



People, Land and Livestock

*Proceedings of a Workshop on the
Socio-Economic Dimensions
of Livestock Production in the
Communal Lands of Zimbabwe*

Edited by
Ben Cousins

PEOPLE, LAND AND LIVESTOCK

**Proceedings of a Workshop on the Socio-economic
Dimensions of Livestock Production in the Communal Lands of
Zimbabwe, held at Great Zimbabwe, Masvingo, 12th to 14th
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**THE EFFECT OF OX SHARING ARRANGEMENTS ON THE SUPPLY
AND USE OF DRAUGHT ANIMALS IN THE COMMUNAL AREAS
OF ZIMBABWE - PRELIMINARY FINDINGS**

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1. INTRODUCTION

Livestock, particularly cattle, form an important link in peasant farming systems through the provision of inputs for crop production. Sixty percent of the national cattle herd is found in the communal areas (Smith 1988) and ninety percent of the farm power comes from animal traction. The major source of draught power for the communal farmer is cattle and the preferred draught animal is the ox, though cows are increasingly used as draught animals. Donkeys are also an important supplier of draught power especially in natural regions IV and V. Since the evolution of permanent agriculture at the end of the nineteenth century the productive utility of cattle as suppliers of draught power and manure has grown steadily in importance and the economic role of cattle is now more pronounced than the socio-cultural roles. Other contributions of cattle to peasant economies are transport, meat, milk, capital and a relatively liquid asset for disposal in times of cash needs (Steele 1981). Cattle are also important for paying lobola and performing ceremonial functions (Bourdillon 1982; Theisen and Marasha 1974). Though the role of cattle as a productive resource has increased in importance, the socio-cultural roles have not been forgotten. They do conflict with the economic roles in some cases, especially where herds fall below the required numbers to form an adequate draught team. Danckwerts (1974) was one of the first researchers to recognise that the multiple roles of cattle

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meant that productivity could not be assessed by direct comparisons between communal and commercial beef production.

2. THE DRAUGHT POWER PROBLEM - AN OVERVIEW

Shortage of draught power ranks second after land shortage as a constraint to agricultural production. The draught power problem in Zimbabwe's communal areas is more acute for the 30-50 percent of the households who do not own sufficient draught animals and have to delay planting while they wait for draught animals to be made available. Lack of timely access to adequate draught power appears to limit the development of many farming systems not only in this country but in local farming systems from Sudan to Lesotho. Reports by Bratton (1984), Mombeshora (1985), Mudimu (1983), and Shumba (1984; 1985) emphasise the problem of the shortage of animal draught power and the adverse effects of lack of draught power on crop production and peasant welfare. Chakaodza's study (1986) reveals that in Rushinga 62,2 percent of the households do not own cattle, and in Chikwaka 43,2 percent are non-owners (Henson et al 1983). In former tsetse-infested areas percentage ownership of cattle is much lower. Avila (1985) reveals that draught shortage is more critical in households headed by widows and young families. Changes in status mean that women may consider buying cattle for themselves. Bratton (1984) sums it all up when he says, "The draught power problem is a central issue particularly among agricultural economists," and Blackie (1982) stresses that research into livestock issues must be a top national priority.

The animal draught power problem is essentially one of excess demand over limited supply. The source of the problem can be

traced to a number of factors, which can be summarised as follows:

1. Inadequate draught animal supply to meet the increased draught power demand. Cattle numbers have been increasing at the rate of 2,7 percent per annum but this increase has not matched the population rate of increase. Between 1961 and 1977 the number of communal cultivators increased by 88 percent from 359 000 to 675 000. Similarly, during that same time total area under cultivation increased by 91 percent from 1,5 million ha to 2,2 million ha at the expense of grazing areas (Shumba 1984). Consequently draught for tillage and manure for fertility have both declined (LeRoux et al. 1978).
2. The war and the persistent droughts after it have further depleted cattle herds. The Dairy Marketing Board study (Henson et al 1983) in Chikwaka points out that considerable losses were sustained during the liberation struggle and immediately subsequent to it, mainly through anthrax and tickborne diseases.
3. Draught animals are in poor condition at the onset of the rainy season, the time when they are most needed for land preparation. Poor animal condition dictates the need for four animals whether the area to be planted is 1 ha or 8 ha (Mombeshora 1985).
4. Low productivity of cattle is generally due to poor or little feed supplementation during the dry season and insufficient natural veld grazing. Also indigenous livestock are assumed by some researchers to be of inherently poor genetic merit (Tawonezvi 1987).

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Consequences of this draught power shortage are:

1. Low acreage under cultivation

In Wedza and Buhera the proportion of uncultivated arable land was found to be 46 percent and 38 percent, respectively (Mudimu 1983). In Zvimba the farmers who failed to plough all their land had less than the draught ratio of 1:1. Shumba reports that households with adequate draught in comparison with those without have larger areas under cultivation, grow more cash crops, apply manure, have timely weed control and achieve higher yields, the difference being 54 percent for maize and 26 percent for groundnuts (Shumba 1985).

2. Notable adverse effects on crop production have been:

- poor tillage
- delayed planting
- poor timing of activities, exacerbating the labour bottle-necks
- low yields as a result of a combination of the above and inadequate application of organic manure (Jaeger 1982).

Delayed planting has been observed to reduce yields by 5-10 percent for every week's delay after the optimum planting date. The timeliness of activities is more critical in Natural Regions IV and V where rainfall is low and unreliable.

The use of cows for draught purposes is another indication of the severity of the problem. Normally farmers would not put females to the yoke. Findings in Mashonaland West study show that females constituted 57 percent of the draught herd. It is not known whether these multiple functions have adverse

effects on the manifestation of oestrus and general productivity of these cows.

The draught power problem presents us with a major research opportunity to make a big impact on the productivity of many farming systems in the region. This paper is a preliminary report of a current study on the draught power situation in one communal area of Zimbabwe. It is a continuation of the work that has already been initiated by other researchers, particularly Bratton (1984), whose study looks at the role of farmer organisations in allocating agricultural resources and services in Zimbabwe's communal areas. However, this study does not attempt to cover all aspects of livestock production in the communal areas. Its broad aim is to make a positive contribution to the draught component of peasant farming systems. Specifically the study looks at the potential of efficiently utilising the available draught through draught exchange markets and draught sharing arrangements, taking into account the socio-cultural aspects of peasant economies.

3. THE PROBLEM STATEMENT

The draught power issue needs clarification. Is it one of inadequate numbers, lack of ownership, or poor access to draught animals? If draught in communal areas represents one common resource pool to which owners have priority access, draught will be allocated to non-owners only when and after owners have finished ploughing their land. After satisfying their own draught requirements, will owners allocate animals to non-owners by means such as ability to pay and efficiency of use. However, if animals are not regarded as belonging to a single resource pool, but to individual owners, the efficient use of available draught may be much reduced because hiring of

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draught animals is governed by factors other than ability to pay.

In the latter case, social obligations to relatives or members of kinship groups or the extended family have to be met first before hiring draught to other farmers who may be more efficient users. The efficiency of use of draught may be much reduced and interventions aimed at increasing draught power may have a much smaller impact on production than expected. For example, cattle owners who use a tine instead of a mouldboard plough may finish their ploughing earlier but may not have the opportunity to allocate their draught to the highest bidder because they are obliged to make them available for their local community or kinship groups. The purpose for which cattle are kept may also influence the efficiency with which available draught is allocated. If draught animals, especially cattle, are kept for non-productive reasons, owners may be inclined to minimise hiring beyond kinship groups. The study looks at all these issues surrounding the draught situation in an attempt to come up with potential solutions to the draught problem.

