However, the economic recovery policy in general does not address specific problems that have affected the adoption of animal power in production and transport. In effect, measures such as monetary and credit policy reforms, parastatal restructuring and trade sector reform have negatively affected the adoption of animal-power technologies.

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For example, a recent survey (Bagachwa et al, 1995) indicates that one of the major constraints to animal traction is the expense required to purchase a plow (about Tsh 30,000). Many farmers cannot possibly afford this level of investment. Prices have gone up because among others, subsidies have been removed. Credit has become tighter and difficult to get. Consequently, smallholder farmers are affected more than the others because they can not provide collateral for the loans.

Although one of the objectives of the Economic Recovery Programme is to ensure that industries operate at full capacity, most of the industries are now closing due to lack of capital to run them. It is not known whether the closure of most of the textile industries (eg Musoma textiles, Kilimanjaro textiles, Sungura textiles, Ubungo Garments etc) has had any effect on cotton production and consequently on the adoption of animal traction.

Until 1983, UFI factory was getting some of the capital from the government through bank borrowing. Following the implementation of the monetary and credit policy reforms, bank borrowing has been severely curtailed. This has affected the ability of the factory to obtain raw materials, and consequently production has been affected too (see Table 1). According to the General Manager, while they are struggling to run the factory under difficult conditions, they expect that by 1996, 50–60% of the steel requirements will be obtained locally. In his view, lack of capital might have affected the ZZK in Mbeya more severely than UFI because UFI had accumulated some savings before the changes were introduced.

Table 1: Target and actual production of plows by UFI 1985–1995

Year	*Target*	*Actual production*
1985	20,000	1,840
1986	–	6,622
1987	–	13,871
1988	20,000	2,482
1989	20,000	10,186
1990	30,000	12,094
1991	30,000	19,753
1992	15,000	11,438
1993	25,000	4,744
1994	20,000	4,190
1995	10,000	1,899 (to September)

Source: UFI annual reports 1985–1995

Following the adoption of the economic recovery policies, the government is withdrawing from productive activities and instead is encouraging growth in the private sector. Productive sectors (eg agriculture) now receive a declining proportion of government funding (URT, 1994).

Animal traction is likely to suffer most because private investors can invest only where the potential for high margins is great. Hitherto, the adoption of animal-powered technology has been very low and also the agricultural sector has not been given adequate support from the government so as to motivate farmers to produce more. Thus there seems to be very little incentive to attract private investors in this area.

Although there has been very little research and development done in this area, and also while extension has contributed very little to the adoption of animal traction, government withdrawal from the direct productive sector will affect research, development and extension of animal traction.

The challenges ahead

The challenges facing animal traction in Tanzania can be classified in three categories: policy matters, institutional issues and matters related to the technology itself.

Policy issues

In the Rolling Plan and Forward Budget, one of the plan documents (URT, 1994), the government has identified the main tasks facing Tanzania's agriculture in the 1990s and beyond. These include: to achieve self sufficiency in food production; to raise incomes of all Tanzanians; to promote sustainable production and environmental protection; to increase foreign exchange earnings; to produce raw materials for the industries.

One area that will require a new sense of urgency in order to achieve the above objectives is the use of animal power. It will be important first to bring agriculture back to the centre stage of the national development policies. Currently, the

government is not paying enough attention to this sector. Policy makers ought to realise that Tanzania cannot be developed by trade liberalisation and similar changes which have produced many 'bare-foot traders'. These energetic men and women can best be organised to produce wealth from the land rather than walking about the whole day selling third-rate imported goods. After all, the majority of Tanzanians depend on agriculture for their livelihood. They can only enjoy the benefits of trade liberalisation and other policy changes if agricultural production improves.

The government must therefore undertake a serious reassessment of its policy priorities and pay special attention to the development of the agricultural sector. For example, government decisions to reduce its commitments to productive sectors will have damaging effects because the decisions have been taken at the time when the agricultural sector is at a low point. Most of the services that depended on government support are likely to suffer because there are not enough private investors to fill the vacuum left by the government. In addition, there are areas (eg infrastructure) which cannot be developed by private investors. Therefore the government must take a leading role in supporting this sector.

