The management and use of draught animals by smallholder farmers in the former Transkei and Ciskei, Eastern Cape Province, South Africa

D. H. O'Neill, J. Sneyd, N. T. Mzileni, L. Mapeyi,
S. H. Israel and the late M. Njekwa

Centre for Tropical Veterinary Medicine, University of Edinburgh,
Animal Traction Centre, University of Fort Hare
Silsoe Research Institute, Bedfordshire, UK

1999

The management and use of draught animals by smallholder farmers in the former Transkei and Ciskei, Eastern Cape Province, South Africa

D. H. O'Neill[1], J. Sneyd[2], N. T. Mzileni[2], L. Mapeyi[2], S. H. Israel[3]
and the late M. Njekwa[2]

[1]*Silsoe Research Institute, Wrest Park Silsoe, Bedfordshire, MK45 4HS, UK*

[2]*Animal Traction Centre, Department of Agronomy, University of Fort Hare, P.B. X1314, Alice 5700, South Africa*

[3]*Centre for Tropical Veterinary Medicine, University of Edinburgh, Easter Bush, Roslin, Midlothian, EH25 9RG, UK.*

Centre for Tropical Veterinary Medicine, Draught Animal Power Technical Report 1

1999

DFID Department for International Development

Livestock Production Programme Project R6609 - Feeding draught cattle in semi-arid areas - University of Edinburgh, Easter Bush, Roslin, Midlothian, EH25 9RG, UK

ACKNOWLEDGEMENTS

We are grateful to Dr R.A. Pearson for assistance in writing the report, to the Agricultural and Rural Development Research Institute (ARDRI), Fort Hare University for providing introductions to some of the farmers interviewed, to Stuart Landsley of CTVM for help in preparation of the report and the British Department for International Development (DFID) for financial support provided through their RNRRS Livestock Production Programme (grant no R6609).

The information and views expressed are entirely the responsibility of the authors and are not attributable to any of the organisations involved.

The results described in this report have been accepted for publication in the journal "Development Southern Africa".

Front cover:

The photograph on the front cover is of Mr Benjamin Kedama with his draught oxen, talking to Mr Nkosi Mzileni from the project on his farm in Esixekweni, Eastern Cape Province.

The photograph was taken by Bruce Joubert. We are grateful to him for permission to reproduce it here.

SUMMARY

A survey was undertaken on the use and management of draught animals in the Eastern Cape Province. Information was elicited through semi-structured interviews at 94 rural households, most of which owned livestock. Each household owned averages of 5.4 oxen, 8.3 cows and 1.0 horses. Animals were used for draught by 79 % of the farmers; only 22 % used cows for draught and only 12 % used equids for draught. The commonest uses were ploughing and harrowing (76 %). Horses were kept mainly for riding. Most farmers preferred animals to tractors for crop production tasks (eg 85 % for ploughing), but many farmers (74 %) used tractors occasionally; only 18 % had never used tractors. The preferred span size for ploughing was six animals and 38 % of the farmers used spans of six. Supplementary feed was given by 50% of the farmers but only 4 % fed working animals; the priority was for cows in milk (44 %), for the economic return. The commonest feed supplements were home-grown maize stover and purchased lucerne. Most farmers (91 %) believe that it is profitable to own draught animals but 97 % were concerned about the risks of drought, theft and disease.

INTRODUCTION

Despite the promotion of motorised forms of power for use in crop production and transport in South Africa, tractors remain an unaffordable and uneconomic technology for many farmers with small land holdings. These farmers have the option of cultivating their crops using manual labour alone, or in combination with animal power. A recent appraisal covering a large part of South Africa indicated that the use of animal power in South Africa is widespread on smallholder farms, and is even increasing in some areas of the country (Starkey, 1995). This increase is occurring despite animal power being perceived by many of the agricultural institutions in the country to be an outdated and impractical technology for agricultural production.

In other parts of southern Africa (e.g. Zimbabwe and Zambia) animal power plays a significant role in crop production in smallscale agriculture and farmers value the contribution that draught animals make on their farms. Major production problems reported in these areas include a shortage of animal power, due mainly to a shortage of large cattle and to the feed resources to maintain them (Barrett, *et al*, 1992). Another constraint is considered to be the lack of suitable implements to use with the smaller animals (cows and donkeys) that are now being worked to supplement the power provided by oxen (Barrett *et al*, 1992).

