

# Gender and animal traction technology in eastern and southern Africa

by

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## Abstract

*Animal traction technologies are not gender neutral. Men are generally involved in cash-earning activities and often have more access, control and ownership of improved technologies, such as animal traction, than women, though women do most of the domestic and agricultural activities.*

*Sustainable agricultural development is necessary to ensure the survival of the rapidly growing populations of eastern and southern African economies. This can only be achieved through the introduction of appropriate technology to boost the agricultural productivity of the majority of the farmers, most of whom are women. The time and effort put in by women to carry out their agricultural and domestic activities (such as weeding, harvesting, transportation of fuelwood, harvested crops and water) can be reduced greatly by the use of draft animals and appropriate animal traction technologies.*

*For animal traction technology to be developed and disseminated successfully, gender issues, such as differential access to land, credit, implements and extension services, need to be taken into consideration. A careful analysis of the potential constraints and benefits is important because the introduction of gender-blind animal traction technology can have different effects/impacts on male and female farmers, given the sexual division of labour and socio-cultural factors prevailing in the region. Women's lack of access to productive resources limits their ability to adopt animal traction technology and thus greatly reduces their production potential.*

## Introduction

Sustainable agricultural development in eastern and southern Africa can only be achieved through the introduction of appropriate technologies which will boost the agricultural productivity of the majority of the farmers, most of whom are women. Over the last twenty to twenty five years, there has been growing interest in the development and

dissemination of appropriate technology for small-scale farmers in the region. Development of animal traction for smallholder farmers has long been identified as an appropriate technology. This is as a result of past failures of the more capital-intensive technologies, the costs of which are now very high. The spread of 'Green Revolution' technologies has been slow and uneven in the region due to

lack of infrastructure for distribution of capital  
rising prices for chemical inputs

lack of specific suitable packages for the  
highly variable soils, rainfall, and crops.

The need to increase the farm power available in the agricultural systems of eastern and southern Africa, where most of the farm activities are carried out manually with a hoe, is receiving particular attention.

Animal traction, used to supplement or replace human power, has proved to be of great benefit to farmers. It can allow farmers to increase labour productivity, overcome seasonal bottlenecks, increase yields because of improved timeliness of operations (particularly weeding), provide a source of manure, and, where appropriate, increase the area under cultivation. These benefits can only be realised fully if the introduction of animal traction technology is gender sensitive. Women play a dominant role in food production but face enormous social, cultural and economic constraints.

## Intrahousehold activities

Farming households in eastern and southern Africa are complex institutions. The complexity arises from the numerous production systems and different accounts within the household, some of which are managed jointly by men and women, some by men only, and others by women only. In contrast with most parts of the world where

households function as a single economic unit with common goals, resources and benefits, the practice in eastern and southern African households is different; family members have separate and sometimes competing own-account activities (Saito, Spurling and Mekonnen, 1994). Therefore the individual, rather than the household, constitutes the basic unit of production for this region.

Individuals are responsible for putting together factors of production for joint or own-account activities. Elaborate arrangements within the household determine what is to be produced, by whom, how it should be produced, and how the produce should be disposed – what quantity to consume, sell or store. A complex set of rights and obligations within the rural household, reflecting biological differences, social and religious norms, and customs dictates the gender division of labour, and land use. These generally place women at a disadvantage, resulting in differential access to factors of production, control of proceeds, and in more general terms, asymmetric economic and social relationships, thus distorting terms of exchange among household members.

The nature of the intrahousehold dynamics, the complexity and asymmetry of the rights and obligations between men and women in the farm household, and their evolution are important factors in animal traction adoption. The effective development and adoption of animal traction technology in eastern and southern Africa depends critically on the understanding of who does what, with what resources, and the process of decision-making within the household.

### **Women's role in agriculture**

Several decades of studies have clearly demonstrated the pivotal roles women play in the agricultural sectors of developing countries. The changes in intrahousehold arrangements have particularly increased women's agricultural responsibilities. Data on the role of African women in agriculture are fragmented. The International Labour Organization (ILO) estimates that 78% of females in Africa are economically active in agriculture compared to only 64% of men (Buvinic and Lycette, 1988). Estimates from FAO reveal that women account for about three-quarters of the labour required to produce the food consumed in

eastern and southern Africa. Also, estimates of the time rural women spend on a variety of production activities in sub-Saharan Africa show that they contribute two-thirds of all hours spent in traditional African agriculture, three-fifths of all hours spent in marketing, and produce more than three-quarters of all eastern and southern Africa's basic food (Gittinger et al, 1990; Saito, Spurling and Mekonnen, 1994). Even though women contribute more labour to agriculture than men, men cultivate larger areas and produce more, due to their access to improved technology (Sylwander, 1992). Studies carried out by Tangka (1994); and Saito, Spurling and Mekonnen (1994) indicate that if male and female access to inputs were less unequal, substantial gains in agricultural output would occur, raising food production.

