

Increasing agricultural production by using animal traction: a rural development puzzle

by

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Abstract

This paper deals with animal traction development in Zambia's rural economy. It discusses some economic issues, animal traction in peasant households and the influence of the broader economic and institutional environment on animal traction adoption. Some implications for development projects are discussed, and suggestions are made for improving animal traction development interventions.

Introduction

Using work animals to increase agricultural production has been recognised, by both the Zambian Government and donor agencies, as an appropriate alternative to motorised technologies. In an recent report it was estimated that approximately 200 000 oxen are used as draft animals in Zambia (Starkey, Dibbits and Mwenya, 1990). In certain regions cows and donkeys are being employed.

This paper presents a brief outline of the role of animal traction in the rural economy, and of obstacles hindering animal traction development. Several policy options for reducing these obstacles and for increasing the use of animals in agricultural production are discussed. Also, some suggestions are made for improving project interventions.

Economic considerations

In several provinces in Zambia (eg, Western, Southern) draft animals are part of the traditional mixed livestock and crop farming system; in others (eg, Luapula) animals have rarely been kept and have less economic importance. Despite these regional differences it is generally appreciated that cattle perform several economic and social functions in the society (Beerling, 1986; Tembo and Rajeswaran, 1986). These include:

- draft power
- food supply (milk, meat)

- manure
- byproducts (hides, etc)
- social and cultural
- investment.

These multiple functions of cattle make it difficult to provide economic assessments of draft cattle as such, because the other costs and benefits involved in cattle keeping cannot be separated. However, as an individual farm operation, animal traction should reduce the costs of production (by increasing labour productivity), thus making it a viable power source for peasant farmers. This means that when the costs of oxen and implements are spread over a given period and given land area, the return to labour should be higher with the use of oxen than without oxen; animal traction is considered a labour saving technology.

In Zambia, animals (oxen) have mainly been employed in primary soil tillage (plowing), leading to an expansion of the cultivated area. Because of this phenomenon, animal traction has mainly functioned as a labour *shifting* technology rather than as a labour *saving* one, because labour peaks in planting, weeding and harvesting were not alleviated. In some areas labour peaks have even increased due to the expanded area under cultivation (Francis, 1988; Agrisystems, 1990). The increased workload especially affected women, as they are often involved in planting, weeding and harvesting.

The major gains from using animal traction arose from the increase in area under cultivation. Several studies indicated that when farm operations were diversified and animals were used for off-farm labour (eg, transport), animal traction became potentially more attractive (Corbel, 1986; Francis, 1988; Huybens, 1988; Rauch et al, 1988; Agrisystems, 1990). It is argued that the degree of labour saving will thus be related to the intensity, diversity and level of use throughout the agricultural production process. Enhancing animal traction development will therefore require progressive changes in farming systems, such as new secondary tillage techniques, agronomic adaptations, improved

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animal husbandry practices, etc. In order to allow for such complex adaptations in farming systems, and to justify investments in animal traction technology, input and output prices, among others factors, will play a crucial role.

Animal traction in a peasant economy

It is well known that national agricultural production must be increased, and the standard of living of people living in the rural and urban areas must be improved, if peasants are to be integrated into the broader economy. This integration may take place when farmers have reasons and incentives to do so. Unfortunately, farming in Zambia (with or without animal traction) has been marginal, and the overall economic environment did not allow a sustained integration of peasant farmers in the economy. Zambian peasants are only partially integrated in the broader economy: while they often rely on family labour and produce to satisfy their needs, they also make use of the broader economic system for their input requirements and for sales of their, often limited, surplus produce. Peasant farmers are not necessarily interested in maximising their profits. In many cases they prefer to optimise their output and to avoid risks in farming, as their ultimate aim is household survival (Ellis, 1988).

Farmers' decisions on adopting or enhancing the use of animals on their farms are not necessarily based on financial profitability. Tangible social and cultural benefits also play a significant role in the adoption process. Zambia's rural economy is complicated and dynamic, and there are important differences within the peasant communities concerning sizes of farms, household structures, labour allocation, etc. These differences should be understood before advising farmers to invest in animal traction technology. Nonetheless, to allow animal traction to be adopted or enhanced requires that the risks of farming be reduced. Therefore, from an economic viewpoint, it is argued that when markets become more reliable and the farming essentials (input supply, credit, marketing, etc) are being reliably taken care of, the use of animals in farming will become more attractive, and peasants will become more likely to accept changes and integrate animal traction in their farming systems.

Obstacles to animal traction development

Several institutional and economic development obstacles have major influences on the adoption of animal traction and other agricultural innovations by small-scale farmers. These include:

- lack of marketing
- lack of institutional development
- lack of private entrepreneurship and market development
- lack of grassroots constituencies and participation
- lack of capital
- lack of market value prices.

