THE SOCIO-ECONOMIC STATUS OF CAPRIVI FARMERS WHO USE DRAUGHT ANIMAL POWER

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ABSTRACT

The main objective of this study was to analyse the socio-economic status of smallholder farmers who use draught animal power (DAP) systems in the Caprivi Region, and to test the gender equality in economics of DAP usage. This study applied rapid rural appraisal techniques (RRA), including a survey. Semi-structured interviews were conducted with 312 farmers at their farms and data were gathered on the use and economics of the draught animal system. The research found that the use of animal power produces higher yields and is more cost-effective than tractor power. Furthermore, the study confirms that the participation of women in draught animal economics is high. The results show that there are no significant differences between male and female farmers (even at a 30 % significance level). The study recommends that government and stakeholders should follow certain strategies and that funding should continue to promote this sustainable form of agricultural power amongst smallholder farmers, with special focus on poverty reduction.

INTRODUCTION

The importance of oxen in providing power for agricultural development is often forgotten in nations and even regions of Namibia that have adopted more modern forms of agricultural mechanisation (Prabhu, Bigot & Binswanger, 1987; Ashley & LaFranchi, 1997). Tractors achieve the greatest savings in time and labour, but at a great initial expense (FAO/UNIDA, 2008; Sanders, Shapiro & Ramasway,1996). Most farmers would like to benefit from tractor power, but these are often unrealistic expectations for the rural poor (Lawrence & Pearson, 2002). Tractors tend to be more appropriate for large-scale commercial farming (Bishop-Sambrook, 2005). Individual tractor ownership is seldom possible for farmers who cultivate small areas (Ashley & LaFranchi, 1997; FAO/UNIDA, 2008). Draught animals are most appropriate for small farms and can also be used for local transport. For these reasons, the agricultural use of draught oxen is once again on the upswing in much of Sub-Saharan Africa (FAO/UNIDA, 2008; Sims & Kienzle, 2006). These important animals continue to assist people in eliminating poverty and creating wealth, by allowing people to prepare, plant and weed fields in less time than is possible by hand (De Graaf, 1994; FAO/UNIDA, 2008). Food distribution and rural trade are also enhanced through improved transport (Panin & Ellis-Jones, 1994; O'Neill, Sneyd, Mzileni, Mapeyi, Njekwa & Israel, 1999), while also saving women and children time and effort in moving water and fuel-wood (FAO/UNIDA, 2008). Finally, oxen also have many other values. Cattle and especially oxen serve many functions in addition to work and they are many rural people's most significant assets.

The main objective of this paper is to characterise the socio-economic status of people who employ draught animal power in production systems in the Caprivi region to generate information that will assist in designing livestock development programmes aimed at poverty alleviation.

MATERIALS AND METHODS

Semi-structured interviews were conducted with 312 farmers at their farms in the Caprivi region to evaluate the economics of the draught animal system. A structured questionnaire was used to obtain further information on livestock production characteristics in the smallholder farming systems. Gathered household characteristics included area, sex, age, level of training/education attained, farming experience, size of household and gender of the head of household. The respondents were chosen because they used draught animal power or tractors, and further on the basis that they were "typical" of a group or represented diverse perspectives on an issue (Leedy & Armrod, 2000). A sample of respondents were selected using lists of households supplied by either the Agricultural Extension office and/or village heads according to the method proposed by Poate & Daplyn (1993). Applying the Statistical Package for Social Sciences (SPSS), the data were processed further to compare the statistical differences among the female and male farmers in the study area.

ASSUMPTIONS

- This study assumed the soil type of eastern Caprivi to be uniform.
- Fertilizer application was not included in this study, and it was assumed that none of the farmers used fertilizer.
- If information on the educational attainment is not given, it is assumed to be zero. Further, if the attainment is post-graduate, it is assumed to be a four-year qualification.
- To make the report more realistic, yields of more than 60 bags per hectare are excluded from the analysis (treated as irregular data). This is based on the information provided by extension officers and by the average responses to questions asked about yield per hectare.
- Even though Caprivi farmers produce different crops, in this report, for the sake of comparison, only maize has been taken into account.

