



Livestock production systems and potential feed and forage options in Zwabagamba in Gwanda District, Zimbabwe

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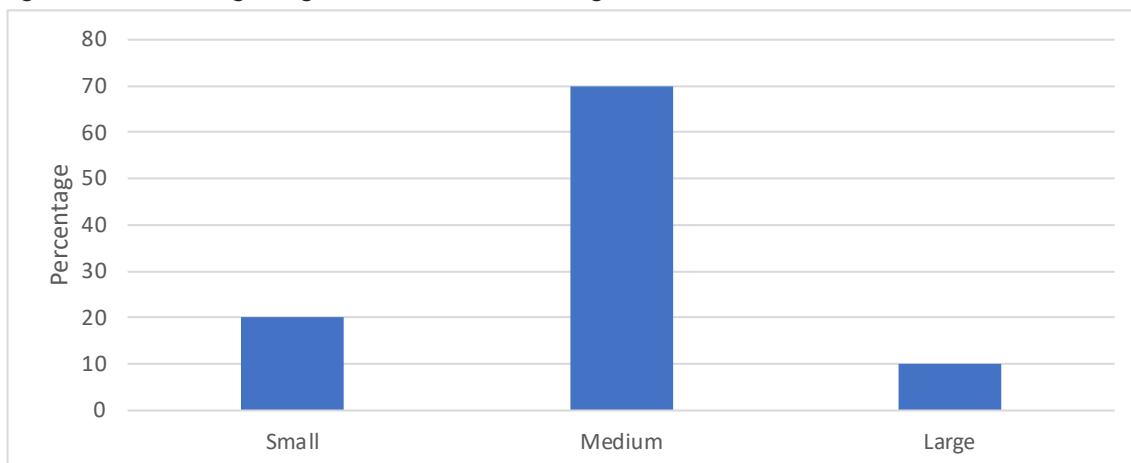
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1 Introduction

The study was carried out with the objective of gathering information on the livestock and cropping activities of the Zwabagamba community in ward 15 of Gwanda District. The information collected will help researchers to design feeds and feeding strategies to increase livestock production in the district. The study was carried out on 14 April 2021.

Eight women farmers were mobilized by agricultural extension officers in Gwanda District. The participants were interviewed through focused group discussions after which three of the participants were selected for individual interviews based on the size of their farms. The farm categories were classified as small, medium and large with sizes ranging from less than 2 ha, 2 to 3 ha and more than 3 ha, respectively (Figure 1). The farmers were interviewed by three female interviewers comprising the facilitator, note taker and timekeeper. The team of interviewers consisted of two AGRITEX extension officers from Nkayi District and one staff member from Lupane State University.

Figure 1. Land holding categories of farmers in Zwabagamba.



2 Farming systems

All farmers in Zwabagamba have some land under their control with farm sizes ranging from one to five ha as presented in Table 1. Zwabagamba is a community of about 200 households, 30% of which are female headed. The number of people per household is 8 with a range of 5 to 10 members per household.

Table 1. Land size and land ownership pattern

Category	Range of land size (ha)	% of households in each category
Small	<1 ha	20
Medium	2–2.5ha	70
Large	3–5 ha	10

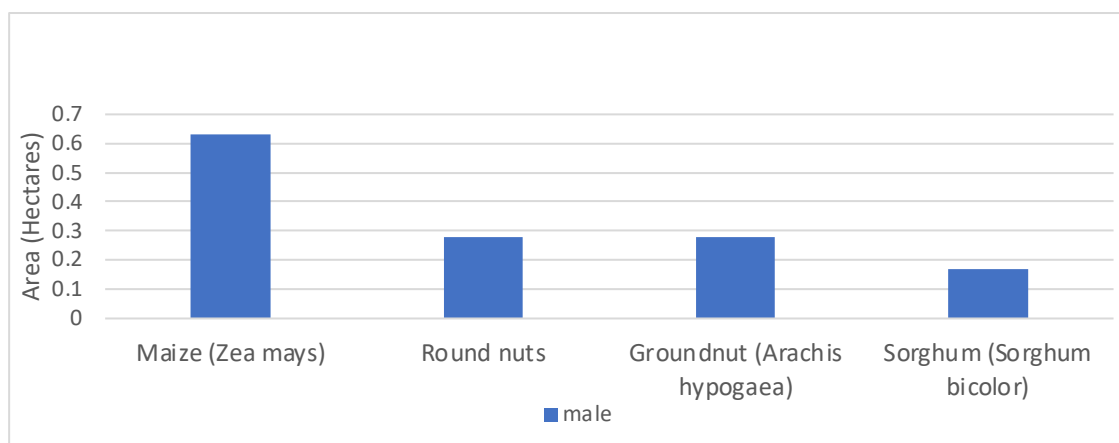
Distribution of households in the different farm size categories is similar for female and male headed households (Table 2). Most households fall in the medium farm category for both female and male headed households. The large farm size has the least number of households for both categories of household heads.

