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SOCIO-ECONOMIC SURVEYS OF GOAT-KEEPING IN MATOBO AND BUBI DISTRICTS

Programme: LPP – research programme

Production system: Semi-arid

***Project title:* Increasing the productivity in smallholder
owned goats on Acacia thornveld.**

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1. INTRODUCTION

“Increasing the productivity in smallholder owned goats on Acacia thornveld” is a three-year research project funded by the DFID Livestock Production Programme. The main collaborators are Matopos Research Station, University of Zimbabwe, Agritex, University of Reading and NRI. The project started in April 1999 and its purpose is to develop improved feeding strategies for poor smallholders based on *Acacia* and other tress pods so as to increase goat production. Feeding strategies are to be developed together with farmers and extension staff through socio-economic surveys, on-station and on-farm experiments. Laboratory analyses will guide the choice of pod treatments.

The objectives of the socio-economic surveys were to examine:

- i. the role of goats in the farming system, including:
 - herd sizes
 - objectives of goat production
 - constraints
 - management practices and productivity
 - marketing
 - past and present goat feeding strategies and feed availability
- ii. farmer knowledge and use of trees as a livestock feed
- iii. labour availability and constraints, and
- iv. tree tenure issues
- v. to identify suitable sites for tree pod collection, on-farm monitoring and on-farm trials

Background Information

Small ruminants, especially goats, play an important role in the smallholder sector in Zimbabwe. A large percentage of small ruminants are kept in the drier ecological zones (Regions IV and V). In these semi-arid areas goats are kept for meat, milk, skins and manure. There are more than 2.9 million goats in Zimbabwe (Department of Veterinary Services, 1997) of which 98% are kept by smallholders. There are 126,920 goats in Matobo District and 8,483 goats in Bubi (Inyathi) District.

Irrespective of locality, goats feed on natural rangelands which are virtually their sole food source (Ward, 1983). Goats kept in semi-arid areas kid all year round, but kidding is mainly concentrated in the dry season, between April and July (Sibanda, 1992). During the dry season kid mortality is higher, partly due to lack of adequate nutrition. Farmers in the communal areas rarely offer pregnant and lactating does any form of supplements, despite the fact that the rangelands offer a wide range of feed, for example, leguminous trees such as acacia species have pods and leaves.

Survey Sites

Four survey sites were selected, two in Matobo District in Matebeleland South province and two in Bubi District in Matebeleland North province. The two districts are situated in natural regions IV and V respectively and are representative of conditions found in the semi-arid parts of Zimbabwe. In each district, two contrasting survey areas (in terms of rainfall and vegetation) were selected. In Matebeleland South, each survey area consisted

of two villages in one ward whereas in Matebeleland North, each area consisted of two villages in adjacent wards. These were:

Matobo District, Matebeleland South

Ward 3 (Gohole and Homestead villages)

Ward 11 (Gubula and Mbembeswana villages)

Bubii District, Matebeleland North

Wards 3 and 16 (Dabengwa and Mbembeswana villages)

Wards 11 and 15 (Badala village and Inyathi Community Cooperative)

The fourth survey site consisted of both Badala village in Ward 11 and Inyathi Community Cooperative in Ward 15. Previously the villages were both in Ward 11. Inyathi Community Cooperative used to be a Mission Farm but it was dissolved in 1980 and the land was divided up for use by smallholders. Many of the households now living there used to be employed on the Mission Farm. The Community Cooperative is the only 'village' in Ward 15.

Methodology

The survey work was conducted in May 1999 over a two-week period. Semi-structured group interviews were carried out in each village in each district, followed by individual interviews with two or three households per village, selected by the extension worker as representative, but avoiding those who had already participated in the groups. Group and individual interviews were guided by a comprehensive checklist of topics (see Appendix 1). A multi-disciplinary team conducted the survey work and comprised the following members:

Heather Kindness (Socio-economist, NRI, UK)

Joseph Sikosana (Livestock Scientist, DRSS, Zimbabwe)

Victor Mlambo (Post-graduate student, UZ, Zimbabwe)

John Morton (Social Anthropologist, NRI), provided inputs to study design and report editing.

In each of the four survey areas the survey team worked together with the local AGRITEX extension officer:

A Moyo (Extension worker, Matebeleland South, AGRITEX, Zimbabwe)

P Sibanda (Extension worker, Matebeleland South, AGRITEX, Zimbabwe)

V Ngwenya (Extension worker, Matebeleland North, AGRITEX, Zimbabwe)

Ms S Moyo (Extension worker, Matebeleland North, AGRITEX, Zimbabwe)

2. SURVEY RESULTS

Role of goats in the farming system

Goat ownership

Goats and other livestock in the two survey sites in Matobo District are said to belong to the head of the family whereas in Bubi District they belong to the family. In all the survey sites women and children were primarily responsible for managing the goats whereas marketing is the responsibility of men.

Participants in the group interviews, as well as the individual interviewees, were asked about their ownership of goats. Household goat herd sizes ranged from 0 to 68 goats with an average herd size per household across all four survey sites of 14 goats. This average masks differences both between and within districts, as highlighted in Table 1. The average herd size in Matobo District (16 goats) was higher than the average herd size in Bubi District (10 goats). Within Matobo District, the average herd size was significantly higher in Ward 3 (22 goats) than in Ward 11 (13 goats). Similarly in Bubi District, the average herd size was much higher in Wards 3 & 16 (20 goats¹) than in Wards 11&15 (6 goats).

Table 1: Average household goat herd sizes, by District and Ward

District	Average household goat herd size	Sample size
All sites	14	123
Matobo District	16	78
• Ward 3	22	26
• Ward 11	13	52
Bubi District	10	45
• Wards 3 & 16	20	16
• Wards 11 & 15	6	29

Importance of goats to the household

During the interviews, respondents were asked to rank goats against other livestock kept by their household in terms of population and importance to the household. In all survey sites, goats were generally ranked highest in terms of population and second in terms of importance to the household. Other livestock kept by households in the areas are cattle, sheep, donkeys, pigs and poultry. Cattle were generally considered most important. Goats were ranked second for a number of reasons; they can easily be used to solve financial problems in the home (they can be disposed of at anytime); they are more resistant to drought and adaptable to harsh environments; they are the main source of milk and meat during the dry season and they breed quickly.