A few hypotheses focusing on these issues of kinship groups will be tested to help achieve the above objectives.

These hypotheses are:

- cattle owners are not free to hire their draught to the highest bidder but are restricted by social obligations;
- new draught-saving technologies are adopted unevenly because draught availability is restricted to kinship groups;

- the other roles of cattle restrict hiring of cattle beyond kinship groups.

4. METHODOLOGY

The area of study lies in Buhera in agro-ecological region IV where extensive crop and livestock farming is the major activity of the majority of the population.

A formally structured questionnaire was the main tool for data collection. A random sample of 180 households in 6 VIDCOs in wards 19 and 23 of Buhera district was selected. The questions were designed to elicit attitudinal responses from the interviewees.

The questionnaire focused on the following specific areas:

- draught animal ownership
- source of draught used by non-owners
- method of payment
- obligations of owners
- clients of draught hirers
- roles of draught hirers
- roles of cattle in peasant economies
- mortality and offtake
- solutions as perceived by the farmer.

In addition to the household surveys, a second formal questionnaire was administered to the Agritex extension workers in the two wards, focusing on the technical aspects of livestock management, the issue of grazing schemes, and the social organisations/groups existing in the communal areas. In-depth interviews were also held with the Agritex extension workers. Secondary sources of information were also reviewed.

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Preliminary analysis of the first survey data is currently being undertaken. Simple frequency tabulations, correlations and cross-tabulations have been done to summarise the general demographic data. Cross-sectional comparisons between households who own animal traction and those that do not will be done. The purpose is to identify differences in resource productivity associated with possessing draught power. T-tests and chi-square analyses will be carried out to find out if there are any significant yield differences between owners and non-owners and between farmers who employ different arrangements to get draught animal power.

5. PRELIMINARY RESULTS

Preliminary results are presented below. More in-depth analysis will be done in due course.

Household demographic data

One hundred and fifty seven households, with a total population of 1248, were interviewed in the survey. The average household size is about 8 people. The ratio between men and women is 51,8:48,2. Ninety four percent of the people are permanent residents on the farms and rely mainly on farm production for income.

Table 1: Age pyramid of the population in survey area

Age category (years)	Frequency (%)
0 - 6	23,9
7 - 19	37,6
20 - 49	31,5
> 50	7,1

Agricultural background

Household farms are small, ranging from 2 to 23 acres. The mean farm size is 7,4 acres. The total cropped area is approximately 1084 acres. Younger families appear to have smaller acreages than older families. Maize is the major staple crop in the area, grown by most of the households, followed by mhunga and groundnuts. Maize occupies the largest acreage, 1,3 to 2 acres on average. The farmers rely on traditional seeds except for maize. Use of purchased fertilisers and other inputs such as herbicides and pesticides is minimal. Six percent of the respondents reported use of fertilisers and 2,4 percent use herbicides. The rest rely on farm manure to improve their soils. The respondents were asked to rank the uses of their cattle in order of importance. Draught power was ranked as the major use of cattle followed by the provision of manure. Selling cattle was ranked third, lobola came fourth, milk production and transport were last. Eighty seven percent of the households own ploughs. Correlation between cattle and plough ownership is $-0,207$ implying that even non-cattle owners possess ploughs.

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Draught power situation

Cattle ownership is summarised in Table 2.

Table 2: Cattle ownership, survey area

Animal type	Total	Average number per household	Maximum number per household	Number used for draught
Cow	347	2	9	180
Oxen	275	2	10	250
Bulls	34	0,2	4	5
Calves	126	0,9	8	0
Donkeys	76	0,03	7	70

Land preparation is carried out in the following ways:

1. land preparation by hand
2. ploughing using own oxen
3. ploughing using hired oxen
4. ploughing using hired tractor
5. ploughing using donkeys

Table 3 summarises the percentage of households utilising the methods of land preparation stated above.