Aggregate data indicate that women account for more than 90% of the labour required for food processing, provision of household water and fuelwood, 80% of the labour for food storage and transportation, 90% of the labour for hoeing and weeding, and 60% of the work of harvesting and marketing (World Bank, 1989). These figures show the significant contribution of women to agricultural production despite unequal access to land, inputs, and information. They also highlight the need to incorporate gender issues in the development and implementation of animal traction technology in the region.

Official underestimation of women's labour contribution to agriculture is common and has been criticised for undervaluing female labour, especially efforts made towards unpaid work, as well as for undervaluing the worth of female-produced goods and services (Dixon-Mueller, 1985). The fact that women's involvement in agriculture is typically much greater than official figures suggest has enormous implications for the type and support of animal traction development and implementation as related to women farmers.

### **Potential benefits of animal traction use**

The potential of animal traction is noted in a growing body of literature. Animal traction technology has been traditionally used in cash-crop production and tasks generally designated to men. Animal traction has been used mainly for land preparation. This has resulted in large areas being

put under cultivation, with no corresponding use of animal traction for weeding. Animal traction use for land preparation alone can therefore increase the burden of work on women. Weeding is predominantly regarded as women's work and is the most constraining activity in eastern and southern Africa. Yield losses due to delayed weeding have been shown to average 8% per week for millet and sorghum in Northern Nigeria and 30% for a two week delay in cotton (Jaeger, 1986). The use of animal traction for weeding is yet to be fully realised in eastern and southern Africa. According to Jaeger (1986), weeding implements are used by less than 25% of animal traction farms in West Africa.

Women are responsible for weeding, food processing, harvesting, fetching and transportation of water and firewood – all of which take much time and effort. Use of animal traction in such activities can lead to delegation of women's duties to other members (especially young boys and men) within the households and hence reduction of the time and effort expended by women.

### **Determinants of women's adoption of animal traction technology**

The number of female-headed households is growing with increasing migration of men from rural areas. Use of draft animals should help these women produce more and should reduce drudgery and labour bottlenecks. Animal use should also save women's time which will be of enormous benefit to communities in which they live, as more time will be spent on other communal activities.

However, use of animal traction requires time and cash investment, as well as access to land, credit, information, and implements. Though women play important roles in agricultural production, they usually have lower levels of physical and human capital than men (Tangka, 1994; Saito, Spurling and Mekonnen, 1994; Quisumbing et al, 1995). These differences arise because of legal, social, and institutional factors that create barriers for women to adopt new technology. Consequently, most women have less access to and higher effective costs for, land, information, technology, inputs and credit.

### **Access to land**

Land, whether allocated, purchased, inherited, or seized, is the most basic resource in agricultural

production. In eastern and southern Africa, agricultural land reforms, the legal system and the patrilineal transmission of property have increasingly concentrated land rights and ownership in the hands of men, giving women little access to its ownership (Henn, 1983). Even in situations where civil law gives women the right to inherit land, local custom may rule otherwise (Quisumbing et al, 1995). In eastern and southern Africa where women do most of the agricultural activities, they are limited to use rights to land, and in most cases this is only with the consent of their male relatives or male community leaders. Women's social status impinges upon their access to land and consequently on their role in agricultural development. A positive relationship between individual land privileges and productivity has been established. Increased individualisation of land rights can improve a farmer's ability to gain returns from land investment, resulting in greater demand for land improvement and complementary inputs. Women's insecurity of land tenure reduces the likelihood of them investing much time and resources in usufruct land that they can be chased out of at any time. Clearly defined land rights improve the creditworthiness of farmers and augment the probability of obtaining formal credit for the purchase of animal traction implements. Women's inheritance of land was often discouraged traditionally by the widely-held assumption that a daughter marries and gains access to land in her husband's compound.