¹ Although this figure is slightly misleading because of the large goat herd sizes of farmers who belong to a specific goat keeping project group.

Objectives of goat production

Goats are kept for a large number of reasons: sale of live animals for cash, meat, milk, manure, hides, *lobola* (marriage dowry), rituals, gifts, sale of bones and for exchange for other goods or services.

The survey respondents were asked to rank the reasons why they keep goats according to importance. Chart 1 shows the ranks given by goat owners in Matobo District. Almost all of the respondents (8 out of the 9 individuals/groups interviewed) said that goats were kept primarily for sale. More than 50% said that meat was the second most important reason and milk the third reason for keeping goats.

Chart 1: Importance ranking of reasons for keeping goats, Matobo District

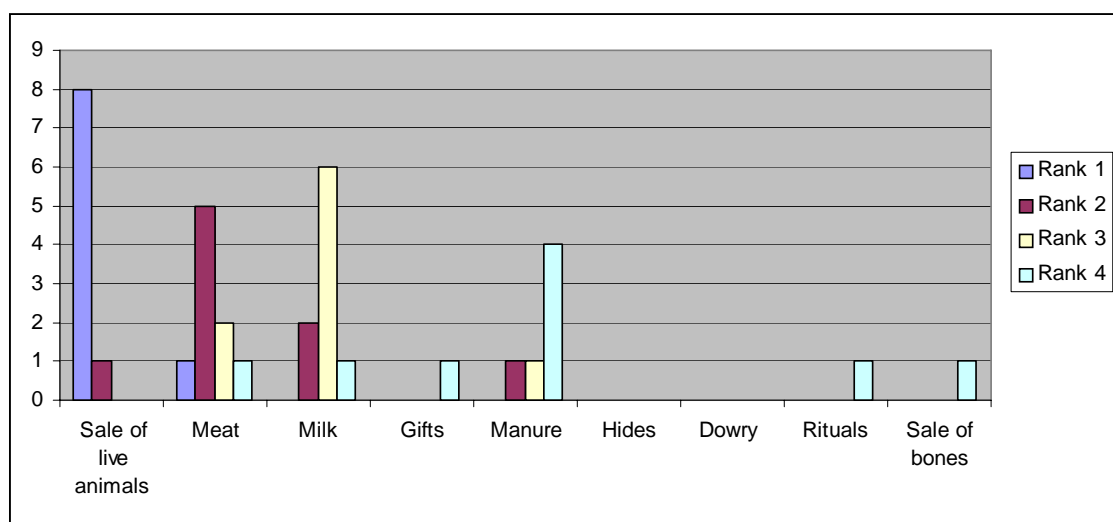
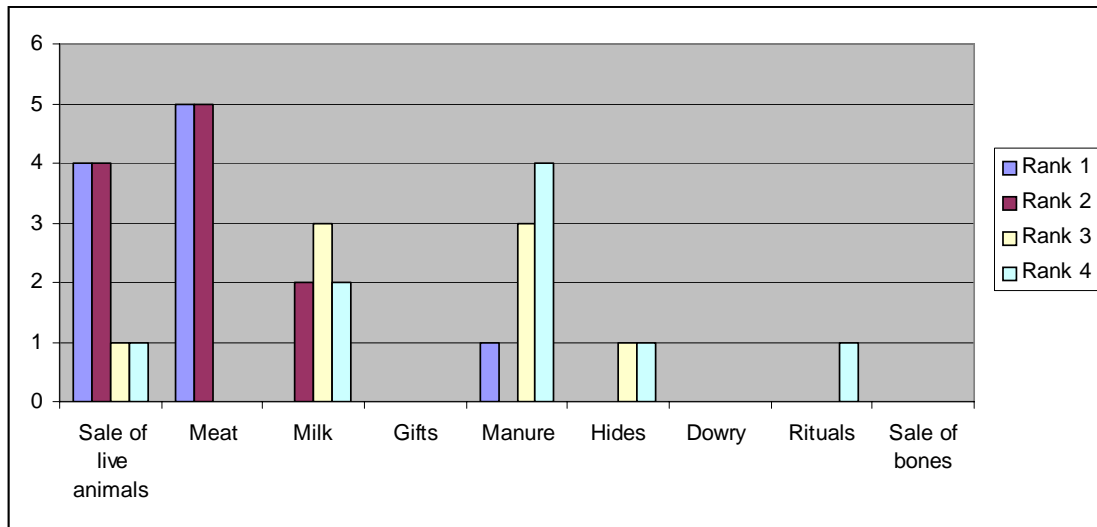


Chart 2 shows the ranks given by goat owners in Bubi District. The picture is slightly different. Five of the 10 individuals and groups interviewed said that goats were kept primarily for meat for home consumption, whereas only four said that the main reason for keeping goats was for cash. Similarly, more people ranked meat as the second most important reason for keeping goats than for cash. Milk and manure followed in the ranking.

Chart 2: Importance ranking of reasons for keeping goats, Bubi District



Although dowry and rituals were generally ranked 5th or lower in terms of reasons for keeping goats, it is interesting to note that they were mentioned by a larger number of respondents in Matobo District than in Bubi District. In Matobo, 7 individuals / groups mentioned dowry and 6 mentioned rituals as reasons for keeping goats, compared to 1 and 3 respectively in Bubi District.

Constraints to goat production

The individual farmers and groups interviewed were asked which goat production constraints they face and were then asked to rank them according to importance. The constraints mentioned were water, stock theft, diseases, abortion, feed shortage, predators, poor productivity, poisonous plants, inadequate shelter and one person in Bubi District mentioned poor buck performance due to black magic.