There is little detailed information on smallholder farming systems in South Africa, particularly those appropriate for draught animal inputs. The present study was undertaken to find out the attitudes to draught animal ownership, how local smallholder farmers typically use and manage their draught animals and to gain some insight into their socio-economic circumstances. A survey was undertaken of farmers and households in 19 districts in the Eastern Cape Province of South Africa, with varying levels of animal and draught animal ownership (Anon, 1996) between August and November 1996.

2. MATERIALS AND METHODS

The survey was located in the former Ciskei (districts - Melani, Ngwenya, Debe Marela, Koloni, Peuleni, Upper Ncera, Chamama and Dishi) and Transkei (districts Lady Frere, Upper Ndonga, Ngqweleni, Maxelegweni, Butterworth, Gwegwe, Xwili, Centuli, Nqunge, Thuthura and Qamata), areas where smallholder farming using draught animal power predominates. Households in the 19 districts were identified by local extension officers for participation, but not specifically on the basis of ownership of draught animals.

The survey team, consisting of two to four people, visited 94 households over a period of four months from August to November 1996 where they conducted semi-structured interviews. At least two of the team members spoke fluent Xhosa, including the team leader, who lead the discussion. The interview was wide ranging and based on a questionnaire covering four main areas - demography, socio-economics, animal factors and crop factors. The survey was designed to yield both factual information and matters of opinion. The questionnaire contained 104 questions, with which the

team leader was totally familiar, and the other team members present recorded the information elicited from the farmers on to the questionnaire as the interview progressed.

The information, which ranged from binary (e.g. yes/no) to simple numeric (e.g. how many oxen do you own?) to open-ended (e.g. why is it profitable/not profitable to own draught animals?), was coded before analysis. During coding the information was incorporated into 181 response boxes, each of which was coded into as many categories (represented by integers) as were needed to cover the responses. For example, box 2 contained the response to question 2 'area or district' and was coded 1 to 19 to cover each of the districts surveyed.

After coding the data were collated on a spreadsheet (Excel, Microsoft Corporation, 1995) and analysed using standard data reduction techniques and statistical analyses (eg chi-squared and t-tests) where appropriate.

3. RESULTS

3.1 Use of draught animal power

Of the 94 farmers interviewed, 79 % were currently using draught animals. Seventy-four per cent of farmers had at some time made use of tractors for land preparation, although three had only used a tractor for the sole purpose of breaking new ground. Seven % did not respond. Of the 17 % of farmers not using draught animals, all but one (hand labour) made use of a tractor in crop production. However none of the farmers interviewed owned a tractor, they tended to hire or borrow when land preparation was required.

3.2 Land holding and cropping area

It was not possible to obtain the sizes of individual land holdings of farmers, as much of the grazing land was communally owned within each community. Most farmers considered their land holding to be the total grazing area owned by the immediate community plus the individually owned cropping areas in the community. The size of these total areas ranged from 345 ha to 15000 ha, with 40 % of farmers reporting total community land holdings of 1000 ha and only 25 % reporting land holdings of less than this. On 71 % of the farms, farmers classified 25 % of the available land as crop land. Other farmers generally cropped more than this, up to 50 % of the available land. There was no significant difference in land holdings or proportion cropped by farmers owning or not owning draught animals.

The majority of farmers (62 %) believed that they had enough land and only 22 % said they did not have enough. Most of the latter farmers were from the districts of Upper Ndonga and Qamata. Most of the remaining farmers (15 %), who responded that they did not have quite enough land, were mainly from Melani, Peuleni and Maxelegweni districts.

3.3 Demographic and economic circumstances

In the households interviewed eight were female-headed. All heads of household lived permanently with their families. The ages of the heads of household ranged from 20 to 94 years, with more than half being over 60 years of age. The sizes of the households ranged from 2 to 18 people, with the majority being 7 or more (Table 1). Many of the households comprised members working away (Table 1). No significant differences in these characteristics were seen between those households using animal power and those that relied on tractor power.

Table 1: Composition of the 94 households surveyed in the former Ciskei and Transkei. The number of observations of each value is given in parenthesis.

