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Animal Traction in Ghana

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INTRODUCTION

The recent state's interest in agricultural mechanization has largely focused on the provision of tractors and imported machinery to the farming population. Animal traction has not received much attention from the country's policymakers. Meanwhile, the strong demand for tractor mechanization services and the low number of tractors call for the need to improve the efficiency of existing power sources to meet the country's growing food needs (Houssou et al. 2012; Benin et al. 2012).

In addition to the handheld hoe, the cutlass, and tractors, draft animals—mainly oxen and donkeys— are used in Ghana for plowing and for carting agricultural products, fuel wood, water, and building materials. Animal traction is used primarily in the northern regions of the country (Upper East, Upper West, Northern, and parts of upper Brong-Ahafo and Volta Regions). In 1997, the draft animal population in the country was estimated at 63,000 work oxen (60 percent of the nation's bullock population), and 14,200 work donkeys (Bobobee et al. 2007). Upper East Region leads in work oxen population (42,130) followed by Northern Region (10,000+), and Upper West Region (9000+).

Much of the northern part of the country is naturally suited to the use of draft animals due to the sandy and shallow nature of the soils which require less traction power than the heavy soils of the humid south. Animal traction can ease the power bottlenecks and complement the use of tractors and other farm power sources. In 2007, the farmer voted 2nd best in Ghana was an animal traction farmer from Sissala West district. Given the rising labor shortage in most farming communities, the limited supply of tractor services, and the soil quality, working animals are particularly appropriate for achieving household food security in many farming communities in the three northern regions. Because tractors are unavailable during early-season cropping, animal traction is relevant for subsistence farming.

This research seeks to answer the following questions:

- What are the specific uses of animal traction as farm power in the three northern regions?
- What is the trend in the use of animal traction in the relevant regions?
- Is animal traction service provision profitable as a business?
- What are issues and constraints to scaling up animal traction as a farm power source?

DATA AND METHODOLOGY

This research was conducted in the three northern regions of Ghana. Several farmers, blacksmiths, and officials from the Tamale Implement Factory (TIF) and the Intermediate Technology Transfer Unit (ITTU), three cotton-producing companies (Amajaro, Wienco, and OLAM), non-governmental organizations working on animal traction (ADVANCE, the Presbyterian Church & TRUDIDEP), and policy makers from the Ministry of Food and Agriculture (MoFA), were interviewed. Farmers in Tolon-Kumbungu, Tamale, Savelugu-Nanton, West Mamprusi, Talensi, Nania, Tarsaw, and Lambusie were met individually and in groups to solicit their views on animal traction technology in the region.

Qualitative surveys of the abovementioned stakeholders were employed in the study. Visits were made to farms and workshops of artisans to observe and inspect their operations regarding the use of implements, tools, and equipment. Data were collected from 30 draft animal farmers and users to gauge their socioeconomic characteristics and analyze the major changes in the use of animal traction over 3-year period.

STATUS OF ANIMAL TRACTION IN GHANA

Animal traction has a long history in Ghana. Organized mechanization services delivery in the country dates back to the 1930s when some churches and voluntary organizations began introducing animal traction technology in the then Northern Territories of the Gold Coast (Boahma 2006).

In the present day, animal traction is mainly used for plowing and carting of goods, and in a few cases, harrowing. In some cases, donkeys are used to cart farming families, school pupils, and construction materials. Draft animals are also used for weeding in some parts of Upper East Region. Labor shortage has obliged the

major cotton-producing companies (OLAM, WIENCO, AMAJARO) to promote the use of animal traction among their outgrowers.

Draft animal farmers use a variety of implements, such as moldboard plows, ridgers, and carts for plowing and carting. A few farmers, especially in Upper West Region, use cultivators, harrows, and markers.

Animal traction can perform a larger range of activities than tractors. Draft animal farmers cultivate a variety of crops, such as maize, rice, and legumes (groundnut, cowpea, and soybean).

While the unit prices of draft animals, implements, and carts have been increasing steadily over the last 3 years, the numbers of bullocks or donkeys owned and purchased have remained fairly stable, as indicated in Table 1.

TABLE 1: DISTRIBUTION OF DRAFT ANIMAL INVESTMENTS (30 FARMERS)

	2010	2011	2012
Bullocks			
Number owned	2	3	2
Number purchased	3	2	2
Unit price (GH₵)	424	550	693
Donkeys			
Number owned	1	1	1
Number purchased	2	2	2
Unit price (GH₵)	188	253	292

Source: Field survey 2012.

Typically, a pair of bullocks (GH₵1,300) and implements (GH₵430), a total of GH₵1,730, can plow 1–1.5 acres per day. At the end of their useful life, the bullocks appreciate and can be sold for about GH₵2,000.

Survey results indicate that draught animal farmers plow about 17 acres of land in the season.

The number of acres plowed among animal traction users has remained fairly stable. For example, over the past 3 years, animal traction owners plowed on average 9 acres per year on their own plots, and 8 acres on other farms. Draft animals are increasingly used for weeding.