Table 2 below highlights the number of individuals/groups who ranked the different constraints first, second and third/fourth combined. There is some variation between wards. Diseases were a big problem in all wards, but were considered the biggest constraint in Ward 11, Matobo District. Stock theft was also another constraint common to all wards, but was most important in Wards 11 and 15, Bubi District.

The importance of feed shortage as a goat production constraint is of particular interest to the project. Only two respondents ranked it as their most serious problem. In Ward 11 in Matobo District feed shortage was ranked as either the first or second most important goat production constraint by 75% of the groups and households interviewed. In Ward 3 feed shortage was considered less of a problem. It was ranked as the second most important goat production constraint by only one individual; the other groups and households ranked it third or lower (and one individual did not mention it as a problem at all).

In Bubi District, livestock feed was considered more of a problem in Wards 3 and 16, where it was ranked by all as either the first, second or third most important constraint to goat production. By comparison, in Wards 11 and 15 feed shortage did not rank highly amongst goat production constraints; it was ranked third and fourth by two groups/ households and was not mentioned as a constraint at all by the others. However, these

findings from Wards 11 and 15, and Ward 3 of Matobo District do not necessarily mean that feed shortage, in interaction with disease, is not in fact operating as a constraint to production.

Table 2: Importance ranking of different goat production constraints, by Ward

	Matobo, Ward 3			Matobo, Ward 11			Bubi, Wards 3 & 16			Bubi, Wards 11 & 15		
	Rank 1	Rank 2	Rank 3/4	Rank 1	Rank 2	Rank 3/4	Rank 1	Rank 2	Rank 3/4	Rank 1	Rank 2	Rank 3/4
Abortions			1			2						
Black magic								1				
Diseases	2		3	3	1		2		1	2	2	
Feed shortage		1	2	1	2	1	1	1	1			2
Poisonous plants							1					
Poor productivity			1									
Predators		3	1			3						1
Shelter									2			
Stock theft	2	1			1			1	1	3	2	
Water	1						1	1				

Management practices

Milking practices and uses of milk

In Wards 11 and 15 in Bubi District most people do not milk their goats. In the other three survey locations, almost all of respondents milk their goats. The common practice is to milk does with single kids and those which have lost kids. Those who milk does with twins start milking much later (after about 2 months). Goats are generally milked throughout the year, although in Ward 11 in Matobo District, most people said that does are not milked in the dry season unless there is adequate feed or green flush available.

In all areas the time at which does are milked varied, ranging from 7 days to 1 month post-partum. Most people start milking after 2 or 3 weeks (when the kids are slightly bigger and stronger) although the few who milk their goats in Wards 11 & 15 in Bubi District start milking slightly earlier, at 1 to 2 weeks. In Bubi the milking period lasts for approximately 2 to 3 months whereas in Matobo the milking period was said to last between 2 and 5 months (or until the kids are no longer suckling).

Milk yields per day per goat were estimated. There were variations in yield estimates between households within the survey areas, but no significant variations between the survey sites. Yields ranged from 250ml to 750ml per day at the start of the milking period but most said that the daily yield declines throughout the milking period. Some people attributed this wide variation to the natural characteristics of the does; some are naturally higher yielding but most are lower yielding (averaging 250-350 ml per day). The yield and milking period depend also on the condition of the doe, the season and the feed available.

Milk is generally for home consumption. It is used in tea, as infant food, as relish (fermented in gourds) and used for baking. The cream from goats milk is used for cooking vegetables. Only the goat project group in Bubi District currently sell milk. They sell a “fanta bottle” of milk (300ml?), either fresh or boiled, for Zim\$3. It is sold to local individuals and the demand exceeds supply.

Marketing

In both survey locations in Matobo District, the majority of live goats are sold to middlemen who come from the cities and least goats are sold in the local community. In Ward 3, the second largest market for goats is the Cold Storage Centre (CSC).

In both survey sites in Bubi District the main market for live goats is the local community. Wards 3 and 16 also sell live goats to middlemen but in Wards 11 and 15, the community is the only market for their goats. This difference is likely to be due to the differences in goat keeping between the two locations; in Wards 3 and 16 the average herd size was found to be 20 whereas in Wards 11 and 15 the average herd size was only 5. There is less to sell and for traders to buy at the latter site.

Goats are sold throughout the year but the peak period/s in Matobo District are at the start of all three school terms (particularly in Ward 11) and also during public holidays, particularly Christmas. In Bubi District, the peak selling period is towards Christmas, and also other public holidays. The difference in peak selling periods between the districts reflects the different markets. Goat owners in Bubi District are reliant on the local market and the highest demand

for goats is towards Christmas. Goat owners in Matobo District sell primarily to middlemen who particularly target the start of the three school terms because they know people wish to sell their goats to pay for school fees.

The price in Matobo District ranges from Z\$300 to Z\$600 and in Bubi District it ranges from Z\$300 to Z\$800. Price variations are mainly due to size, but age and body condition are also contributing factors. Young male castrates (usually 2 years and over), older female goats and non-productive goats are sold. Prices in Matobo District from middlemen averaged Z\$300-350. Prices in Bubi District within the locally community varied more, but tended to be higher than Matobo prices, particularly towards Christmas. Z\$400, Z\$500 and Z\$600 for both male castrates and older females were mentioned by several respondents.

Few other goat products are sold. One household sells hides to Bulawayo at a price of Z\$25 per hide and the goat project group in Bubi District sell manure when it is available, but said there is not a big demand for it. Last year they sold six one-ton carts of manure for Z\$240.

Goat feeding strategies and feed availability

Feed calendars were drawn with groups and individuals in all survey sites. The following feed calendar is for Ward 3, Matobo District. It shows the feed sources and months in which they are fed which were common amongst those surveyed. The various symbols indicate the months in which the different sources of feed are eaten by goats and underlining (‘^^’) indicate the months in which the different feed sources are **most commonly** eaten.