Lack of marketing

Zambia's economy is highly unstable and unreliable. The inadequacy of Zambia's marketing infrastructure is indicated by the fact that farmers are often not paid until months after their produce has been collected. In some districts the marketing organisation does not collect all the produce.

The reasons for the parastatal's poor performance are well known:

- it is a large organisation with a monopolistic status which is characterised by large diseconomies of scale, exacerbated by relatively scattered and remote farming communities
- it lacks the individual and institutional capacity to manage its affairs
- it lacks accountability and responsibility.

Lack of institutional development

Most Zambian institutions involved in agriculture, and hence directly or indirectly with animal traction, are heavily "top-down" organised. Bureaucracy is the rule rather than the exception. These large bureaucratic institutions are difficult to manage and rarely create animal traction development opportunities.

Lack of private entrepreneurship and market development

The previous government did not create an economic environment in which private entrepreneurship and local markets could flourish. Lack of such initiatives and markets resulted, for example, in shortages of rural craftsmen and artisans and of implements and spare parts, and a lack of private investments and markets.

Lack of grassroots constituencies and participation

Rural Zambia has few small-scale farmers' organisations. Individual peasants, living isolated and scattered, lack the power to make claims on institutions.

One of the reasons why many primary cooperative societies have failed to become successful in helping farmers to obtain ox-drawn equipment and other inputs is that a centre-down policy has prevailed over participatory, bottom-up, approaches.

Lack of capital

Many small-scale farmers lack financial resources to invest in animal traction technologies.

Lack of market value prices

Prices for agricultural outputs do not reflect their true economic scarcity value. Government pricing policies on both farm inputs and outputs are not appropriate (Harvey, 1988).

Improvement of animal draft power

The full benefits of animal traction cannot be realised unless support systems are created that provide the necessary incentives (such as prices), economic opportunities (markets) and access to resources and inputs to enable peasants to increase their agricultural production in a sustainable way. Therefore, animal traction development inherently requires institutional reform, the paying of market value prices to farmers, market development, rural transport (oxen), feeder road development and rural industrialisation (support services).

Marketing

There is an urgent need to improve the marketing system in Zambia in order to increase the impact of, and sustain, animal traction development initiatives. The present and previous governments have directed their policies to market liberalisation (prices) and privatisation in order to get the marketing "right". It is believed that privatisation could contribute to:

- an increase in competition between private buyers and parastatals, urging the parastatals to reorganise into a more efficient institution
- the creation of a diverse and innovative trading and processing community
- price differentiation and development of trade and local markets.

But there are also arguments against privatisation of marketing institutions and allowing private entrepreneurs to compete on the market:

- food security is a national matter
- private traders may exploit unknowledgeable farmers
- multiple trading channels undermine the so-called "stop order credit recovery system".

The discussion concerning privatisation and liberalisation entails much more than is covered in this paper. Privatisation and liberalisation require careful and in-depth analysis. Without care and sensitivity in promoting market liberalisation, there could be a risk of repeating such experiences as previously occurred in Zambia.

Institutional development

Agricultural institutions will continue to play an important role in agricultural development. It is therefore important to address the issue of institutional development. This issue can be interpreted in different ways. Accepting the debate concerning institutional development in this paper, it refers to strengthening the management and organisation of public sector institutions involved in the agricultural sector (the extension service, credit organisations, etc), to improve their efficiency and effectiveness. For example, if credit is properly managed it could be of great importance to animal traction development in Zambia. Some of the prerequisites of institutional improvement are financial sustainability, motivation of staff and accountability.

Private entrepreneurship

Private entrepreneurship and initiatives in local communities may form a basis for sustainable animal traction development. For example, private businessman could be involved in input supply, development and maintenance of ox-drawn implements and carts and distribution of spare parts, provided such involvement is profitable. Such a bottom-up approach to development should be supported by top-down assistance. Local markets and trade could stimulate farmers to sell their surplus produce for direct payments.

Farmers' organisations

Project sustainability analyses (Cernea, 1987) have suggested that farmers' organisations, founded in local organisational patterns and with a high degree of interest among members, have contributed to the success of development interventions. In some cases the concept of generating funds for the organisation has contributed to its success. Where countervailing power is created, farmers might be more prepared to demand realistic prices for their produce in an open competitive market, and thus may avoid exploitation by private traders. The local farming community must participate actively in the development process to sustain animal traction development. One complicating factor in organising peasant farmers is the low population density in the rural areas.

Improvement of project interventions

Variations in, and the complex nature of, peasant households (resources, culture, etc) within an unreliable economic environment ensure that the outcome of animal traction development projects remains uncertain. However, within this complex and unpredictable environment, animal traction

development projects will continue with their interventions in the rural economy.