Table 3: Households using different land preparation methods

Category	Years		
	1986/87 (%)	1987/88 (%)	Increase or decrease
prepare by hand	1,5	1,9	+ 0,4
plough using own oxen	59,0	56,2	- 2,8
plough using hired oxen	35,2	37,4	+ 2,2
plough using hired tractor	0,2	0,5	+ 0,3
plough using donkeys	3,5	4,0	+ 0,5

Twenty five percent of the land put under cultivation was ploughed using hired draught power. Approximately 37 percent of the households do not own adequate draught power and they rely on borrowing to meet their draught requirements.

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Those who do not own draught animals utilise a number of means to get access to draught power. Five different methods were identified and they are discussed below:

Table 4: Arrangements made by non-owners for gaining access to draught power

Arrangement	%	Acres ploughed
1986/87 season		
Draught for labour	32,9	82,50
Sharing of draught	20,3	33,50
Loaned free of charge	30,4	139,50
Loaned for payment	10,1	16,50
Traditional/ <u>nhimbe</u>	6,3	6,0
1987/88 season		
Draught for labour	30,1	86,0
Sharing of draught	22,7	43,5
Loaned free of charge	28,0	110,0
Loaned for payment	14,2	20,9
Traditional/ <u>nhimbe</u>	5,0	10,0

These arrangements were made mainly with friends and relatives as shown in Table 5:

Table 5: Sources of draught power for non-owners

Source of Draught	1986/87 (%)	1987/88 (%)
Relatives	70,9	65,8
Friends	13,9	14,0
Local farmer	12,7	15,1
Government tractor services	1,3	2,0
Farmer group	1,3	3,1

Five percent of the households engage in winter ploughing. A majority of the farmers cultivate their land in summer and 95 percent do so with the first rains. Only 5 percent of those farmers who winter ploughed did not plough again with the first rains but went straight on to plant.

Draught for labour

This arrangement appears to be the most popular in terms of the number of non-cattle owners who use it (33 percent); 82,5 acres were ploughed using this arrangement. In the 1987/88 season the acreage increased to 86 acres. Non-owners enter into an informal agreement with draught power owners whereby they agree to look after the owners' animals for a period of time. In return the non-owner has access to the services of the animals, especially draught power. This arrangement is

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common with absentee landlords who would like somebody to look after their livestock. In such cases, the non-owner has access to draught power as well as manure, and yield differences between non-owners and cattle owners may not be as evident. Where the draught owner is resident on the farm and hires his draught in return for labour the period when he requires that labour is usually during the rainy season when animals have to be looked after. This labour is also employed for such agricultural tasks as weeding. These arrangements result in low yields being achieved by non-owners because they have to devote part of their time to somebody else's field in payment for the draught they received, at the expense of their own fields. Also, such arrangements do not give them access to organic manure. A lack of timely access to draught power for initial cultivations coupled with labour shortages for their own farm operations is probably a major disadvantage for these farmers.

Sharing of draught power

This is a common arrangement among households with inadequate draught power. Twenty percent of the farmers with less than the required number of animals to form a draught team often join with farmers in a similar position to make up the required span of four draught animals. Only 33 acres were ploughed under this arrangement. The acreage increased to 43 acres in the 1987/88 season. This arrangement often occurs between neighbours regardless of kinship groups. Ploughing is done by both parties alternating between their fields until all the ploughing is finished.

Usually there are no monetary transactions. Besides the exchange of draught these farmers help each other with other agricultural tasks.

Loaned free of charge

This is the most important arrangement as measured by the acreage (139,5) cultivated using the arrangement. Approximately 30 percent of draught hiring in communal areas does not involve cash payment. Owners have an obligation to lend draught animals to members of their immediate families before they can release their draught animals to any other farmers. These immediate family members can be sons, brothers, mothers, and uncles, usually located in the same village. Small gifts are often extended to the owners though amounts and type of gifts are not specified. For instance, sons may assist their fathers with the herding of cattle or with agricultural operations such as harvesting. Some non-owners pointed out that they often hold beer parties at the end of the season to thank their relatives who assist them with draught power. It is difficult to attach a monetary value to such informal transactions.