Variable	Minimum	Maximum	Mean	Median	Mode
Age of head of household (yr.)	20 (1)	94 (1)	61,7	63 (2)	68 (7)
Household size	2 (1)	18 (1)	8,0	7 (14)	6 (16)
Household members working away	0 (24)	9 (1)	2,2	2 (15)	0 (24)
Household children at school	0 (1)	13 (1)	4,0	4 (20)	5 (20)

In most households (84 %), women helped with the management and use of the animals and with caring for crops (86 %). Regarding the role of women, the commonest response was 'housewife' (48 %), although what this entailed seemed open to interpretation (e.g. helping to grow food for the family could be part of a housewife's duty). A further 41 % of the responses indicated that the women undertook general farming activities in addition to their roles as housewives. However only 3 % of the responses indicated that women did ploughing. The predominant agricultural activities of women which were associated with field work were a combination of planting, weeding and leading animals.

The use of children to help with draught animals were even more widespread, only 5 % of respondents indicated that children did not help, although they were not necessarily the only helpers. In the few cases where children did not help, assistance was provided by hired hands or neighbours, or there was no help at all.

Examination of the eight female-headed houses as a sub-group, did not reveal any differences from the above pattern for the group as a whole. In one of the female-headed households children did not help with the draught animals, only hired hands, and women did not become involved in crop care.

The end of a day spent threshing beans in Esixekweni

Ploughing the land in preparation for a maize crop in Chamama, Amatole Basin

3.4 Crops and cropping practices

The main crop grown by all farmers was maize. For the 57 farmers for whom the information is available, 22 % did not sell any of their crop, whilst 50 % sold about 25 % of their crop. Additional crops grown were beans and/or peas (86 farmers), squashes (79 farmers), potatoes (64 farmers), and vegetables (3 farmers). Two farmers in Maxelegweni grew millet and three farmers in Qamata grew stock feed (one farmer grew rain-fed barley and two grew lucerne under irrigation). The majority of farmers (79 % of those interviewed) used manure to fertilise their crops either by itself (40 %) or in conjunction with inorganic fertiliser (39 %). Only 3 % of those interviewed used inorganic fertiliser alone. Fourteen % of farmers interviewed did not respond. Eighty-two percent of the farmers reported that their yields were satisfactory and a further 5 %, in the Qamata district, reported that their yields were satisfactory because of irrigation. Only 2 % reported unsatisfactory yields. There were no differences between farmers currently using draught animal power and those that did not

All the farmers for whom the relevant responses are available reported that they weeded their crops. Most of the weeding was carried out by hand hoes and cultivators (83 %), with only a further 1 % and 6 % respectively being done by cultivators and hand hoes alone. Thus, draught animals clearly play a major role in establishing and caring for crops. No farmers reported the use of herbicides. Farmers used the residues from their crops in various ways (Table 2).

Table 2 : The different uses of crop residues and the percentage of farmers carrying out each activity (n= 84)

Activity	Leave on field	Collect	Feed to animals	Use as fertiliser	Sell
Number of farmers	42	36	79	3	1
Per cent of farmers	50	43	94	4	1

3.5 Ownership of ruminants and equids and use for draught.

All farmers interviewed owned some ruminants or equids. Eighteen farmers owned more than 100 ruminants (mainly sheep and sometimes goats, in addition to cattle). Two of the farmers with over 100 ruminants had more than 50 cattle. At the other end of the scale, two farmers interviewed owned no cattle or horses, only small ruminants. One farmer kept two horses, which he used for draught, but no cattle and one farmer kept only oxen with his sheep and goats. All other farmers interviewed (90) kept at least one cow (Table 3). Oxen were kept by 86 % of the farmers interviewed and bulls by 29 % of the farmers (22 farmers keeping one bull each and four keeping two bulls). All except eight farmers, located in Dishi and Upper Ndonga districts, kept some small ruminants. Farms on which draught animal power was used had significantly more cattle than those farms not using animal power (Table 3). One of the farmers not keeping cattle used a tractor for land preparation and the other relied

on manual labour. The use of oxen and bulls for draught was reported by 67 % of the farmers. Twenty-two % of farmers used their own cows for draught, although 52 % of farmers said they would be happy to use cows for draught. This willingness to use cows was similar over the districts surveyed. Eighteen of the farmers using cows spanned them with oxen to make up the spans, two farmers borrowing oxen from neighbours to do this. Three farmers used only cows without spanning them with oxen, one using them to complement the work done by his horse.