### **Access to credit**

Cash flow, financial services or credit are important and necessary for the purchase of draft animals, implements and other farm inputs such as improved seeds. These are quite difficult for women to acquire, particularly those heading households with limited cash income. Property that is accepted as collateral for credit, (eg land) is normally held by men, and formal financial institutions often refuse the types of valuables (eg jewellery) held by women. The transaction cost involved in applying for credit is generally higher for women than for men owing to a higher opportunity cost for neglected activities. Lack of credit and limited income constrain women and female-headed households from investments in such productivity-increasing ventures. Women's low educational levels relative to men, their lack

of familiarity with loan procedures, and social and cultural barriers limit their mobility and interaction with predominantly male moneylenders. Women who are not members of local groups such as farmers' groups, may be prevented from receiving not only extension advice, but also credit in the case where the extension worker plays an important role in obtaining it. Women are generally involved in production of relatively low-return crops that are not included in formal lending programs. Women with limited cash find it difficult to invest in animal traction because death, loss or injury of their animal can be very risky for them. It is therefore important to consider the needs and limitations of women in the development and dissemination of animal traction technology.

#### Access to agricultural extension

Extension has been shown to increase agricultural productivity and close the gap between technical knowledge and farmer's participation, by spreading information about new techniques. Literature shows that extension is cost-effective, and has a significant and positive impact on farmers' knowledge, adoption of new technology and hence farm productivity. Despite women's role in agriculture, they do not get a fair share of agricultural extension advice and other services (seeds and fertiliser provision). In eastern and southern Africa, where women and men may be responsible for different crops, it is very important that women get access to extension services. Unfortunately, men are still the main targets for modern extension services. Additionally, many societies place restrictions preventing male extension workers from meeting with female farmers and extension messages do not get passed on by men to women in the same household.

A relatively small number of extension agents are women, and it cannot be assumed that female extension agents are aware of the gender issues in agriculture and technology adoption. Few female extension agents have the relevant training in animal traction technology, and consequently have very little, if any knowledge to pass to women farmers (Sylwander, 1992). Domestic responsibilities sometimes render women immobile, making it impossible for them to attend meetings and courses away from home. Women

are less likely than men to speak the national language; this limits their participation in the extension meetings, as these often are not offered in the local languages. Thus unless timing, location, training and extension programs take into account women's multiple roles and responsibilities, particularly the severe constraints on their time and mobility, information and technology transfer may never reach them.

#### A note on methodology

The complexity of the gender issues in animal traction can be analysed using a linear programming model. Linear programming provides the framework within which issues such as the following can be examined:

- the appropriateness and comparative advantages of using specific combinations of draft animals and animal implements for male and female farmers – who have different access to capital, credit and grow crops for different purposes

- the evidence of complementarity that can be exploited from the practice of mixed farming (crop and animal production)

- the causes and implications of the under-utilisation of draft power

- the effects of farm size and economies of scale on the profitability of animal traction.

The linear programming model is a whole-farm approach which has the potential of providing a realistic assessment of the suitability and acceptability of animal traction technology. The complexity of the trade-offs of labour used for different tasks and different activities during a growing season can be difficult to sort out. Parametric variation of a linear programming model can be used to examine systematically the benefits from utilisation of animal traction, its effects on gender division of labour, potential scale economies, and the seasonality effects that are characteristic of the subsistence rainfed agriculture of eastern and southern Africa. Additionally, parametric variation of the model can provide insights about adjustments and responses to animal traction technology, that would otherwise require a much larger multi-year data collection effort to apply econometric techniques.

Linear programming is a computational technique for solving linear objective functions subject to a system of constraint equations. The most common farm models maximise profits (or cash income), after satisfying subsistence needs, for fixed input-output activities subject to constraints on resource availability by choosing the best cropping and/or animal production patterns.

Adoption of animals can be included as integer variables in the model. Each of these may be considered with the different sets of animal-drawn implements – the plow only, the weeder only, and plow and weeding implements together, as well as using animal traction for planting, harvesting and transportation. The model can be solved with each or a combination of these choices imposed.

The linear programming model is a whole-farm approach that can incorporate household objectives, risks, and constraints that other analysis techniques cannot handle. However, this requires detailed and reliable information about the objectives of the decision-maker, the farm-level constraints, and the input-output relationships.

### Conclusion

Animal traction technology can provide the opportunity to increase agricultural and labour productivity for all farm activities (land preparation, planting, weeding, and harvesting), and to decrease drudgery and time spent in transportation of crops, water, fuelwood etc. Because women normally have a considerable workload, the direct and indirect benefits from the use of animal traction should increase agricultural and labour productivity and have a positive impact on the well-being of families and communities of which they are a part.

These benefits can only be realised if women, the majority of farmers in eastern and southern Africa, can make full use of animal traction technology. Full benefits can only be derived from the technology if development and implementation guidelines are made to ensure that women's needs,

opportunities or constraints be considered at all levels, and in all activities. Until training and extension programs include well-planned, active women's components, information and animal technology transfer is unlikely to reach female farmers. Thus, women's contributions and production potential are never fully realised.

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