An economic analysis of the utilisation of donkeys in Botswana: the past and the future

by

May Mrema *

Department of Agricultural Economics and Extension, Botswana College of Agriculture
Private Bag 0027, Gaborone, Botswana

Abstract

The adoption of donkey technology in Botswana is mainly found among the small-scale, resource poor farmers who make up 85% of the farming population. The degree of adoption varies as the constraints and the opportunities available to the farmers change. In the past the presence of a large national herd of cattle made the use of cattle traction popular (46% of the farmers used it in 1984). The tractor took over in the latter part of the 1980s and in the early 1990s. This was made possible by the provision of free tractor services by the government's Accelerated Rainfed Agricultural Programme (ARAP). Only 17% of farmers used donkeys for draft purposes at that time.

When the Arable Lands Development Programme (ALDEP) was introduced to provide donkeys and complementary implements to resource poor farmers (those with 40 head of cattle or less), at a substantial grant of 85% of the market price of the package, the ownership and use of donkeys increased compared to other types of traction (19% of the farmers used donkeys in 1990). The use of this type of traction is expected to increase in the future due to the withdrawal of ARAP assistance, and because of the increase in cattle deaths during 1995/1996 which depleted the cattle population.

The fast rate of population growth (3.6% in the rural areas and 5% in the urban areas) is putting pressure on the agricultural sector to produce more food. Since the majority of producers (85% of the total) are the traditional resource poor, and since ALDEP continues to support them, the utilisation of the donkey which has an advantage in terms of cost of purchase, usage and management, is expected to increase.

Introduction

Adoption and intensification of any technology depends on its availability, the constraints to its adoption and the benefits that result from its use. Botswana's climate is semi-arid, making crop production very risky. Many farmers are only able to cultivate small fields of between 0.1–5.0 ha (mean 2.0 ha), mainly for subsistence purposes. Such small-scale cultivation makes use of only 20% of the 1.3 million ha of land that is potentially available for arable farming. Production is low at 260 kg/ha/year for grains (MFDP, 1991). This makes farmers reluctant and often unable to adopt costly technology unless it is heavily subsidised. This is the case for the 99% of traditional farmers (MOA, 1990), whose annual incomes are too low to allow expensive investments. To minimise the inherent risks in crop production farmers practise mixed farming and mixed cropping.

Farmers commonly have three locations where they may live and work:

- the crop fields, where farmers stay only temporarily during the growing season
- the cattle post, where animals, mainly cattle, are kept and looked after by herd boys (male heads of family tend to visit these every weekend from their place of work in the urban centres)
- the village, which is the permanent residence and where grain is stored.

These locations are often far apart (usually around 10 km). Roads and communication in these areas are poor and donkey transport is common. The disparity in incomes between the rural and urban areas has drained the former areas of most of the young, educated, and able males between the ages of 25 and 45. The increased rate of migration of this section of the rural population has left many females to head households (57% of the families) aided by people aged 55 and over (MFDP, 1991; Mrema, 1996). The resulting labour shortage in the rural areas has left the farmers with no alternative but to use the most labour saving

* *Subsequent address:*
Mrs May Mrema, PO Box 765, Entebbe, Uganda

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Table 1: Area plowed using different types of power, 1990

Type of power	*Area plowed %*
Hand	20
Animal	40
Tractor	40

Source: Mrema, 1994

methods of farming, eg, broadcasting of seeds (85% of the farmers), and not applying fertiliser.

Past and current use of donkeys in Botswana

Some of the opportunities and constraints discussed in the introduction have resulted in the adoption of different traction methods among traditional farmers at different times and with different intensities. From Table 1 it can be seen that in 1990 relatively little of the land under crops was tilled by hand. The proportions plowed using animal and tractor power were the same.

The reason why hand power is not popular is because with the semi-arid climate, plowing and planting have to be done on time if any yield is to be realised. Hand power cannot ensure this. Table 2 shows the actual per cent of the farmers that used each type of traction over the years. It shows that in the early years, cattle traction was the dominant method used, although this type of draft power had a set back in the drought years of 1982–1987, as shown by the lower number of farmers using cattle traction between 1984 and 1986.

Table 2 shows that the use of donkeys was low in 1989 while that of tractors was at its peak despite the fact that on the small fields the use of tractors was probably uneconomical (tractors, spare parts, and fuel are all imported from South Africa). However, the real costs of tractor use were never felt by the farmers because of the introduction of the government's Accelerated Rainfed Agricultural Programme (ARAP) which included free tractor services, seeds and fertiliser for up to 10 ha cultivated. This gave farmers the opportunity to shift from the use of cattle traction to that of tractors, although most did not own tractors (Mrema, 1994). Most of those who used tractors were the 40% of the farmers who did not own cattle (Kerapeletswe, 1992; MOA, 1991). By 1990 the area plowed by tractor equalled that plowed by the use of animals (Table 1).

Table 2 shows that in the late 1980s donkey traction among farmers started to rise. This was because of the introduction of another government programme, The Arable Lands Development Programme (ALDEP), that targeted mainly the resource-poor farmers. These farmers were offered harrows, plows and planters at a subsidised rate of only 15% of the market price. This resulted in a 6% increase in the total number of donkeys between 1988–1990 (Table 3).