Table 3: Goat feed calendar for Ward 3, Matobo District

Feed shortage						**	**	***	***	***	**	
Collected pods								<u>^^</u>	<u>^^</u>	<u>^^</u>		
Collected crop residues								<u>++</u>	<u>++</u>	<u>++</u>		
Fallen leaves and pods					<u>==</u>	<u>==</u>	<u>==</u>	==				
Crop residues in fields				>>	<u>>></u>	>>						
Dry leaves and dry grass				<u><<</u>	<u><<</u>	<<						
New shoots										@	<u>@</u>	
Green leaves and grass	<u>##</u>	<u>##</u>	<u>##</u>	<u>##</u>	<u>##</u>						<u>##</u>	<u>##</u>
	J	F	M	A	My	J	Jy	Au	S	O	N	D

Key: Crop residues include groundnut hay, cowpea residues and bambara nut residues.

Most people said that from December to the beginning of May, goats have sufficient green leaves and grass. In November there are new shoots for goats to eat, and some said that these may be available in October, depending on the rain. From April/May goats are eating dry leaves and grass and also crop residues in the fields (particularly in May when harvesting is finished). Fallen leaves and pods are eaten mainly in May, June and July. From August to the

end of October is the period of feed shortage and during these months goats are fed pods and crop residues (particularly groundnut hay) which have been collected earlier in the year and stored. Some feed pods for two months and others for three months; this depends on the quantity of pods collected and the timing of the rains and hence the availability of new green shoots in November. If the rain is late then November is also a feed shortage month.

Feed sources and availability for Ward 11 in Matobo District are similar. Differences are that green leaves and grass are available slightly longer in Ward 11 (from November up to the end of May). The feed shortage months in Ward 11 are July, August and September. October may also be a month of insufficient feed, depending on the start of the rains and the browse flush. Dry leaves and grass and fallen pods are eaten a month later in Ward 11 than in Ward 3 (due to the prolonged availability of green leaves and grass in the former) but crop residues are eaten in the same months. Few people in Ward 11 collect tree pods to feed to their goats.

Table 4: Goat feed calendar for Wards 3 and 16, Bubi District

Feed shortage						**	***	***	***	***	**	
Collected pods								^^	^^	^^		
Collected crop residues								++	++	++		
Dry litter							~~	~~	~~	~~	~	
Fallen pods					==	==	==	==				
Crop residues in fields					>>	>>	>>	>>				
Dry leaves and grass					<<	<<	<<	<<				
New shoots										@	@	
Green leaves and grass	##	##	##	##	##						##	##
	J	F	M	A	My	J	Jy	Au	S	O	N	D

Key: Collected crop residues include groundnut hay, cowpea husks, maize stover and maize bran

The feed calendar for Wards 3 and 16 in Bubi District illustrates that the feed shortage period is longer (July to the end of October). This supports the results from the goat production problem ranking, which showed that feed shortage was considered a more important problem in Wards 3 and 16 than in Wards 11 and 15. In November, and sometimes even in October, green shoots are available and then green leaves and grass are available from November to the end of April, or even into May in a good year. Dry leaves and grass, crop residues in the fields and fallen pods are available in May, June and July. The quantity of these feed sources available in July is likely to be small which is why July is also considered a feed shortage month. Dry litter is eaten during the worst feed shortage months (July to end October²). The category of stored crop residues includes maize stover, groundnut hay, veld hay and maize bran, and these are fed to the goats from August to October, mainly in August and September. Collected tree pods are also fed from August to the end of October, although not many people collect and feed these to their goats.

² Leaves and browse species eaten in September and October are Umtshekisana and A Nilotica leaves.

In Wards 11 and 15 in Bubi District the feed shortage period is slightly shorter. Usually August, September and October are the months when there is insufficient feed. Usually from the beginning of November there are green shoots and then from mid-November to the end of April green grass and leaves are available (sometimes even in October and up to May if the rains are on time and sufficient). Dry leaves and grass, crop residues in the fields and fallen pods are available for the same three months as in Wards 3 and 16 (May, June and July), although in Wards 11 and 15, fallen pods are said to still be available in August. Dry litter is eaten in August and September and is supplemented by stored crop residues in August, September and October and collected tree pods in September and October.

Goat Productivity

Kidding period and age at first kid

In Matobo District 50% of the respondents said that the majority of goats kid twice per year and 50% said that the majority kid once per year. The kidding peaks (i.e. the months when most kids are born) are shown in Table 5. The main kidding peak in both Matobo Wards surveyed is April/May. Respondents varied as to the timing of the second peak; some said there is a second peak towards the end of the year (Sept/Oct/Nov or Nov/Dec) and some said June or July/Aug.

Table 5: Main kidding periods, by Ward

	Main kidding peak	Other kidding peak/s
Ward 3	April/May	Nov/Dec, June, July/Aug
Ward 11	April/May	Sept/Oct/Nov, July
Wards 3&16	April/May	Nov/Dec
Wards 11&15	April/May	Oct/Nov, Aug, Sept

In Bubi District the main kidding peak is also April/May. In Wards 3 and 16, the second kidding peak is Nov/Dec but in Wards 11 and 15, the respondents varied in their timing of the second peak (August, September or October/November). A number of households in both districts attributed the high incidence of kidding in April/May to the availability of feed and therefore the good condition of does at the time of conception.

In Wards 11 and 16, most goats reportedly kid once per year, although one household mentioned that kidding twice per year is possible but their goats were constrained by poor access to bucks. In Wards 3 and 16, most does kid twice per year. However, two households explained that kidding twice per year does not mean that the does kid every six months. It means that two kiddings are possible within the space of twelve months, with kidding periods of 8 to 10 months (eg. kidding in April then again in Dec)

The age at first kid in all four survey sites ranged from 10 months to 24 months. In Ward 3 in Matobo District, 12 or 18 months is the most common age at first kid. In Ward 11 in Matobo District all respondents said that goats kid at 12 months. In Wards 3 and 11 in Bubi District the range was between 10 and 18 months but kidding at 12 months is most common. In Wards 11 and 15 half the respondents were divided in their opinions; half said that the age at first kid is 12 months and the other half said it is 24 months.