Institutional matters

A number of institutional problems must be solved if animal traction is to be used effectively. This is an onerous challenge considering that since the colonial period, well known institutional problems have persistently affected the adoption of this technology. These problems include:

Lack of coordination

Efforts to develop and spread the use of animal traction have been scant, poorly organised and unsystematic. Any future efforts must take into account past experiences to avoid similar mistakes.

Research and development

There has been very little research and development on animal traction. It must be stressed that an efficient animal traction technology cannot develop spontaneously, it must be guided by research. The challenges of the years ahead include how to make research and development on animal traction more attuned to the needs and conditions of the smallholder farmers. For example, research is required to find solutions to many problems affecting the adoption of animal-drawn weeding technology (for some of the problems see Loewen-Rudgers et al, 1990; Birch-Thomsen, 1993; Sosovele, 1993). Research and development must also be expanded to include research on the impact of the technology on the environment, on socio-cultural issues and attitudes towards the technology, and on the division of labour in the households and the role of women in use of the technology. More importantly, research and development must be directed to how to develop more sustainable production systems using animal traction. Given Tanzania's peculiar circumstances, the government must continue to support research and development on animal traction until cooperatives or farmers' associations are able to run such institutions on their own.

Extension

Extension and diffusion of this technology are very low. Whereas plow usage can vary between 20 and 70% in localised areas, adoption is less than 20% throughout the country. Labour bottlenecks have shifted to weeding and transportation. The main challenge here is how to increase the use of the plow and to expand the adoption of animal-drawn weeding technology and transport. Extension services must be provided with the basic infrastructural support to enable them to reach the target groups and stimulate adoption of other animal-drawn implements.

Supply and distribution of implements

Production of animal-drawn equipment is currently low and mostly confined to the plow because raw materials are not adequately available and the demand for other implements is low. The national demand for plows is only 20,000 annually. If the two factories were producing at full capacity, about 30,000 plows could have been produced each year. Following financial reforms, efforts must be stepped up to ensure that alternative sources of funding are available to the factories so that production continues.

Distribution of the equipment and spare parts must also be streamlined. Currently UFI has outlets in various regions, but it will be important to ensure that a smooth distribution system is in place. More often than not, plows or carts lie idle in rural areas simply because a simple nut or bolt is missing. With the trade liberalisation programme, private traders may be encouraged to

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participate in the distribution and retail of equipment. The main challenge is for the government to stimulate demand and use of this technology. If demand remains so low, there will not be a sufficient incentive for private traders to invest in animal traction.

Matters related to the technology

Compared with tractors, for example, animal-powered technologies have only a limited ability to work hard soils. Farmers often have to wait for the first rains to soften the soils before cultivation starts. However, this is also the best time for sowing. In a farming system which depends on rainfall, timely planting is not only crucial in determining yields, but it is also vital if the full benefits of other improvements (eg seeds and fertilisers) are to be achieved (Sosovele, 1991). Animal power can plow 0.2–0.3 ha a day (Arnon, 1981), but this area is reduced if the soils are heavy. Some of the tools which could be used in heavy soils are too heavy, require large teams of animals to pull them and are expensive. The challenge ahead is to produce an affordable and suitable tool which can be used in heavy soils.

Similarly, it appears that animal power can be used in areas which have moderately high rainfall. However, these areas also contain tsetse flies. The use of animal traction can be limited by tsetse flies unless extensive bush clearing and other control measures are taken. Burning, use of chemicals and biological control are expensive, and may not be environmentally acceptable. The main challenge ahead is to how to direct research and development to finding solutions to this problem.

Conclusion

The development of animal traction has been influenced by the changes that have characterised the political economy of Tanzania. The colonial and post-colonial governments made efforts to increase the adoption of animal traction but, in all cases the measures were scant, unsystematic and poorly organised. In more recent times, economic reform programmes have further affected the adoption of animal traction, and the sector does not command the same importance as it did in the 1960s and 1970s.

One of the main challenges facing animal traction now and in the future is how to bring agriculture back to the centre stage of development policies in Tanzania. Once agriculture is recognised as the leading sector in the country's economy and development policies, efforts will have to be made to ensure that animal traction is given adequate support to overcome some of the institutional and socio-cultural hitches that have affected its adoption in the past.

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