Traditional methods ("beer-brewing")

Nhimbe is a social function or community service in which work is done on one's farm by members of the community with no payments made except the provision of beer and food at the end of each day's work. Work done under this arrangement includes ploughing, weeding, harvesting and threshing. However, nhimbe's popularity among farmers is declining in most parts of the country. Six percent of the respondents who do not own draught power still utilise these social functions especially if they are desperate. However, the community can only assist them in this way after they have completed working on their own fields. In most cases these households plant later than the optimum date. These farmers also claimed that they left some

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of their fields unploughed because of lack of access to draught power.

Loaned for payment

Very few farmers utilise this arrangement (10 percent in 1986, when 16,5 acres were ploughed using hired draught power). Draught power owners lend their animals to non-owners in return for cash. Often a loaning fee is arrived at after negotiations between the two parties. The time of payment is often agreed on as well. The fee is usually for a fixed area. The average payment for an acre is about Z\$10,00. The ploughing is often done by the owners themselves and the loaning fee thus also includes the cost of labour. Payment takes different forms but it is usually money or grain. Where parties are related payment is much lower than for outsiders. There are no defined draught hirers per se nor any institutionalised forms of hiring draught. It is up to individual farmers who do not own cattle to look for hirers and to negotiate with them to release their animals.

Use of tractors

Two farmers reported that they had hired a tractor from the district office and they had to pay \$40,00 for 2 ha, i.e. \$8,00 an acre.

Ploughing by hand

Approximately 1,5 percent of the households interviewed claimed that they hand ploughed their fields because they failed to get access to draught power. Consequently, they ploughed significantly small fields of 1-2 acres.

6. DISCUSSION

A number of interesting questions have arisen from this survey and I shall look at them in this section.

About 56 percent of the households have adequate draught power, while 44 percent of the households do not own an adequate number of draught animals and rely on other sources to meet their draught requirements. About 2 percent of these households till their land by hand. Important sources of draught for this disadvantaged group are friends, relatives, local farmers, and the government tractor services. This group enters into various informal arrangements with the owners to have access to draught power. Draught animals are only made available to non-owners after owners have finished ploughing their own fields. This is usually 3-4 weeks after the first rains; in areas of low rainfall timeliness of activities is critical. Yields of maize of owners and non-owners were not significantly different since most farms were hit by the 1986/87 drought. Implement ownership appears not to have any positive correlation with draught ownership. Forty seven percent of the non-owners have ploughs, implying that some of these households may have owned some animals that died during the persistent droughts.

Use of cows for draught is now accepted by most farmers. The results show that even households with two oxen still use a large proportion of their cows for ploughing. It is only after a farmer has acquired at least four oxen that there is a significant reduction in the proportion of cows used for ploughing. If cows are accepted as draught animals there could be potential for producing a dual-purpose cow that will ensure the provision of draught power as well as the production of calves. This will be subject to extensive research into the

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effect on conception rates of using cows for draught purposes. Such a move would mean production of oxen for the beef industry and increased annual offtake rates from the Communal Land sector. It is interesting to note that annual offtake rates are low, below 3,5 percent. Sixty nine percent of the animals sold are oxen and the remainder are cows, bulls, and donkeys. Farmers are reluctant to sell their cows, probably because they have realised the importance of cows over other animal types. The increasing demand for cash for school fees is forcing many farmers to dispose of their oxen.