Kid mortality

Periods when kid mortality is high varied within wards. In Ward 3, Matobo District, high kid mortality was reported in April/May, June, August/September and from August to December. The reasons for mortality were a lack of feed and therefore little milk for the kids, leaving them -susceptible to diseases and predators. This was said to be the cause of mortality in both April/May and August/September.

In Ward 11, Matobo District, kid mortality is highest in July, Aug, Sept and October (particularly September/October). Again this was attributed to the lack of milk due to poor feed availability for does and drought. 1998 was considered a particularly bad year for kid mortality during these months. Some people store groundnut, bambara nut and cowpea hay to supplement the does' feed during these months. Other said that mortality is due to diseases and that they lack knowledge about how to treat them.

In Wards 3 and 16 in Bubi District a variety of months when kid mortality is high were mentioned together with several different causes of death. Some kids die soon after they are born (2 days up to about 2 weeks) and others die when they are approximately 3 months old. Kid mortality in October, after being born in September, was attributed to lack of feed and this lack of milk. Another respondent also said that mortality was highest in August/September, but when the kids are 3 months old (i.e. they were born in April/May) and that the causes of death are heat and diseases. This concurs with the view of another farmer who mentioned that when kids reach 3 months, if they have not been vaccinated they can die. November and December were also mentioned as months when kid mortality is high in Wards 3 and 16. The reasons for this are poor shelter and kids eating poisonous plants (this was also said to be a problem in August, when there is little other green feed available).

High kid mortality in Wards 11 and 15, Bubi District, was reported in May, June, July and August both soon after birth and 2 to 3 months after birth. The causes of death were shortage of feed and diseases. Another farmer mentioned that diseases-related kid mortality occurs throughout the year, and kids from 1 week to 3 months of age are all affected.

Abortions

Low goat productivity in goats was also attributed to abortions, which again was attributed to a lack of feed. Abortions in all Wards were said to be most common in the dry season, particularly August/September/October amongst does which are due to kid in November/December.

Farmer knowledge and use of trees as a livestock feed

Browse species

Farmers identified the types of trees found in their wards and which are natural feed sources for goats. Table 7 details the different tree types and in which wards they are found. It indicates which trees have pods that are eaten by goats and which other tree parts are also eaten.

Availability of different tree species

Farmers were asked to indicate which tree species are most abundant in their wards. *Acacia tortilis* is the most plentiful tree in both wards in Matobo District. Mopane is also plentiful in ward 3 and *A. erubescens*, *Dichrostachys cinerea* and *A. nilotica* are all numerous in Ward 11.

A. nilotica is the most plentiful tree species in Wards 3 and 16, Bubi District, followed by *A. tortilis* and Mopane. In Wards 11 and 15, *D. cinerea* is most abundant, but there are also good numbers of *A. tortilis*, *A. karoo* and *A. nilotica*.

Pod types collected

In Matobo District the majority of people who collect pods to feed to their goats in the late dry season said that they collect *A. tortilis* pods (in Ward 11, this was the **only** tree pod collected that was mentioned). In Ward 3, *D. cinerea*, *A. nilotica*, *A. erubescens* are also collected for goats.

In Bubi District, *A. tortilis* and *A. nilotica* are collected in both survey locations. In Wards 3 and 16, *D. Cinerea* and *A. erioloba* are also collected (although the latter is not very abundant) and in Wards 11 and 15, *Piliostigma thonningii*, *Albizia amara/harveyi* and *D. cinerea* are collected.

Goat tree pod preferences

The farmers were asked to indicate which tree species their goats prefer as a feed source. Results are shown in Table 6 below.

Table 6: Preference ranking for pods of different tree species

Rank	Matobo Ward 3	Matobo Ward 11	Bubi Wards 3 and 16	Bubi Wards 11 and 15
1	<i>A. tortilis</i>	<i>A. tortilis</i>	<i>A. nilotica</i>	<i>D. cinerea</i>
2	<i>Ziziphus mucronata</i>	<i>A. nilotica</i>	<i>A. tortilis</i>	<i>A. tortilis</i>
3	<i>A. erubescens</i>	<i>A. erubescens</i>	<i>D. cinerea</i>	<i>A. karoo</i>
4	<i>D. cinerea</i>	<i>D. cinerea</i>		<i>A. nilotica</i>

Other uses of browse trees

Few other uses of tree pods were known. A couple of goat owners mentioned that *D. Cinerea* pods are used to treat asthma and *A. tortilis* can be used as a dressing for burns.

Table 7: Tree species available and fed on by goats in the different survey sites, and the parts of the tree eaten