Table 3: A comparison of ownership of oxen (total 508), cows (779), bulls (30) and horses (96) in households using draught animal power (+DAP, n= 75) and those that were not (–DAP, n= 17)

Animals	Oxen		Cows		Bulls		Horses	
	+DAP	-DAP	+DAP	–DAP	+DAP	–DAP	+DAP	–DAP
Average number per household[1]	6,19	2,44**	9,09	5,39*	0,36	0,17	1,15	0,56
Median	5	1	6	3	0	0	0	0
Mode	3	0	6	2	0	0	0	0
Max. per household	50	14	98	15	2	1	13	3
Min. per household	0	0	0	0	0	0	0	0

[1]Difference within each animal type between +DAP and –DAP farmers significant at P <0,05 *, P<0,01 **

Mixed breeds of cattle (crossbreds) were kept by 97 % of the farmers interviewed who kept cattle, six farmers kept purely indigenous animals (Nguni). Farmers using cattle for work mainly used the mixed breeds of cattle (91 %), but 3 farmers used the western breeds and 5 used indigenous breeds.

Thirty-four farmers (36 %) kept horses (Table 3), 11 of these farmers keeping only one horse and 9 keeping two horses. Horses were used mainly for riding and cultural activities, but 10 of the farmers keeping horses (11 % of all farmers interviewed) used them for draught work. Two farmers in Qamata district owned five donkeys and two donkeys respectively, and three farmers in Melani district owned two, five and two donkeys respectively. Four of the five farmers used the donkeys for carting mainly firewood, water and feed. The other does not use his pair for work. The farmer owning five donkeys in Melani uses four of them for all cropping practices including ploughing as well as for transport. He does not use the three oxen he has for work. Only two farmers surveyed kept mules, one of these was one of the donkey owning farmers in Qamata, who kept three horses and a mule. He used these for carting but not for field work, preferring a tractor. The other mule owner kept two mules but no cattle in Ngqweleni district. He used the mules for both field work and transport with a cart. It appeared that farmers not using draught animal power were either farmers with some of the larger animal holdings (four farmers) or those who kept few large ruminants (usually cows), few oxen and rarely equids.

3.6 Implement ownership

Four farmers currently using draught animal power did not own any implements, two others owned only a sledge each. Ten farmers not currently using draught animal power provided information on implements. Of these two did not own any implements, but the other eight owned one or more ploughs, with a harrow, and/or cultivator. Two seeders and a cart were also owned in this group. Results from all farmers responding were pooled and are given in Table 4.

Table 4: Ownership of implements - percentages of farmers owning none, one or more implements

Implement type	None	One	Two	Three	Four	Five	Number unspecified
Plough	13	24	8	5	0	0	51
Harrow	71	17	5	0	0	0	7
Seeder	52	17	3	2	0	0	24
Cultivator	23	19	7	5	2	3	41
Cart	71	18	5	0	0	0	6
Sledge	37	60	0	1	0	0	1

The most commonly owned implement, not surprisingly, was the plough, which was sometimes also used as cultivator between maize rows. Few farmers owned seeders or harrows, and sledges were more commonly used for transport than carts, although sledges were usually used for transport around the farm. No farmers owned a tractor although most (74 %) had used them occasionally. Forty one % of farmers currently using draught animals said implements were available locally but the other 59 % said implements were difficult to obtain and were not available locally.

Seventy-eight % (59 farmers) of the current draught animal users hired or borrowed animal-drawn equipment when needed. Although almost half (44 %) of the farmers who were not using draught animal power did not respond, those who did hire or borrow equipment when needed were in the same proportion. Of the 67 farmers who did hire or borrow equipment, 16 (24 %) hired or borrowed ploughs, 41 (61 %) harrows, 43 seeders (64 %), 23 (34 %) cultivators and four (6 %) carts. Several farmers also reported hiring or borrowing some or all of the animals needed for work, usually from relatives.

The commonest uses of draught animals were for ploughing and harrowing (76 %). The use of animals for transport (excluding riding) was rather limited, with 46 % of the farmers not using their animals for this purpose. Only 36 % of the farmers owned a cart and, of the remaining 64 %, 24 % did not own a sledge. The most commonly reported uses for a cart were for the collection of firewood alone (67 %) or water and

firewood (29 %). Transport of people (1 %), goods for pay (1 %) and a general combination of all (2 %) were given as the other uses.