Labour as a form of payment for draught services is becoming increasingly important and may have negative repercussions on income, thus widening existing disparities in favour of draught-owners. Yet labour is a resource that non-owners can readily provide as payment. Where labour is the means of payment, the cost of hiring draught could be in excess of tractor hiring rates. The priority placed on fulfilling the family's own consumption requirements makes the opportunity cost of labour very high during peak labour periods. Hiring tractors is relatively cheap (approximately \$8,00 an acre) and is quicker, but how many non-owners can afford to raise the necessary cash at the beginning of the rainy season? If the demand for tractor services increases, the timeliness of operations may be jeopardised because the tractors will not be able to meet the increased demand on time. Households who use tractors are also denied manure, which is critical for successful crop production. Only 6 percent of farmers purchase chemical fertilisers.

Sharing draught animals seems to be well defined where both parties own some form of draught animal and implements as well. Owners of draught are happier releasing their animals to other draught owners whom they can trust and who will not ill-treat

their animals, since their own beasts form part of the team. A small proportion of the land is ploughed using this method. Probably most of the sharing occurs at the start of the season when the animals are weak and a team of four is necessary. As the season progresses the condition of the animals improves and a draught team of two may be adequate to complete the remaining fields. This hypothesis requires further investigation.

Hiring out of draught animals does not appear to be a commercialised venture. A number of reasons can be hypothesised. The opportunity cost of time, the cost of labour, and the wear and tear of the animals and the implements involved in ploughing may be much higher than the current payments being offered. The opportunity cost of time is much higher during the planting time. Because draught owners are not self-sufficient in a lot of other things and depend on the community for social security and moral support, they are not in a position to bid higher prices for their draught animals.

Only a small proportion of draught owners winter plough their fields. The reasons were not solicited from the farmers. However, 95 percent of those farmers who winter ploughed their fields had to plough again at the onset of the rainy season before planting. If more farmers could be encouraged to do winter ploughing, more draught power could be released for use by non-owners at the start of the season. Also it is crucial to take advantage of the animals when they are strong at the end of the season rather than leaving them to waste the weight gain made during the rainy season. Animal traction performance is a function of body weight and the heavier the animal the better. Apart from reducing the draught demand at the onset of the rainy season other agronomic benefits are realised from practicing winter ploughing. Once more farmers begin to winter plough, the introduction of complementary, draught-saving

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technologies such as the tine will have the positive effect of reducing draught demand.

The poor performance of draught animals is attributed mainly to lack of feed during the dry season. Farmers have responded to this problem by storing crop residues which are then fed to the animals to maintain basal weight. The poor condition of the animals dictates the need for a draught team of four oxen thus reducing the available draught pool. If nutrition could be improved through efficient utilisation of crop residues, proper timing, and selective feeding of draught animals, the draught team could be reduced to two thus increasing the available draught for the community.

Summary

Owners of draught animals first ensure that they plough their own land before hiring their draught animals to others. Priority is given to immediate family members and only after meeting family obligations can draught be hired by friends and other local farmers. Lending out of draught animals to relatives is often free though other informal exchanges (e.g. labour) take place. Non-owners have to look for means of accessing draught from draught owners. No organised draught market exists at the moment. Payment offered appears not to be a major motivating force behind hiring out of draught. Other factors such as strengthening friendship, encouraging good neighbourliness, and assistance with funerals are more important than hard cash.

A potential for draught sharing arrangements exists. Sharing of resources within communities is a historical tradition to which farmers are accustomed. However the evolution of the market economy has slowly eroded the spirit of community

ownership and use of resources on a communal basis. Land is a resource owned by the community in communal areas and a resource owned communally is managed by no one. This is the "tragedy of the commons". Cattle represent a resource that is individually owned. They are the single most important resource that farmers have and which they can dispose of at will. Draught animals therefore are a resource that farmers guard carefully and which they can use as collateral. But once a viable market for draught power is created and enough compensation is offered in return, more draught owners will be willing to realise their animals for use by other farmers. Payments can be in the form of crop residues which can then be fed to the animals and ensure strong draught teams that perform well.