	Local names	Edible pods	Other parts eaten by goats	Matobo District		Bubi District	
				Ward 3	Ward 11	Wards 3 & 16	Wards 11 & 15
<i>A. erioloba</i>	Uguwe, Iwoholo	Yes	Fruits, Leaves	Y	Y	Y	
<i>A. karoo</i>	Isinga		Leaves, Seeds		Y	Y	Y
<i>A. nilotica</i>	Isangawe, Usangawe, Isinga	Yes	Leaves	Y	Y	Y	Y
<i>A. tortilis</i>	Umgagani	Yes	Leaves	Y	Y	Y	Y
<i>D. cinerea</i>	Ugagu/Ibhangali	Yes	Leaves	Y	Y		Y
Duiker berry	Umqhobampnuzi		Fruit			Y	
Marula	Umganu, Imganu		Fruit			Y	
Mopane <i>Colophpermum mopane</i>	Ipane (same as Imphane?)	Yes?? bitter	Leaves	Y	Y	Y	
<i>Z. Mucronata</i>	Umphafa/Umphata		Fruit, Leaves	Y	Y	Y	Y
<i>P. thonningii</i>	Ihabahaba						Y
<i>Combretum hereroense</i>	Itetshane, Itetchane, Tetshane	Yes??	Leaves	Y		Y	
<i>Terminalia prunoides</i>	Ivikane		Leaves			Y	
<i>Albizia amara/harveyi</i>	Umbola						Y
<i>Combretum apiculatum</i>	Umbondo		Leaves	Y		Y	Y
<i>Schiziphyton ratanenii</i>	Umgoma		Fruit			Y	
<i>A. nigrescens</i>	Umkhaya	Yes	Leaves	Y	Y	Y	
<i>Diospyros lycioides</i>	Umqathuva		Leaves				Y
	Umtewa			Y			
<i>Boscia albitrurnia</i>	Umtopi		Fruit peel	Y			
<i>Guibortia coleosperma</i>	Umtshibi		Fruit, Seeds			Y	
<i>Combretum imberbe</i>	Umtswili	Yes??	Leaves	Y		Y	

Collection of pods

A large proportion of the interviewees in Ward 3 in Matobo District collect tree pods to feed to their goats in the late dry season. They said that the collection and use of tree pods as a feed for goats is common in their area and that people have been doing it for a long time.

By comparison, only 2 people out of 52 people interviewed in Ward 11 in Matobo District currently collect and feed tree pods to their goats in the late dry season, when the feed shortage is considered most severe.

In Bubi District in Matebeleland North, approximately 2/3 of the respondents in the first location (Wards 3 and 16) collect tree pods. However, all the respondents said that the practice of collecting pods to feed livestock in the late dry season is not common in their villages. Of those currently collecting, one household collects pods for their cattle as part of a fattening scheme and another collects pods for their pigs (but the goats also eat them because the pigs and goats are fed together). All those collecting tree pods learnt about the benefits of the practice from AGRITEX extension staff.

In the second location surveyed in Bubi District (Wards 11 and 15) about 50% collect tree pods. However, those that currently collect tree pods for their goats said that they do not collect many and that it is not common in the area. One woman has planted seeds (*D. cinerea* and *P. thonningii*) in her compound so that in the future she does not need to go far to collect pods.

The reasons why some people do not collect tree pods for use as a livestock feed was addressed during the interviews. The most common reasons given were the same in each of the four survey sites: a lack of knowledge of the practice; a lack of understanding of the benefits, and laziness. A few people also mentioned that there was no need due to small herd sizes (especially Wards 11 and 15 in Bubi District), sufficient feed throughout the dry season and because goats fend for themselves naturally.

Pod collection periods

There was some difference between individuals concerning the months when they collect tree pods but the general collection period, April to August, did not vary between districts. Within this period, most people mentioned June and secondly July as the months when most pods are collected. The variation in collection months was due to differences in when pods ripen, but June was said to be a windier month and therefore many of the pods are blown to the ground.

The most common time mentioned for pod collection was in the morning on weekdays (6/7/8am up to 10/11am) before goats are let out to feed. However, some people collect throughout the day both during the week and at weekends and some children collect pods after school. A few respondents also mentioned that there was one day in the community when people are not allowed to work in their fields (Wednesday in Bubi District) and that a number of people collect tree pods on that day.

Quantity of pods available and variations

In 1999 pod yields in different locations within Matebeleland South province were very low compared to previous years.

The farmers were asked about variations in pod yields and possible reasons for these. Some farmers had not noticed any annual variations in pod yields and others gave conflicting views; some mentioned that when there is less rain, there are fewer pods and others that if there is little rain, there are more pods. A more common observation was that low pod yields are a result of a lot of rain at the critical flowering stages (October to December). This damages the flowers before pollination has taken place and results in low pod yields.

Variations between the quantity of pods from different trees were attributed to the fertility of the soil and the size of the tree; the more fertile the soil and the bigger the tree, the greater the pod yield. One interviewee observed that some trees are producing fewer pods as a result of the parasite 'Mistletoe'. Others observed variations in the time that pods ripen but had not noticed any particular differences in total yields between tree species.

Quantity of pods collected

The quantity of tree pods collected annually varied between households (from one 50kg sack to ten 50kg sacks). However, there was no clear relationship between the quantity of pods collected and location or goat herd size. For example, one household with 47 goats collects 2 sacks of pods each year and another with 6 goats also collects 2 sacks of pods each year.

The quantity collected per day depended on a number of factors: the number of people collecting, the collection time, the quantity of pods available and whether other activities were being carried out concurrently. Due to these factors, it is not possible to calculate the average amount of time needed to collect a particular quantity. However, to give some indication of the time being spent on collection, the estimations ranged from 4 hours to 1 day to collect a 50kg sack of pods.

Methods of collecting pods and pod quality

In Matobo District, those collecting tree pods collect them from the ground. Several said that striking pods from the tree is not normal and that if you do strike and get fresh pods, these will spoil in storage. Collecting pods from the ground is favoured because they are ripe and dry and therefore good quality. All the interviewees who collect pods said that they collect dry pods because green ones rot in storage and also goats do not like the smell of green pods.

In Bubi District, pods are collected from both the ground and the trees. Those collecting from the trees think that the quality of the pods is better because they are cleaner than if they had fallen to the ground. They overcome the problem of unripe pods and possible spoilage by drying the pods. They also said that where pods are collected from depends on the time of collection; there are likely to be fewer pods on the ground in the afternoons because the goats will have already eaten them. Two other people mentioned that where pods are collected from depends on the type of pod. *D. cinerea* do not fall to the ground

and are therefore picked from the tree. Pods of *P. thonningii* and *A. nilotica* are picked from the ground.