Table 2. Land ownership by gender

Category	Range of land size	Households in the category	Proportion of male headed households	Proportion of female headed households
Landless	0	0	0	0
Small	1–2	20	14	6
Medium	2–3	70	49	21
Large	3–5	10	7	3

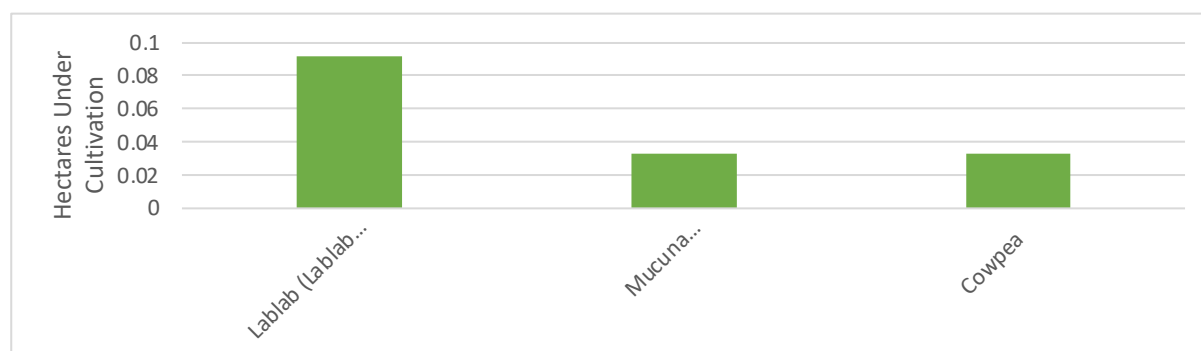
All farmers who participated in individual interviews were from male headed households and major crops grown are maize, roundnuts, groundnuts and sorghum (Figure 2). Maize is planted on more than 0.6 ha while groundnuts and roundnuts take about 0.3 ha each. Sorghum takes up about 0.2 ha of the cropping area.

Figure 2. Dominant crops cultivated by male headed households.



Land allocated to fodder production is very small. Farmers grow legume fodder crops such as *Lablab purpureus*, *Mucuna pruriens* and *Vigna unguiculata* (Figure 3). *Lablab purpureus* is the most popular taking up on average an area of nearly 0.1 ha. Fodder crop production is hindered by limited seed supply and late disbursement of seed.

Figure 3. Fodder crops grown in Zwabagamba.



Both male and female headed households do most of the farming and hire labour for activities such as ploughing, crop harvesting, preparing threshing floors and threshing small grains. Household labour availability is influenced by migration of household members with men comprising 50% and youth and women consisting of 30 and 20%, respectively. The major reason for migration is to seek jobs which are found elsewhere. In addition, some men temporarily migrate in the dry season for the purpose of finding grazing for their livestock, a process called 'ukulagisa'. Farmers indicated that both female and male headed households hire labour which is easy to find but is expensive. The labour cost is dependent on the type of labour hired with female labour being cheaper than labour provided by men (Table 3). Labour is paid using the South African rand (ZAR) or in exchange for cereal grains.