Areas that need more research

1. Details on total farm size, area ploughed by own animals and area ploughed by hired oxen.
2. Reasons why most farmers do not winter plough their fields:
 - record of planting dates for major crops to find out if there are delayed plantings by non-owners of draught.
3. Details on the arrangements for obtaining draught power from relatives and try to quantify these gifts:
 - the extent of the relationship, whether paternal, maternal, first cousin, etc.
4. Details on labour arrangements, i.e. how many labour days per acre, when is labour provided, and who does the

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ploughing? Do these arrangements occur across village boundaries?

5. Identify the most constraining aspects of current arrangements.

References

- Avila M. 1985. "Socio-economic research in Mangwende and Chibi Communal Areas" in Avila M (ed) Crop and Livestock Research for Communal Areas. Harare: Department of Research and Specialist Services.
- Blackie M J. 1982. Improved Productivity from Livestock Production in the Communal Areas of Zimbabwe. Harare: University of Zimbabwe, Department of Land Management. (Working paper no. 2)
- Bourdillon M. 1982. The Shona Peoples. Gweru: Mambo.
- Bratton M. 1984. Draft Power, Draft Exchange and Farmer Organisations. Harare: University of Zimbabwe, Department of Land Management. (Working paper no. 9)
- Chakaodza B. 1986. A Baseline Study of Rushinga Communal Area. Harare: Zimbabwe Institute of Development Studies.
- Cousins B. 1987. A Survey of Current Grazing Schemes in the Communal Areas of Zimbabwe. Harare: University of Zimbabwe, Centre for Applied Social Sciences.
- Danckwerts J P. 1974. A Socio-economic Study of Veld Management in the Tribal Areas of the Victoria Province. Salisbury: Tribal Areas Research Foundation of Rhodesia. 155p.
- Henson B et al. 1983. "Milk Collection in Chikwakwa: a Study Undertaken to Consider the Potential of a Milk Collection Scheme in a Communal Area". Harare: Dairy Marketing Board, unpublished report.
- Jaeger W K. 1986. The Economics of Animal Draft Power in West Africa. Boulder: Westview (Westview Special Studies in Agriculture Science and Policy).

- Le Roux P, Stubbs, A T and Donnelly P H. 1978. "Problems and prospects of increasing beef production in the Tribal Trust Lands", Zambezia 6(1): 37-48.
- Mombeshora B G. 1985. "Livestock production" in Avila M (ed.) Crop and Livestock Production in Communal Areas. Harare: Zimbabwe Agricultural Journal (Special report no. 1).
- Mudimu G D. 1983. "The Draft Power Problem in Zimbabwe: an Extensionist's View of the Causes, Effects and Solution". Paper presented at CIMMYT Technical Networking Workshop on the Draft Power Problem, Mbabane, Swaziland, 1983.
- Sandford S. 1982. Livestock in the Communal Areas of Zimbabwe. London: Overseas Development Institute. [Report prepared for the Ministry of Lands, Resettlement and Rural Development, Zimbabwe.]
- Shumba E M. 1984. "Animals and the cropping system in the communal areas of Zimbabwe", Zimbabwe Science News 18(7/8).
- Smith T. 1988. "Nutritional constraints to ruminant livestock production in the communal sector of Zimbabwe" in Proceedings of the Workshop on Livestock Research and Extension for Communal Area Farming Systems held at Henderson Research Station 16-18 February 1988. Harare: Department of Specialist Services and Agritex.
- Steele M C. 1981. "The economic functions of African-owned cattle in colonial Zimbabwe", Zambezia 9(1).
- Tawonezvi H et al. 1987. "Milk Production from Crossbred Dairy Cattle on Range". Paper presented at Workshop, The Role of Indigenous Cattle and Their Crosses as Dairy Animals, Henderson Research Station, 1987. Harare: Zimbabwe Government, Veterinary Department.
- Theisen R and Marasha P. 1974. "Livestock in Que Que Tribal Trust Land : an Ecological Study of the Importance of Livestock to Development", mimeo.



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