The goat owners were also asked if they had noticed any difference in the quality of pods according to **when** they are collected (i.e. whether they are collected in April, June or August). This was considered a confusing question because most judged the quality of the pods according to ripeness and whether they were completely dry and the month they are collected does not influence those characteristics.

Marketing of pods

Marketing of tree pods was not common in any of the survey areas. Only one group of goat keepers (who are part of a specialised goat project) buy pods from local children who collect tree pods after school and at weekends. They are paid in kind; 1 biro per 2 litre tin of pods, which is equivalent to Zim\$0.5 per 2 litre tin.

In Ward 3 in Matobo District, some people said that pods were collected and sold in the past but that it only happens in very bad drought years. During the drought in 1992, a 20 litre container of pods cost Zim\$1. However, the practice of buying and selling pods is not common now and some consider it a bad practice because it encourages people to pick green pods.

Quantities of pods fed to goats

In many cases the quantities fed to an individual goat were not known or were difficult to quantify. Some farmers were able to estimate the amount fed to their goats but they are difficult to compare because of the units used³, the frequency of feeding pods and the form in which the pods are fed (whole or crushed). Table 8 details the estimated quantities fed per goat from different respondents.

Table 8: Individual estimates of the quantity of tree pods fed per goat per day

Location	Amount fed per goat per day	Frequency	Form
Ward 3, Matobo	500 ml	Every two days	Whole
	2 litres	Daily	Whole
	500ml	Daily	Whole
	1 litre	Once per week	Whole
Wards 3 and 16, Bubi	500g	Every day	Whole
	0.5 litres	Not every day	Whole
Wards 11 and 15, Bubi	250g	Sometimes daily	Crushed
	0.8 litres	Daily	Whole

Those who do not feed pods every day said that pods are fed according to availability of other feed sources and one person said that if pods are fed to the goats every day the condition of the goats would improve too quickly and that could cause death. To avoid this they feed pods every other day interchanged with hay.

³ The quantity fed was generally estimated according to the container used to measure out the pods. Some used litre/ml containers and others used kg/g containers (of particular market goods such as jam).

Processing of pods

The majority of goat owners interviewed feed whole tree pods to goats. This was particularly true in Matobo District where no-one processes the pods. The reasons for feeding them whole are that goats eat them whole naturally and can chew on their own. Pods in this district are only processed for pigs.

In Bubi District, three people mill/crush the pods and mix different pods together. In some cases this mixture is combined with maize bran to increase the feed quality. The reasons for processing the pods are to increase palatability and to prevent the goats from only eating one type of pod. A further three people also said that they sprinkle salt (coarse NaCl) on the pods but the reasons for doing so differed. One person does it to increase the appetite of the goats, another does it to provide extra minerals and the third does it to prevent the goats from eating too much and ensuring they drink plenty of water after eating.

Storage of pods

Collected pods are mainly stored in drums and bags/sacks. A few people store pods in storerooms, granaries, cribs (*ingalani*) and on raised platforms to protect them from goats. All said that there is little or no wastage if the pods are stored dry. If the pods are kept in a storeroom, it needs to be aerated to prevent storage losses.

Detrimental effects of feeding on pods

In Matobo, a few respondents had noticed that when goats eat too many pods, they 'get fat' or their condition improves very quickly (due to the protein content of pods) and this can cause them to get ill and even die. One person identified this as pulpy kidney disease (enterotoxaemia) and had noticed that it was a particular problem in July and August when there are plenty of pods available on the ground. As mentioned previously, one person counteracts whatever it is causing the goats to get sick by sprinkling the pods with salt so that they eat fewer pods and drink water after eating.

Some farmers in Matobo had also noticed wounds in the intestines of goats when they slaughtered them and thought that these wounds were also associated with eating tree pods. Another farmer mentioned that some of the seeds (i.e. *nilotica*) could get stuck in a goat's rectum and cause death.

No detrimental effects of feeding goats on different browse pods have been observed by farmers in Bubi. However, one person noticed that their cattle got bloat from eating too many pods.

Labour availability and constraints

Labour needed to collect and process tree pods was discussed with the groups and individual households. The period when the pods fall and can be collected (April to August, but mainly June and July) does not conflict with heavy labour demands in the fields because harvesting is finished by the end of May. Grain threshing takes place in June but those already collecting pods generally collect them for a few hours in the morning (before the goats are let out) and said that labour is not a constraint to

collection. Alternatively, pod collection can be combined with other field activities where trees are in their fields or people can make use of the weekday when field activities are prohibited.

Those currently collecting tree pods consider the activity important and include it in their plans. Furthermore the activity is shared amongst several household members. In Matobo District, pod collection is mainly carried out by women and children, whereas in Bubi District, the male household heads also participate in pod collection. Also, as indicated previously in the report, farmer estimates suggest that a substantial quantity of pods can be collected in a relatively short period of time (e.g. one 50kg sack in one day).

Nearly all households who currently collect pods feed them to their goats unprocessed, so there are few labour demands other than collection. One group of farmers in Matobo District were asked if labour would be a constraint if the researchers recommended that pods be fed to goats processed. They thought it would require a significant amount of labour if done by hand and that it would be too expensive to mill the pods by machine. The cost of milling maize is currently Zim \$5 for a 20 litre bucket. In contrast, those people already grinding/crushing pods in Bubi District did not consider labour a constraint. One woman crushes pods using a mortar and pestle and said it is not difficult or time consuming.

Tree tenure

Tree tenure was discussed with all the farmer groups and individual households. The situation was similar in all areas; trees on land communal land belong to the community⁴ whereas trees on households' land (within homestead compounds, within fields and in some areas on land near the home) belong to the households. Permission needs to be sought from the households before pods can be collected from their trees. In some areas use of trees on communal land was limited to members of the village whereas in other areas use of trees was open to anyone.

