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The potential for animal traction in south-western Nigeria

by

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Abstract

On average, agricultural productivity in sub-Saharan Africa is poor. To increase the productivity of agriculture in sub-Saharan Africa cultivation must be both intensified and extended. Seasonal labour shortages are a major constraint to this. Tractors have not proved a viable technological solution for smallholder farmers. Animal traction may be a feasible intermediate solution that could result in increased overall productivity. In the south-west of Nigeria there is little livestock keeping because of the problems of trypanosomiasis: as a result there has been no history of animal traction. Farmer awareness of animal traction is very low and there are many barriers to the uptake of the technology including the supply of animals, poor infrastructure for veterinary care and implement distribution and farmers' lack of capital. However these problems are not insurmountable and animal traction could still have an important impact in the south-west of Nigeria.

Introduction

On average, agricultural productivity in sub-Saharan Africa is poor. To increase the productivity of agriculture in sub-Saharan Africa cultivation must be both intensified and extended. In other words both the total area cultivated and the yield per unit area cultivated must be increased. Manual cultivation is used commonly by farmers but it is technically inefficient and is labour intensive, so limiting the scope for expanding the area cultivated. It has been reported that in many farming systems of West Africa, seasonal labour shortages are one of the primary production constraints. To increase productivity there is therefore a need for improved, appropriate and sustainable technology. The experience in many developing countries, including Nigeria, is that tractors have not been an appropriate solution (see Daramola, 1987 unpublished;). Animal traction may be a viable intermediate option in the humid parts of West Africa. Although draft animal traction has had a fairly long history of success in the northern part of West Africa, it is relatively uncommon in the southern parts because of ecological, socio-economic and cultural dissimilarities.

As is common in West Africa, the majority of Nigerian farms are small. However, small farms, usually less than 2 ha each, account for over 90% of the total agricultural production. In the light of this there is a need to direct attention to the small-farm sector. The small-scale farming sector offers good potential for increasing the output and income of the farming community, thus helping to reduce poverty.

Technological developments can help to increase agricultural productivity and efficiency and maximise the exploitation, utilisation and processing of natural resources (Naiz, 1978). However, most farmers in sub-Saharan Africa have benefited only marginally from recent developments in production technology. Some of the reasons include the inappropriateness of some of the developed technologies for sub-Saharan African conditions. For example, farmers have not accepted monocropping in place of the traditional mixed cropping. The development and adoption of technology appropriate to farmers' conditions along with essential services would considerably increase their productivity and income. In addition, a small increase in productivity on individual farms would add up to a substantial increase in total production. Attention should therefore be focused on 'appropriate technology' suitable to small farms.

Tractors have been shown to be inappropriate for small farms for reasons including the lack of spare parts and the high cost of fossil fuels. Animal traction appears to be an appropriate alternative technology. However, if animal traction is to realise fully its yield-increasing potential through mass adoption in south-western Nigeria, it is necessary to reinforce the elements that minimise variance because farmers have very low

risk-bearing abilities (Norman, Simmons & Hays 1982). The requirements for successful introduction of animal traction into an area have been discussed by various authors. Many interacting factors are important and they should be considered as a whole rather than in isolation. This paper discusses appropriate technology of particular relevance to the rainforest zone of southern Nigeria, bearing in mind that such discussion should centre on resource endowment among the small farmers within the region and the appropriateness, divisibility and sustainability of the technology.

Problems and requirements

According to unpublished data from a study I conducted in Nigeria, awareness about animal traction was low (30%). Another 5% of sampled farmers were completely ignorant about animal traction. No farmer in the study area had adopted animal traction for whatever purpose. This suggests that animal traction is alien to farmers in the area, at least, at the farm level. Economic factors accounted for differences in the responses of farmers. Potential adoption of animal traction was correlated with farmers' income. These findings are consistent with earlier works on animal traction in the humid zone by Reynolds (1986) and Jaeger and Matlon (1990).

The primary requirement of draft animal power is animals. A steady supply of mature animals would be needed for a successful animal traction scheme. Cattle are currently scarce in southern Nigeria due to the presence of tsetse flies. The parasitic disease trypanosomiasis carried by these flies infests 90% of cattle in the humid zone. A recent survey in southern Nigeria indicated the presence of 0.3 million cattle, compared with 12.0 million cattle in the whole country (Akinwumi and Ikpi, 1985). However, some breeds, such as N'dama and West African Shorthorns, can tolerate trypanosomes. In the forest regions very few cattle are found but they are present in larger numbers in the savannah where dense rainforest has been cleared.

The suitability of the cattle breeds available in Southern Nigeria depends upon what work is to be performed, and the power required. Work output is related to body size and a small breed would be more limited in its usefulness where heavy soils, which require more effort for land preparation, are found. Farmers can overcome the lower power capacity of small animals by increasing the numbers in a team.