RESULTS AND DISCUSSION

Household characteristics

Table 1 summarises the gender distribution of Caprivi farmers surveyed. Nearly 47 % (47/101) of the respondents in the eastern Caprivi who used draught power were women. The women respondents from Katima Rural represented 15,1 % of the total farmers surveyed. In Sibinda, 13 %, in Kabbe, approximately 11 %, and in Linynati only 1,6 % of the farmers were women. Linyanti farmers had the largest fields for crop growing, and the best access to fertile floodplains. Access to this land may have been limited for women. Overall, in eastern Caprivi, female farmers surveyed represented 40,7 % of the 312 farmers interviewed. The wide acceptance of women as users of draught animal power and even of tractors could impact positively on household food security and showed that the region was reasonably accepting of gender equality where it pertained to access to land and draught animal or tractor power. This implies that government and other non-government organisations interested in gender equality could easily encourage female farmers to use draught animal power (the Draught Animal Power Acceleration Programmes [DAPAP and DAPAP2] were successful).

Draught Animal Power

The vast majority of farmers in this study used draught animal power. Eighty-one per cent (81 %) of the farmers used oxen exclusively, with an additional 8 % using oxen and also an own tractor, or a hired tractor. Cattle were owned by all but a few farmers, and even those without cattle had previously owned cattle, or hoped to do so in the future. Oxen were viewed as a source of farm power that would continue into the future. Sixty-six percent (66 %) of the farmers thought that young people would continue to use oxen. While many young people in the Caprivi region hoped to use a tractor, many adults stated this was unrealistic, as tractors were too expensive. Twelve percent (12 %) of the farmers said young people would not use oxen in the future, and 5 % said that young people might use oxen, but that it would depend on their education, the economy and availability of tractors. However, when asked about the economic and environmental sustainability of using oxen, 83 % stated that oxen were an essential and sustainable farm power resource in the region.

Table 1. The number of people surveyed in each area

Area	Male	% Male	Female	% Female	Irregular	Total
Katima Rural	51	16,3 %	47	15,1 %	3	101
Kabbe	48	15,4 %	34	10,9 %	0	82
Sibinda	47	15,1 %	41	13,1 %	2	90
Linyanti	34	10,9 %	5	1,6 %	0	39
Total	180	57,7 %	127	40,7 %	5	312

Figure 1. Plowing with oxen near Ngoma, Caprivi.

Table 2. Comparative statistics for household characteristics, farm size, yield per hectare, and educational attainment of male and female farmers who used oxen in eastern Caprivi

	Gender Group	Kabbe		Katima rural		Linyanti		Sibinda	
		Statistic	Std. Error	Statistic	Std. Error	Statistic	Std. Error	Statistic	Std. Error
Male farmers	Yield[1]	2,7	2,7	6,2	1,3	3,8	1,0	11,6	2,5
	Age	54,7	2,9	49,8	2,1	48,8	2,5	51,9	2,6
	Qualification	6,2	0,3	8,7	0,5	7,5	0,7	7,8	0,8
	F_experience[2]	30,3	2,6	20,4	2,3	23,8	2,6	22,1	3,5
	Farm size (ha)	3,0	1,5	6,9	1,2	19,9	5,3	13,9	4,1
	Area_planted[3]	1,7	2,6	3,7	0,6	7,9	1,6	5,9	1,4
	Number of oxen	6,2	0,9	6,1	0,9	7,0	1,0	3,9	0,7
	Family size	6,6	1,3	7,9	0,8	6,3	0,4	7,8	0,7
Female farmers	Yield[1]	4,9	6,4	5,7	1,7	7,7	6,3	8,9	1,2
	Age	53,6	4,7	57,4	2,3	40,0	5,6	54,0	2,7
	Qualification	7,4	4,6	3,7	0,7	5,0	2,9	4,7	0,9
	F_experience[2]	22,1	3,8	26,4	2,5	14,8	5,8	28,8	3,2
	Farm size (ha)	4,6	4,0	3,9	0,6	18,0	9,4	4,9	0,7
	Area_planted[3]	2,4	4,4	1,9	0,4	8,1	5,7	3,4	0,7
	Number of oxen	7,3	1,8	4,6	0,6	6,0	2,0	1,9	0,6
	Family size	8,2	1,3	6,1	0,5	4,8	1,3	5,8	0,7