Table 3. Activities that farmers hire labour for and the cost of hiring by gender

Activity	Cost of hiring man labour (ZAR) ^a	ZWD ^b equivalent	Cost of hiring woman labour (ZAR)	ZWD equivalent
Ploughing	250	1,800	200	1,440
Crop harvesting	100 kg of maize	4,320	50 kg of maize	2,160
Crib construction	150/cart	1,080	120/cart	862
Preparing threshing floor	–	–	30–50 kg s grains	2,160
Threshing small grains	100 kg maize	4,320	60 kg maize	862

a. ZAR (South African rand) (USD 1 = ZAR 16.8810 at 08 July 2022).

b. ZWL (Zimbabwean dollar) USD 1 = ZWL 361.9000 at 08 July 2022.

Zwabagamba area receives very low rainfall which occurs from November to April with the score of less than 1 to 2 for the rainy season. The period between May and October is dry. The year is divided into four seasons based on activities that farmers do at these times. The four seasons are ikwindla, ihlobo, intwasa and ubusika (Figure 4). Ikwindla season falls between November and March when it is raining, farmers do land preparation and planting during this season. Ihlobo season also falls into the rainy season from February to April. In this season farmers harvest green mealies (maize), fresh groundnuts and roundnuts as well as cucurbits for home consumption and sales. The third season intwasa occurs from May to June and coincides with the onset of the dry season when farmers harvest the dry grain crops and collect maize stover. This is the season that construction activities such as brick moulding and building are also done. Ubusika season falls between August and October, this is the driest period of the year, construction activities continue and gardening activities as well as early land preparation are also done.

Figure 4. Farming seasons and activities carried out in each season.

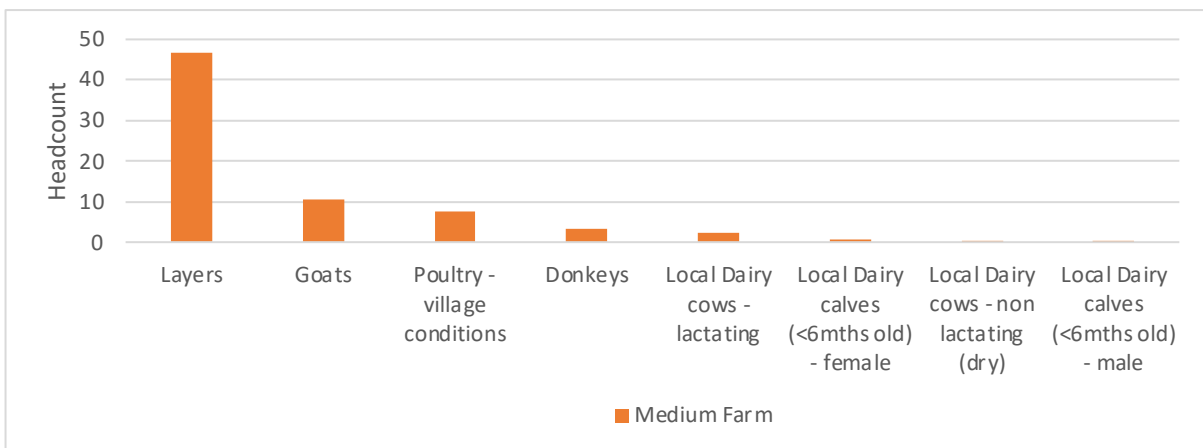
Season	Farming activities	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Ikwindla (November to March)	Planting, stumping, fencing	■											■
Ihlobo (February to April)	Harvesting fresh crops e.g. green mealies, roundnuts, groundnuts and cucurbits for home consumption and selling		■	■	■	■							
Intwasa (May to June)	Harvesting dry grains, threshing and collecting stover					■	■	■					
Ubusika (August to October)	Gardening, preparing land									■	■	■	

Water does not seem to be a problem because access to water for irrigation and livestock is within a distance of 2 km from a nearby water sources such as the dam which supplies water throughout the year, boreholes which supply water for seven months of the year and ponds which supply water during the rainy season. Men and women have equal access to water. For irrigation, farmers use drip and bucket systems to grow a variety of vegetables such as leafy vegetables, tomatoes, onion, okra, sugar beans, maize, butternut and carrots. All farmers have access to water for livestock, however, elderly members are unable to drive cattle to drinking points hence some cattle find their own way to these points. This can be dangerous for the cattle in the late dry season when there is high risk of cattle being stuck in mud as the dam dries out.