Fodder is available throughout the year. However, the nutritional value of grasses falls rapidly as plants mature and become upalatable. Browse maintains its feeding value over a long period and is therefore a valuable supplment to grass. Leguminous browse in particular has the potential to provide high quality feed at low cost throughout the year.

Maintenance of draft animals in good health is partly dependent on husbandry and hygiene. Farmers unaccustomed to dealing with cattle could find it difficult to recognise health problems at a sufficiently early stage to allow simple remedies to be effective. Accessible and well-trained extension staff would be necessary to provide advice. Prophylaxis against diseases such as rinderpest, trypanosomiasis, and contagious bovine pleuropneumonia requires medication from sources external to the farm so a veterinary system would be required. There is evidence that stress, which can arise from work, poor nutrition, other concurrent diseases, pregnancy and lactation, increases susceptibility to trypanosomiasis. These factors have not been quantified but they constitute additional constraints on the use of draft power in a tsetse-infested zone.

An important issue is the integration of cattle into a farming system where at present livestock are absent. Small ruminants exist but they are usually free-ranging and are not specifically cared for. If farmers are to own draft cattle there must be drastic changes to the present farming systems.

Animals are of limited use without complementary equipment for land preparation. Animal traction is not likely to be profitable at the early stage of its adoption because of the high set-up costs required, particularly for the purchase of animals and implements. Access to adequate credit on favourable terms is a prerequisite for the adoption of animal traction (Munzinger, 1982). The potential adoption of animal traction in the study area was found to be positively and significantly related to the amount of credit available to the farmer ($p<0.05$). This is the major reason for soliciting government involvement to

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ensure that farmers do not get discouraged before the technique starts being profitable. Extreme caution should be exercised at the introduction stage because there is always the tendency for a resource-demanding intervention to be targeted at wealthy or elite farmers, with whom poorer farmers may not be able to identify (Kalb, 1982). What really matters in the adoption of any innovation is the way the project is perceived by potential adopters. Thus target farmers should be able to observe animal traction in operation over a period of time and be able to try it out for themselves.

Farmers in the study area have not been practising animal husbandary within their current farming systems hence they consider the fact that they need to keep cattle a major decision to take. The majority of farmers do not know and cannot even comprehend how animal traction operates, let alone consider committing their finances to the fixed investment its acquisition demands. Culturally and socially they suspect they might find work oxen a bit difficult to handle. Demonstration units would be needed, and pioneer farmers would have to be identified, trained and provided with necessary animals and implements so that others can see the innovation and relate it to their own circumstances. This should be closely followed by training programmes for animals and farmers.

According to empirical results in the study area (Daramola, 1987 unpublished), potential adoption of animal traction in the study area was found to be positively and significantly related to farm income (at the 0.10 level), the amount of credit available to the farmer (at the 0.05 level) and the distance of farm to input source (at the 0.01 level). A negative and significant relationship was found to exist between potential animal traction adoption and distance of product market (at the 0.05 level). Some of the problems also discovered to be confronting farmers in the study area included the escalating cost of hired labour, lack of hired labour during peak periods and diminishing family labour.

Since most farmers in the target area are resource-poor, the initial animal-traction acquisition cost is the most important economic factor that will limit possible adoption of animal traction. Prejudices and, in exceptional cases, cultural factors will also be constraints to adoption. In the light of farmers' lack of knowledge of animal traction, educational intervention directed to the possibility of animal traction in the study area will be necessary.

Being rational decision-makers, farmers are willing to embrace any innovation that will assist them in overcoming labour shortages on their farms, more so if it contributes to profitability. In this direction, many empirical studies have established that animal traction can be a profitable innovation for small farmers if the production inputs are not supply-constrained and the necessary infrastructure is provided. Previous studies have also shown that farmers broke their adoption chain due to input supply problems (Daramola, 1987; unpublished). This suggests that adequate preparation is important to ensure successful introduction and adoption. Intervention is expected to be facilitated by the World Bank-assisted State-wide Agricultural Development Projects in Nigeria.

Conclusion

Although animal traction is not an easy technology to introduce because of its many interacting facets and the complexity of the infrastructure required, it is important to state that this study indicates that none of the difficulties of introducing animal traction to the humid zone is insurmountable, as was also found by Reynolds (1986).

From the empirical information gathered, favourable consideration will be given to animal traction in the region by farmers as long as its adoption will not seriously disrupt existing farming systems, jeopardise farmers' subsistence nor impose additional strain on their limited resources. The majority of farmers have very little knowledge about animal traction and this is the major challenge facing animal traction introduction in south-western Nigeria.

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