The two severe drought periods of 1982–1987 and 1992–1993 both led to the increased purchase of donkeys. These drought periods claimed the lives of thousands of cattle and many of the herders were left without cattle. The hardier donkeys survived to do the plowing for an increased number of poor farmers assisted by an increased number of tractors provided by ARAP. The droughts also resulted in the increased adoption of other complementary technologies provided by ALDEP. For example, the farmers who row planted increased from 8% (1982) to 25% (1991),

Table 2: Types of draft power and proportion (%) of farmers[1] who used each type

Year	*Cattle number*	*%*	*Donkey number*	*%*	*Tractor number*	*%*
1984	4321	46	2054	22	2952	32
1986	8573	40	3642	17	9121	43
1987	21800	41	9300	17	22600	40
1989	20850	36	9850	17	26850	47
1990	21150	37	11000	19	24850	44

[1] *Some farmers used a combination of two types of traction at the same time.*
Source: Adapted from various MOA publications.

Table 3: Adoption of donkey traction by traditional farmers, 1988–1990

Year	*Number of farms*	*Number of farms with donkeys*	*Total number of donkeys*	*% of farmers with donkeys using them for draft power*	*Average number of donkeys/farm*
1988	62800	26900 (43%)	145900	21.2	5.4
1990	63300	29300 (46%)	154900	27.3	5.4

Source: CSO, 1988 and 1990

and those who used chemical fertiliser with row planting increased from 2.5% (1984) to 23% (1991) (Kerapeletswe, 1992; Strivastava, 1989). Two other factors led to increased ownership and borrowing of donkeys during these periods; the heavy soils and the use of heavy implements designed for oxen, both of which meant that teams of 6–10 donkeys were needed for plowing. The relatively poor condition of the donkeys during the droughts also contributed to the need for large teams of animals.

Constraints experienced

As discussed above, the intensification of a technology is dependent on the constraints that exist. The adoption of donkey use in Botswana has been restricted by a number of constraints some of which are discussed below:

Training of donkeys to plow in straight lines has been a big problem for the majority of users of this technology, usually the women. In the past this job was done by men, but now the majority have left for the urban areas. This has resulted in an increase in the use of tractor hire to hasten timely plowing.

Inappropriate implements designed for cattle have proved to be clumsy and heavy for donkeys (Chepete and Mase, 1988). To exacerbate the problem, there is no manufacturer or assembler of these implements in Botswana. Maintenance of implements in the villages is non-existent, so once an implement breaks down it is discarded before the end of its potential life. Although ALDEP offers a large number of implements to the farmers, most farmers were found to have only one implement bought some 20 years ago (Chepete and Mase, 1988).

Inability to own carts due to their high cost. Even those made by the few artisans found in the villages cost between P 2400 and P 2800 (US$ 1200 and 1400 respectively) in 1993. The few farmers who own carts make them locally by using discarded vehicle parts (axles, and bodies of pickups), and logs. Men make the carts. Most of the female headed farms (57%) do not have carts because they cannot construct them. This has considerably hindered the use of the donkey for the transport of the harvest, firewood and water.

The above problems have resulted in a greater use of tractor hire (P 110/ha) that saves on labour and which has proved to give the farmers a higher gross margin per hectare but not per total area planted (Table 4).

Future utilisation of donkeys

Urbanisation in Botswana is increasing at a fast rate. It is estimated that by the year 2016, two-thirds of the population will be in the urban centres (MFDP, 1991). This will put pressure on the agricultural sector to increase production. The overall population is growing rapidly at 3.6% pa (MOA, 1991). The economy that had been growing until 1990 at the rate of 13% pa, has slowed down and only grew at 3.1% pa, in the 1994–1996 period. The ability of the Government to import the bulk of its food (70–80%), or to continue providing heavy subsidies to farmers, is declining. Most of the food in the future will have to come from local sources. So far the bulk of the locally-produced food (85%) is grown by the small scale, resource poor farmers (MOA, 1990). It is these farmers who will have not only to increase productivity but also the area planted. The only cheap, available, domestically produced traction animals for the majority of farmers will be donkeys, since about 40% do not own cattle.

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Table 4: Comparison of area planted, productivity and gross margins between donkey and tractor traction in 1988

Type of traction	*Area planted (ha)*	*Yield/ha[1] (kgs)*	*Workdays per hectare*	*Gross margin/ha (Pula)*	*Total gross margin/farm (Pula)*
Tractor	12.6	374	12.2	95	1202
Donkey	4.9	176	19.9	66	326

[1] Yield of main smallholder crops (millet, maize, sorghum and pulses)
Source: MOA, 1989
US$1 ≈ 2.7 Pula at this time

The outbreak of contagious bovine pleuro-pneumonia (CBPP) in 1995–1996, in the major farming areas of Ngamiland and Chobe, depleted the national cattle herd considerably. Until the disease has been completely eradicated, restocking of cattle cannot be done. Restocking itself will take some time before the herd reaches its past size. This means that even those who were using cattle traction two years ago cannot do so now or in the near future. It is therefore predicted that this will result in an increase in the utilisation of donkey power in the future. Most female farmers prefer to use donkeys due to their economic advantages (ie, they are cheap to buy, manage and utilise). Most farmers in the future will be women.

Conclusions

The degree of adoption and utilisation of donkeys in Botswana has changed over time. This has been because of the changing opportunities available to farmers at different periods, especially the existence of government-supported programmes. It is anticipated that there is going to be an increased use of donkeys in the future due to economic reasons and as a result of the outbreak of contagious bovine pleuro-pneumonia.

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