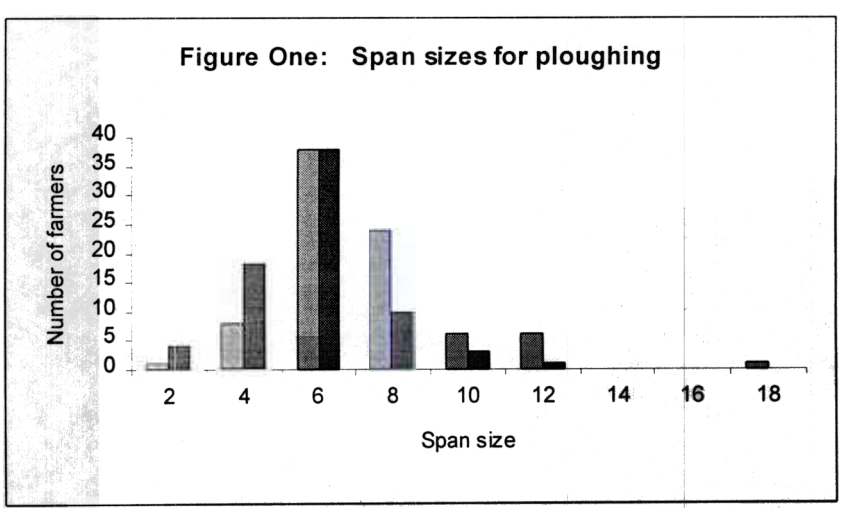
3.7 Working practices

The majority of farmers responded that they preferred to use animals rather than tractors for their cropping operations (Table 5).

Table 5. Preferences of farmers (number and per cent) for tractor or animal power in cropping practices

	Ploughing		Harrowing		Seeding		Cultivation		Transport	
	n	%	n	%	n	%	n	%	n	%
Animals	81	86	81	86	85	91	85	91	57	60
Tractors	9	10	8	9	6	6	6	6	7	8
Neither	4	4	5	5	3	3	3	3	30	32

There was a difference between preferred and actual use of span size for ploughing with cattle as shown in Figure 1.

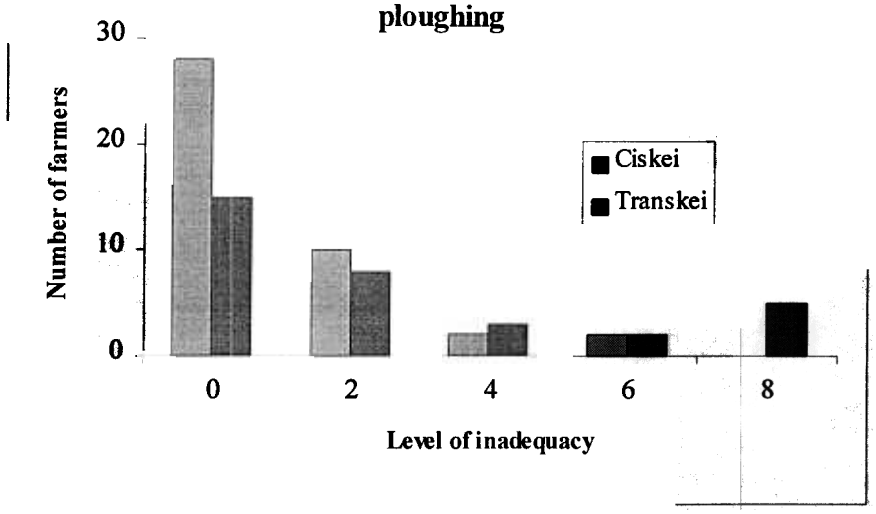


Most farmers preferred to span 6 animals and actually did so. Farmers in the districts of the former Ciskei were generally more satisfied ($0,05<p<0,01$)[1] with the number of animals they were using for draught than the farmers interviewed in the former Transkei, as shown in Figure 2. The farmers interviewed in Ngqweleni and Maxelegweni were least satisfied with the number of animals they had available for work. Most of them wanted more oxen, and this is where the need for 8 more oxen

[1] Chi-squared on difference between mean shortages, with negative binomial distributions fitted to Ciskei and Transkei data (Ross, 1987).

predominated, although the numbers of cattle owned did not appear to be different in these two districts from elsewhere.

Figure Two: Farmers with inadequate oxen for ploughing



Farmers used the same span sizes for harrowing as for ploughing. However, only one pair of animals was used for cultivation and seeding by all farmers currently using draught animals. For carting all farmers also used one pair of animals, except for three farmers using four animals and two using eight animals. One farmer, who had a 4-wheeled wagon, used a span of 12 animals to pull it. Animals were worked both in the mornings and the afternoons as required. The 10 farmers using horses for work generally used them for harrowing, seeding, cultivation and carting. Ploughing was done either by oxen or a tractor. The horses worked in pairs or singly.