[1]Yield is calculated based on bags (one bag is equal to 50 kg)
[2]Indicates farming experience in years
[3]Indicates area planted during the previous season before the interview

The highest average numbers of oxen were owned by Kabbe female farmers (with a mean of 7,28 oxen per household), closely followed by Linyanti male farmers with a mean of 7 oxen. Next were Kabbe and Katima rural male farmers with a mean of 6,10 each, and then came the Linynati female and male farmers who owned virtually the same number of oxen (6). However, in terms of yield, (Table 2) the group that owned the fewest oxen (Sibinda male farmers) and whose farm sizes were second largest, performed better than the other areas, with almost double production quantity per hectare (11,6 bags). This was followed by female farmers with an average yield of 8,94 bags in the same area. This does not necessarily imply that the farmers of this area were more productive than the others, because other factors that affect yield were not included in this analysis (such as wild animal raiding and soil fertility). However, most importantly, Table 2 shows that female participation in household security was significant. In terms of education, male farmers who used oxen had a higher educational attainment (Table 2). Educational achievement in Katima rural and Sibinda in particular, was higher (with male education averaging 8,67 and 7,79 years, respectively). The educational attainment by males in the other two areas was more or less the same. On the other hand, female educational attainment ranged from 2,89 to 7,28, with higher female farmer educational attainment in Kabbe. This might suggest that educational attainment was a main determinant of productivity.

Table 3 shows that there was no significant difference between male and female farmers in any of the variables. Table 4 compares the characteristics (yield, age, family size, highest qualification, farming experience, land size, area

Table 3. T-test statistical comparisons between female and male farmers in eastern Caprivi

		N	Sig.
Pair 1	Yield per ha for female and male farmers	55	0,90
Pair 2	Age of female and male farmers	55	0,96
Pair 3	Family size headed by females and by males	55	0,16
Pair 4	Highest qualification of female and male farmers	55	0,40
Pair 5	Farming experience of female and male farmers	55	0,71
Pair 6	Land size owned by female and male farmers	55	0,26
Pair 7	Area planted previous season by female and male farmers	52	0,66
Pair 8	Number o foxen owned by female and by male farmers	54	0,31

planted and oxen owned) and results for male and female farmers. The mean yields over all areas were 4,96 and 7,92 bags of maize respectively for female and male farmers (with standard error 1,35 and 1,45). However, the average age shows that male farmers were seven years younger than female farmers; this suggests that the female farmers may have been widowed. On the other hand, family size was bigger for male households, possibly due to the traditional practice of polygamy among the male farmers.

The average educational attainment was higher among the male farmers, who had completed grade 7,8 compared to 4,5 for female farmers. This might be due to female farmers having had less opportunity to go to school, for various reasons, but it is believed that gender equality may be greater among the new generation. However, to bring women on board in communal farming still requires all stakeholders to stand together against cultural or traditional restrictions.

In terms of cultivated land under their control, the women had only 3,9 ha compared to 15,4 ha for males. This shows that the traditional leaders need to work closely with the policy makers on the issue of land distribution to female as well as to male farmers.

On average male farmers only planted 42 % of their crop land, whereas female farmers planted 53 % of the land under their ownership. This might imply that female farmers take more responsibility and risk to achieve better productivity compared to male farmers.

Table 4. Summary statistics for female and male farmers in eastern Caprivi

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Yield per hectare for female farmers	4,96	55	10,02	1,35
	Yield per hectare for male farmers	7,92	55	10,78	1,45
Pair 2	Age of female farmers	56,76	55	14,13	1,91
	Age of male farmers	49,40	55	13,36	1,80
Pair 3	Family size headed by females	6,20	55	2,89	0,39
	Family size headed by males	7,09	55	3,28	0,44
Pair 4	Highest qualification of female farmers	4,49	55	4,54	0,61
	Highest qualification of male farmers	7,80	55	4,08	0,55
Pair 5	Farming experience of female farmers	26,04	55	16,50	2,23
	Farming experience of male farmers	22,40	55	16,46	2,22
Pair 6	Land size owned by females	3,92	55	3,83	0,52
	Land size owned by males	15,35	55	25,77	3,48
Pair 7	Area planted previous season by females	2,06	52	2,73	0,38
	Area planted previous season by males	6,49	52	8,06	1,12
Pair 8	Number of oxen owned by females	5,22	54	4,23	0,58
	Number of oxen owned by males	5,78	54	5,34	0,73