All the interviewees said that if the value of trees increased (i.e. as a response to an increase in the value of tree pods) there would be no change in ownership; no-one would be able to make a claim on the trees. Most people felt that there would also be no change in use rights. They were asked whether some people may suffer if others collected more pods than they are currently doing but most people tended to be of the opinion that it was up to each household to make sure they collected enough for their own livestock. However, several said that if problems were encountered in the future then the community would have to discuss the problems and work out solutions.

In Matobo District many of the goat owners interviewed compared the use, and potential use, of tree pods with the case of Mopane worms. Previously, people from outside the villages used to be allowed to come and harvest Mopane worms. However, when they realised the commercial value of the worms and when some were unable to sell their worms because of outsiders saturating the market, the communities met to discuss the issue. They decided to prohibit outsiders from collecting Mopane worms and collection is now monitored by the communities.

⁴ Generally the community referred to the village

Within the villages there are no restrictions on collection. Some people collect a large quantity and some people collect none; it depends on individual entrepreneurship. Tree pod collection is viewed in the same way. If collection increases and those people who are less able to collect or choose not to collect are left with fewer pods available on the ground and/or later into the dry season, it is their own problem.

Conclusions

Site selection for on-farm monitoring, trials and pod collection was based on a preliminary analysis of the survey data. In Matebeleland South Ward 11 was selected, mainly because livestock feed was ranked as an important problem and because there is currently very little use of collected tree pods as a feed source in the late dry season. This compared to Ward 3 in Matebeleland South where livestock feed was not considered a big constraint and nearly all the interviewees already collect and feed tree pods. In Matebeleland North the second site visited (Wards 16 and 3) was selected because of the larger goat herd sizes, the higher ranking of livestock feed as a constraint and the fact that a large number of goat owners are not currently storing and feeding tree pods.

Issues arising from the socio-economic survey for further scientific investigation include: the disadvantages of using fresh pods; and the advantages of milling, mixing pods of different tree species, mixing pods with bran, feeding pods on alternate days, and feeding pods mixed with salt.

The survey results suggest that labour should not be a constraint to increased use of tree pods as a dry season feed source. However, it would be worthwhile collecting more accurate data on the amount of time required to collect a certain quantity of pods (and at different times of the day). This data could be used together with the project's recommendations of quantity to feed per goat per day to calculate the labour required. A similar exercise could be carried out for labour required for processing if this is to be recommended.

The survey results also suggest that to livestock owners in the villages tree tenure is not currently a problem nor do people envisage it will become one, even if the value of tree pods increases and tree pod collection increases. However, it would be worthwhile discussing tree tenure and land tenure issues at the District Council level to verify that this is the case.

Appendix 1: Indigenous knowledge and management strategies on goat production and marketing - Checklist

1. Role of goats in the farming system

- Goat owners (gender/female-headed households)
- Goat herd sizes
- Which livestock do the households own? Rank in order of importance (ask afterwards what ranking criteria used)
- Why goats are kept/objectives of goat production (ask farmer to list reasons for keeping goats and then rank them)
- If goats milked, in what circumstances? Quantity of milk? What is the milk used for (if consumed then by whom; sold; processed for consumption and/or sale)?
- Marketing systems
 - What goat products are sold
 - Where
 - To whom
 - When (what periods of the year)
 - Prices (are goats for meat sold according to age/weight/size/other)
 - Changes in marketing systems in recent years
- Any changes in the role of goats in the farming system in recent years?
- Future expected changes?
- Main constraints to goat production (ask farmers to list them and then rank)
- Goat productivity figures
 - When are kidding conception and birth peaks
 - How many times does kid per year (on average)?
 - Kid mortality (number or proportion that die, which months and when most severe, how soon after born)
 - Abortion rates (how often, when is it most severe)
 - Twinning rates
 - What factors affect kid mortality, abortion, twinning rates and number of times does kid/year
- Diseases: any indigenous remedies for worms?

2. Management practices

- Who is responsible for managing goats
- Kraaling and feeding/herding practices
- Feeding strategies – past, present and future
 - Feed calendar (present): monthly calendar showing feed sources and use
 - Seasonal variations
 - Historical changes (5 – 10 years ago)?
 - Feed sources (rank) according to quality and quantity
 - When is the period of greatest feed shortage (indicate months * severe, ** most severe)
 - Do any factors cause variation in the feed shortage months
 - Quantity or quality constraint – theoretical ‘if had 10 additional ‘units’ of two different types of feed (one quality, one quantity(eg. pods and straw?)), which livestock would they feed it to and in which months

3. Current use of trees

- Which trees do people use the pods from?
- Who uses them?
- For what purposes
- Does anyone buy pods? If so, what quantity, what price, bought from whom/where?
- Does anyone buy sell? If so, what quantity, what price, sold to whom/where?
- Which tree pods are preferred (for the different uses) and why?
- Any processing? What, why and by whom? If not processed, why not?
- Any storage? If so, how? For how long? Any deterioration in storage?
- Quantity of pods used for feeding goats (total and quantity fed per day)
- What are the beneficial and detrimental effects of feeding pods to livestock/goats? Reasons for detrimental effects?
- Have farmers noticed any effects on germination of seedlings from pods passing through goats
- Quantity/proportion of pods being used at the moment (from different tree types)
- Does pod quantity vary? If so, what factors do farmers associate with the variation?
- What level of use could the trees bear?
- Other pods available but not being used (from same trees being used by some farmers and from other trees)? Why not?

4. Tree tenure

- Who do the trees belong to now (on own land/communal land/other)?
- Who is currently allowed to use tree products
- What do people who have trees but no goats feel about others using their tree pods?
- If they increased in value, who could make a claim on the trees
- Would the increased use of pods lead to any problems

5. Labour issues

- Who is currently collecting pods? (Any payment? If so P per Q?)
- When is this carried out?
- Time required to collect x quantity of pods
- Labour required for other aspects of processing, storing and or feeding pods? Quantity, by whom and when?
- What other activities take place at the time when pods are/need to be collected?
- Would pod collection conflict with other labour requirements?
- Are there other constraints (other than labour) to pod collection?