Eighty-one farmers responded to the question on training. Animals were trained by the head of the household alone (22 %), or with assistance from children, spouse and / or brothers (74 %). On only three farms were the animals trained by hired hands (4 %). Ninety-three % of the farmers started training their oxen at between 2 to 3 years old.

All farmers except one said they worked their animals until they were fully-grown, the exception was one farmer who said when he had a group of young oxen fit to be worked, then he would sell the older ones. Animals too old for work were used in local customs by 80 % of the farmers before being sold or eaten (100 %) or just eaten (3 %).

3.8 Feeding and management practices for livestock

All farmers interviewed grazed their animals on communal grazing land except two; one of these paid
for grazing on neighbouring farms and the other had leased a government farm and so did not graze his animals on the communal land. All grazing land was natural pasture. When asked to assess the quality of their grazing land, 22 % of farmers said it was very good, 19 % said good, 16 % said fair, 13 % said poor and 30 % of farmers said very poor. A score from 1 (very poor) to 5 (very good) was given to these

assessments of quality. Comparing these ratings for the districts in Ciskei and Transkei showed that the grazing was considered better ($0,05>p>0,01$)[2] in the former Ciskei than Transkei. For example, of the 28 farmers who assessed the grazing as very poor, 20 were in the former Transkei and 8 were in Ciskei.

Half the farmers interviewed supplemented the grazing with other feedstuffs. Irrespective of whether farmers did feed extra or not, 51 % responded that their priority for feeding would be cows with calves. Only 4 % responded that their priority would be for working animals, whilst 26 % responded that any animals in poor condition, usually because of drought, would be a priority for extra feed. The reasons for these priorities were given as milk production (44 %), better prices at market (14 %), work output (5 %) and survival (2 %). Supplementary feeding was provided 'when necessary' (75 %) and 'in drought periods' (21 %). Stover was the most commonly fed supplement, usually in combination with lucerne (Table 6). Because of the stated priorities, this supplement would be fed mainly to milking animals rather than those used for work.

Table 6: Number and percentage of farmers feeding the different types of feeds given to livestock to supplement grazing (n=47)

Type of feed	Stover	Lucerne (purchased)	Lucerne (home-grown)	Dairy concentrate
Number of farmers	41	35	4	5
% of farmers	87	74	9	11

That 43 % of respondents collect stover to feed to animals (see Table 2) supports the finding in Table 6 that nearly all (87 %) the farmers who do give their livestock supplementary feeding (n=47) use their home-grown stover.

Access to water for livestock was generally close, with 34 % of farmers having a supply available to the animals on farm and 27 % having water within 1 km. Twenty-seven percent of farmers regarded their access to water for livestock as distant.

All farmers reported the use of vaccination for disease prevention, with two farmers also using traditional methods in addition. Spraying and dipping was used by all respondents to cope with ticks and external parasites. Although farmers reported the presence of worms in their livestock, no farmers acknowledged the use of wormers. Most farmers (98 %) used antibiotics to treat their livestock for diseases with some farmers (81 %) reporting the use of vaccines. Few farmers (3 %) reported the use of home remedies to treat livestock diseases.

3.9 Farmers' opinions on draught animals

Most of the farmers interviewed (91 %) believe that it is profitable to own draught

[2] Pearson chi-squared on a 2x3 contingency table.

animals. Of the remainder, only one said that it is not (this farmer had inadequate oxen and spanned his cows), 3 said that they did not know and no response was recorded from six farmers. The main reasons were the low outlay (67 %) associated with their use, have low running costs, being cheap to operate (14 %) and are income-generating (11 %).

When farmers were asked if draught or other animals fetched higher prices, 57 % responded that draught animals are less valuable and 32 % responded that they are more valuable. This latter opinion seemed to be prevalent in the Peuleni, Dishi and Xwili districts.

Most farmers believe that draught animals should be of relatively small frame (86 %) typical of the local, indigenous mixed breeds. Nevertheless, amongst the few farmers who did specify a breed, the Nguni was clear favourite. The main reason for the farmers' choices was given as 'hardiness' by 91 %.