CONCLUSIONS

This research focused on the socio-economic status of farmers and challenges related to the use of various sources of farm power to grow maize (other crops were not considered in this study) in eastern Caprivi in Namibia. While it was recognised that farmers in eastern Caprivi grew a number of field crops, such as sorghum, millet and beans, the primary crop grown was maize. It was a culturally preferred food, and was much more marketable when there was a surplus to sell. The productivity of the cropland, the size of the fields and other factors affecting the yields were largely based on farmer recall. However, there were substantial field checks and discussions with family members to obtain the most accurate figures. Factors such as the loss of crops to wildlife were noted, but not accounted for, as this study looked at what was harvested, not what was lost.

In this study (Table 2) many results resembled those of Ashley & LaFranchi (1997) who used three categories of farms: less than 1 ha, 1–2 ha, and over 2 ha, with approximately 1/3 of Caprivi farmers in each category. They found that draught oxen were used by approximately 80 % of the farmers, and similarly found that the typical approach by the majority of small farmers was to make sure that family land was protected by using it, and relying largely on low input and low output systems of management to reduce financial risk of crop failure or loss.

The results show that there are no significant differences between male and female farmers (even at a 30 % significance level). Statistically male and female farmers have the same productive capacity. This implies that there was no significant difference among female and male farmers in terms of production and productive capital in eastern Caprivi. It further signifies that the use of draught animal power by women in eastern Caprivi is considerable and that the practice is equitably accommodated in this area of communal agriculture. Furthermore, the area is well situated to contribute significantly to poverty reduction.

Therefore, government strategies and expenditure should continue to promote this type of sustainable agriculture amongst smallholder farmers.

In addition, Ashley & LaFranci (1997) found the use of tractors and commercial inputs, such as fertilizer, to be low, largely because of the farmers using a low-risk farming strategy. Small farmers in particular minimised financial risk of crop loss due to drought or wildlife and other pests, by minimising cash costs and using local seeds, oxen and family labour. This 2008 study found similar results.

Finally, Ashley & LaFranchi (1997) stated that the most basic food requirement for a typical Caprivi household of six was approximately 20–28 bags of maize per year. On average, this benchmark was met in our study (Table 2), but the data were skewed by the high production levels of the tractor farmers. In fact, most of the households in Kabbe, and many of the households with smaller plots, were not able to meet this basic food requirement.

This study indicated that farmers in much of eastern Caprivi are facing numerous challenges to improve crop production. The most successful farmers all have considerable off-farm income, and a greater tolerance to risk from weather, wildlife, rising fuel prices, animal disease and feed shortages for livestock. Small farmers with little off-farm income have more to lose from wildlife damaging crops, high cash-input costs, great risk to any cash investment such as tractor purchase or hire, improved seeds, and fertilizer. Given current trends in expanding conservancies and increases in elephant numbers, it will remain difficult for future generations to grow crops and improve food production in eastern Caprivi, without some change in the financial risks involved. Eastern Caprivi has great potential as a crop-growing area. However, without continued technical, management and financial support, particularly compensation for crop damage, increased crop production in the area will be limited. There is a crucial need to increase the production and management proficiency of farmers through training programmes.

Government's major development objectives cited in its First National Development Plan (NPC, 2001), are the promotion of growth and employment, and the reduction of poverty and inequality. Government policies should promote equity, efficient resource use, and sustainable natural resource use. The high level of participation of women in draught animal power in Namibia, specifically in the eastern Caprivi region where the practice is culturally accepted and encouraged, showed that these women are in a position to contribute to Namibia's food security. Government strategies and funding should continue to promote this form of sustainable agriculture amongst smallholder farmers, to reduce the amount of physical labour involved in hand-tilling and to reduce poverty. However, additional policies that encourage and reduce the risk of draught oxen ownership may be necessary to make farming a more appealing occupation. If these are effective, draught animal power (DAP) could be an important motivator to encourage farmers to remain on the land rather than to migrate to the towns.

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