Development projects and programmes should mainly address institutional, organisational and managerial dilemmas if animal traction is to be enhanced. However, significant attention should also be given to technical aspects, because the introduction or enhancement of animal traction requires progressive changes in the farming systems, such as new tillage techniques, agronomic adaptations, improved animal husbandry practices, etc. Because each of the constraints discussed above has a different importance in each district or development area, no generally applicable solutions can be provided. The following suggestions for improving the use of animals in farming are therefore considered a basis for discussion rather than blueprints or panaceas.

Project identification

Animal draft power development projects are seldom initiated by the beneficiary community; most current animal traction development projects are part of a national development strategy. Future animal traction projects should be formulated on the basis of the needs of the beneficiaries (identified through baseline studies, providing socio-economic and infrastructural data), and the beneficiaries should participate in project identification.

There is a role to play here for a national coordination body which should, whenever possible, involve the local community in project identification.

Planning

Because animal draft power development initiatives can still be considered as “puzzling” rural development efforts which take place in an unreliable environment, the costs and outcomes are difficult to predict. Consequently, planning of animal traction projects should be flexible and should result in an evolutionary project design. Representative examples are the District Development Support Programme in Mpika, which allows planning within a learning process approach, and the Animal Draft Power Development Programme in Western Province. Learning by doing, combined with research and experience, allows the “provincial plan” to develop into a more viable “district plan”.

Some general characteristics of the planning process will include (de Graaf, 1989):

- an emphasis on action oriented training among staff and beneficiaries
- a monitoring system
- a concern for participatory decision making

- a redesign orientation, allowing periodic revision of project organisation, project objectives and job descriptions for project personnel
- a management and planning focus on the type of resources needed to continue the flow of animal traction benefits after the end of project funding, and the institutionalisation of the capacity to provide them
- planning and implementation reinforcing each other.

Project implementation

Project implementation is the stage in which the planned animal traction strategies are tested in the harsh light of reality. Because circumstances change, learning proceeds and experience accumulates over time, a flexible approach to management, which allows for adjustments if required, is suggested.

Emphasis should change from isolated short-lived projects to longer-term initiatives of developing institutional and individual capacity within institutions, thus allowing sustainable animal traction development. Projects could, for example, function as intermediate organisations, with the aim of linking small-scale farmers with the broader economy (such as external markets) and with government agricultural agencies and private or non-governmental organisations. These links will imply that projects should emphasise assistance to agricultural agencies and entrepreneurs and to the organisation of small-scale farmers into constituencies.

Projects should use their expertise to contribute to the design of policies and strategies to support the creation of farmer organisations. There is a clear need for viable local organisations and for strategies to create them. At present, trying to make farmers and other “actors” in development aware of their own responsibilities in the process is a huge task for projects. Projects should assess the possibilities of involving and stimulating local entrepreneurs, such as artisans, marketers and other businessmen in the development process.

In general, emphasis should shift away from attention to the projects’ own cycle, towards the post-project achievements and the ability of different organisations to use these achievements as the basis for further initiatives.

Monitoring and evaluation

The national coordination body could assist in developing monitoring and evaluation procedures. These guidelines should be circulated to all projects dealing with animal traction development. The

collected and processed data should be evaluated and the results could form the basis of an "early warning system".

Conclusions

Animal traction has functioned as a labour shifting technology rather than as a labour saving one because labour peaks in planting, weeding and harvesting were not alleviated; indeed they were sometimes increased due to larger areas under cultivation. The major gains from using animal traction arose from increases in area under cultivation. Making animal traction a more attractive individual farm operation requires that animals are used throughout the agricultural production process. Enhancing animal traction development will therefore require progressive changes in the farming systems, such as new techniques, agronomic adaptations, improved animal husbandry practices, etc. In order to justify animal traction investments and allow for changes in farming systems, input and output prices will play a crucial role. Thus government policies (for example, on producer prices) will play an important part in enhancing and sustaining the use of work animals. Animal traction development takes place in a changing economy which is characterised by high degree of instability and unreliability. This, coupled with the complexity of peasant households and decision-making structures, means that animal traction development remains a puzzling rural development issue. Outcomes of project intervention are not predictable.

However, improving animal traction technology inherently requires that the essentials (input supply, credit, marketing, etc) are taken care of. Projects should pay attention to general issues such as marketing, animal traction technology, institutional development, provision of capital to small farmers, farmers' organisations and participation. Projects should adopt the role of intermediate organisations and should aim to avoid bypassing institutions and other "local actors in development".

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- Note: all these publications are available at Palabana ADP Training Project, Box 31905, Lusaka, Zambia*
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Photograph opposite

Women with donkey cart collecting forage for their donkeys and stall-fed animals, Tanga, Tanzania