In comparing the use of tractors and draught animals, the farmers gave wide-ranging responses. The most commonly held views were related to the comparative speeds and costs of each power source. Eight-five percent of farmers interviewed suggested *'tractors are fast but are costly'* and *'oxen are slow but save money'*. Additional comments made by 6 farmers were *'tractors can plough deeper'*. Two farmers said '*communal grazing is free*', two more farmers said '*tractors can work in all conditions*', while a further two farmers said '*animals are readily available, in contrast to a hired tractor*' and '*tractors can cause compaction*', respectively.

In addition to draught work, animals may provide four useful outputs: milk, meat, skin/wool and manure. Of these outputs, a large majority of farmers (88 %) reported that they utilised all four. However, a small number of farmers (10 %) reported that manure was not a useful output to them.

The survey also tried to elicit what farmers like about farming and what are the major risks to their success as farmers. The reported benefits of being a farmer were satisfaction, prestige and status and showed very clearly the importance of job satisfaction. The risks were categorised into the controllable and uncontrollable threats. Of the controllable threats, the greatest were thieves and diseases, 92 % and 88 %, respectively. Drought constituted the greatest uncontrollable threat, reported by 97 % of the farmers.

4. DISCUSSION AND CONCLUSIONS

The smallholder farmers interviewed used and, for the most part, relied on draught animal power for their farming activities. Whilst this sample of farmers interviewed may not represent the poorest resourced members of the community in the districts surveyed, it was apparent that amongst livestock farmers it was representative of the smallholder farmers present in the area. Starkey (1995), in a rapid rural appraisal of draught animals power in South Africa, observed that in Transkei 40-80 % of farmers used draught animal power for weeding and planting and at least 30 % used animal

power for ploughing. They found that cattle were the animals most commonly used for work.(Starkey, 1995).

In the present study, cattle were the most important source of animal power, with a considerable number of farmers (over 50 % of those interviewed) willing to use cows for crop production. Although there are virtually no statistics on this, the number of cows used for work is probably increasing in sub-Saharan Africa (see for example Jabbar, 1993, Starkey, 1993), and in Zimbabwe, for example, Chawatama & Ndlovu (1995) reported an increase in the use of cows for draught as a result of drought. Moreover, Ndlovu & Francis (1997) commented that the use of cows for traction could be considered as a barometer of draught animal power shortage. The acceptance of draught cows found in the present survey seems higher than might be expected from the situation elsewhere, but it may well be that this is due to differences in the sizes of the breeds and crosses used for work by smallholder farmers in the respective countries. The breeds and crosses used for work in the districts surveyed were generally large compared to the size of the breeds and crosses used in Zimbabwe, where the Zebu is prevalent for example (Ndlovu & Francis, 1997). Hence the generally smaller female animal would be more acceptable in areas such as the Eastern Cape than in areas where working breeds are smaller. The use of cows may also be a reflection of the farmers' perceived shortage of draught power. Horses mentioned in the survey were generally kept for riding and ceremonial purposes, but some farmers also used them for work, but not in the numbers found for working cattle.

The circumstances which may predispose the farmers Eastern Cape to use draught animal power can be described in three categories:

4.1 Resources

The survey has confirmed that the semi-arid zone livestock-crop production systems typical of the Eastern Cape are generally livestock oriented. There was a wide availability of animals, especially cattle, potentially suitable for draught work. Most farmers expressed a preference for animal power over tractor power, although the majority of farmers had used tractor power when they considered it necessary, usually for opening up fallow ground. Farmers seem to be well resourced, relative to smallholders in neighbouring countries, since tractor power was available and span sizes were generally larger (4-8 animals) than those of 2-4 typically found elsewhere in sub-Saharan Africa (Dibbits, 1993, Chawatama & Ndlovu, 1995). Also, vaccines and antibiotics were used to maintain animal health by most of the farmers. Implements were not obviously in short supply although some farmers felt access could be improved. Grazing supplied most of the nutritional need for livestock for most of the year, supplemented by crop residues, although few farmers seemed prepared to purchase supplementary feeds for their draught animals, preferring to supplement cows first. This may be because the value of the working animal is less readily converted to cash.

4.2 Economic factors

The majority of farmers interviewed, most of them current users of draught animal power, believed it was at present profitable to own or use draught animals, the main

reason (67 %) being the low capital outlay. Thus, draught animal power was more economically attractive at present than tractor power in the smallholder farming community, amongst those farmers owning livestock. It was noticeable that one farmer with limited numbers of livestock used manual labour to work his land. Many farmers, including those not currently using draught animal power, stated that tractors were fast but costly, whereas animals were slow but a cheap form of power. Many appreciated that animals provide other benefits in the forms of milk, meat, manure and skins whereas tractors are associated with expensive overheads, such as fuel, parts and servicing. No farmers raised the issue of the cost of caring for animals. Either this was considered insignificant or farmers did not regard the care of their animals as warranting any expenditure.