PROFITABILITY OF DRAUGHT ANIMAL TRACTION SERVICES

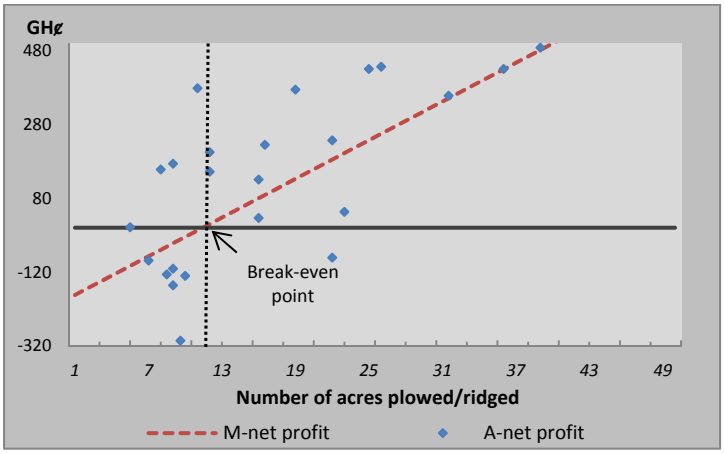
The net profitability of animal traction service provision as a business was assessed using field-based assumptions on costs and revenues. Table 2 and Figure 1 present the results.

TABLE 2: COST AND REVENUE ASSUMPTIONS (GH₵)

Investment costs				Maintenance costs per year	Variable costs per acre	Service charge per acre
Pair of bullocks	Moldboard plow	Plowshare	Yoke			
1,300	350	10	70	433	10	28

Source: Field survey 2012.

FIGURE 1—PROFITABILITY OF ANIMAL TRACTION SERVICE



Source: Field survey 2012. Note: y axis = Net profit per pair of bullocks. GH₵ = Ghanaian Cedi. A-net profit = actual net profit. M-net profit = modeled net profit

Figure 1 indicates that the net profit increases with increasing acreage. The break-even point, that is the number of acres that must be plowed by the provider to cover his costs, is estimated at 12 acres. Most draft animal farmers interviewed operate at about 17 acres, above this break-even point. This result indicates that animal traction has been profitable for these users who combine own use with hiring services.

CONSTRAINTS TO ANIMAL TRACTION DEVELOPMENT

LACK OF YOUNG PLOWBOYS

Animal traction farming in Ghana still predominantly relies on overaged labor. Labor shortage is compounded by increasing school enrollment of the youth who serve as plowboys.

Design issues

Fast-wearing plowshares. Animal traction farmers in Ghana are confronted with the lack of quality spare parts, especially durable plowshares. Survey respondents complained about the fast-wearing nature of their plowshares. The average lifespan ranges from 2 to 4 acres among surveyed farmers. The local shares forged by blacksmiths wear very fast because they have low hardness values.

*Poor harnesses and yokes.*The existing withers yokes made from wooden poles or planks and the traditional collar harness are uncomfortable for the animals. With regard to the yoke, the points of contact are so small that the pressure developed causes harness sores and restrict the animals during work.

Inappropriate implement beams. The animal traction implements (plows and ridgers) used in the country are copies of imported European implements, which were developed to suit the big animals of the temperate regions. With the local breeds, the imitated Eberhardt design raises the hitching points too high for the smaller animals. This imposes undue pressure on the operator and stresses the animals, leading to high implement draft on the animal and early fatigue of the operator. The metal scraps that serve as raw materials for blacksmiths are drying up because they are being exported by dealers, and the existing foundries are not producing steels for blacksmiths.

LIMITED DRY-SEASON FEED AND WATER

The three northern regions where animal traction predominates are located in the drier part of Ghana. Feed and water are not sufficiently available during the dry season in these regions.

OTHER CONSTRAINTS

Rampant theft, disease, and the high cost of medication are additional problems faced by animal traction farmers. Moreover, state interest inanimal traction technology as part of the country's agricultural mechanization strategy is limited, as seen by the abandonment of previous animal traction centers (e.g. the Nyanmpala animal training center).

CONCLUSION

- Tractors, animals, and hand hoes are all relevant for agricultural mechanization. When tractors are not available, small-scale farmers will still use animal traction.
- Animal traction and tractors should be seen as complementary power sources and as such should be allowed to co-exist on a level playing field.
- Research and policy are essential to upgrading animal traction technology and reducing the drudgery associated with the technology.
- The use of donkeys should be considered as these animals are hardy and not prone to theft like oxen.
- It is essential to revive abandoned draft animal technology training centers and assist local blacksmiths.

Animal traction may not be an important contributor to national food security, but it is a major source of farm power for the farming population in the three northern regions where its uptake was quite successful in the 1970s and 1980s. Any mechanization strategy should consider the constraints faced by animal traction users.

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