For supplementary feeding, the preference was to give extra to cows in milk rather than to working animals (only 4 %), as this was economically more advantageous. The opinion on whether draught animals were more or less valuable than other animals was more evenly divided, with 32 % believing that they were and 57 % that they were not. This suggests that at least some farmers would be prepared to consider management interventions that might improve work performance or health and longevity of their working animals.

4.3 Social factors

Animals are associated with many traditions and customs, particularly *lobolo*, and so are fully integrated into the farming culture in Eastern Cape (Elliot, 1995; Panin & Ellis-Jones, 1994). Hence, the farming practices in the Eastern Cape are unlikely to become separated from the use of livestock and its interaction with crop production. The farmers have a long history and sound understanding of using animals and this has been reflected by their general preference for using draught animal power rather than tractor power, for which there seems to be less affinity. Almost every farmer (94 %) reported enjoying the satisfaction of farming (and hence by definition their association with livestock) but perceived drought (97 %) and the risks of theft and disease (also 97 %) as being the greatest threats to their success.

The current management and use of draught animals in the areas surveyed in Eastern Cape Province indicates that for those smallholder livestock farmers wishing to maintain, or increase their crop production, draught animal power at present is an appropriate technology to use. It therefore merits promotion in the region.

5. REFERENCES

Anon, 1996. Land use systems research programme. ARDRINEWS, Agricultural and Rural Development Research Institute, University of Fort Hare, Alice, December 1996, 4-14.

Barrett, JC, O'Neill, D.H. and Pearson, R.A., 1992. Strategic research needs relating to draught animal power: a diagnostic study in Zimbabwe. Working Paper of the Draught Animal Working Group (DAWG), ODA Livestock Production Programme, NRI, Chatham, 76pp.

Dibbits, H.J., 1993. Human and draught animal power in crop production: past experiences and outstanding problems. In O'Neill, D.H. & Hendriksen, G. (eds) *Human and draught animal power in crop production.* Proceedings of the Silsoe Research Institute / CEC Workshop, January 1993, Harare. FAO, Rome, 11-25.

Chawatama, S and NDLOVU, L R , 1995. Some factors affecting draught power output in the smallholder sectors of Zimbabwe. In Ellis-Jones, J, Ndlovu, LR, Pearson, A & O'Neill, D (eds) *Improving the productivity of draught animals in sub-Saharan Africa.* Proceedings of Workshop at Matopos Research Station, Bulawayo, September 1995. Overseas Division Report OD/95/20, Silsoe Research Institute, Silose, UK. 102pp

Elliot, A., 1995. *The Xhosa and their traditional way of life*. Struik Publishers (Pty), Cape Town. Sixth impression. ISBN 0 86977 540 5

Jabbar, M.A., 1993. Research on cow traction in Africa: some lessons to be learned. World Animal Review, 74/75, 58-63.

Ndlovu, L.R. and FRANCIS, J., 1997. *Performance and nutritional management of draught cattle in smallholder farming in Zimbabwe*. University of Zimbabwe Publications, Harare. 99pp ISBN 0-908307-62-4

Panin, A. & Ellis-Jones, J., 1994. Increasing then profitability of draft animal power. In Starkey, P, Mwenya, E & Stares, J (eds) *Improving animal traction technology*. Proceedings of the first Workshop of the Animal Traction Network for Eastern and Southern Africa (ATNESA), Lusaka, January 1992. Technical Centre for Agricultural and Rural Cooperation (CTA), Wageningen, The Netherlands, 94-103. ISBN 92-9081-127-7

Ross, G.J.S., 1987. MLP Manual. NAG, Oxford

Starkey, P.,H. 1993. Animal traction: a worldwide view with a small farmer perspective. In O'Neill, DH & Hendriksen, G (eds) *Human and draught animal power in crop production.* Proceedings of the Silsoe Research Institute / CEC Workshop, January 1993, Harare. FAO, Rome, 83-86.

Starkey, P. H., (Ed), 1995. *Animal Traction in South Africa: Empowering rural communities*. Development Bank of Southern Africa, Halfway House, South Africa, 160p. ISBN 1-874878-67-6.