3 Livestock management systems

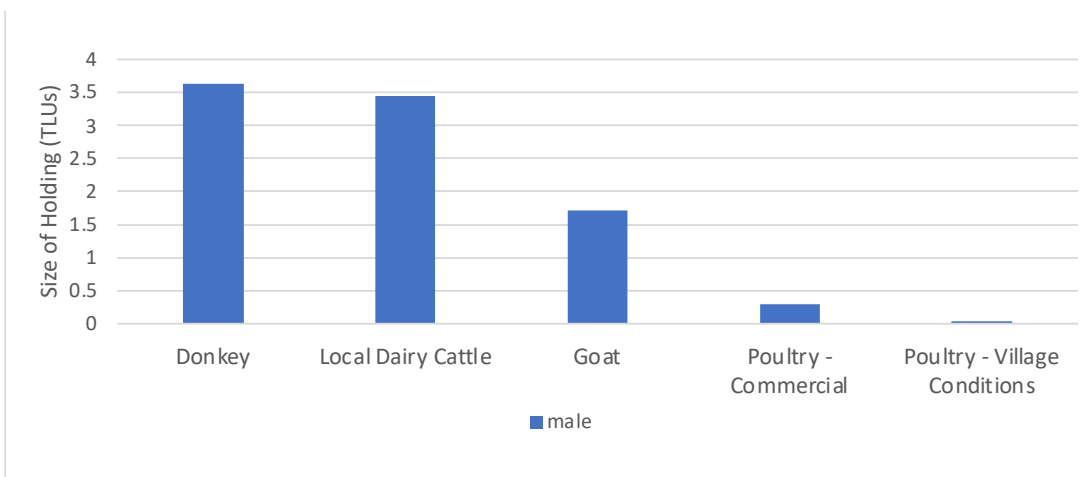
Farmers in Zwabagamba have a range of livestock that include donkeys, cattle, goats, poultry and pigs. Over 90% of households own chickens, goats and donkeys. On average each household owns 10 village chickens which are used for meat and income generation as well as 10 goats used for meat, milk and manure production. Each household owns an average of four donkeys, which are used for ploughing, drawing water, transport and hiring out. Sixty per cent of the households own cattle that provide milk for home consumption, draught power, manure and some income. Poultry and goats are the main sources of income. This information from the focus group discussion is in line with data collected from individual interviews (Figure 5).

Figure 5. Average livestock numbers per household in Zwabagamba.



When using the tropical livestock unit (TLUs) equivalent, the five most dominant livestock per household are donkeys, local dairy cattle, goats, commercial chickens and village chickens (Figure 6).

Figure 6. Dominant livestock categories in TLUs by gender of household head.



Livestock are housed in kraals constructed from poles where feeding troughs in the form of drums are provided. The livestock are penned at night and are mixed in terms of sex and ages. Calves and kids, however, are separated from the older animals. Feeding for goats and cattle is through open grazing in rangelands. Newly acquired goats are tethered to prevent them from getting lost. Animals use grazing without supplements from December to July and are offered bought supplements from the months of September to early November.

The farmers estimated that about 60% of households' process livestock feed. The feed is mainly maize stover and legume haulms, which may be mixed with salt to improve palatability. About 30% of farming households offer concentrates to their livestock. It was noted that livestock from male headed household can have access to feed in the dry season through the process called 'ukulagisa' where men go to camp with cattle in areas that are far but have abundant herbage. Men were said to be stingy as they were averse to selling their livestock to cater for the needs of the rest of the other animals. Women on the other hand are willing to sell some of their livestock to secure feed for other animals but they may be limited by lack of resources. Overall feed availability for livestock is moderate to no problem of feed supply in the growing season. However, there are severe shortages of feed for livestock in the dry season.

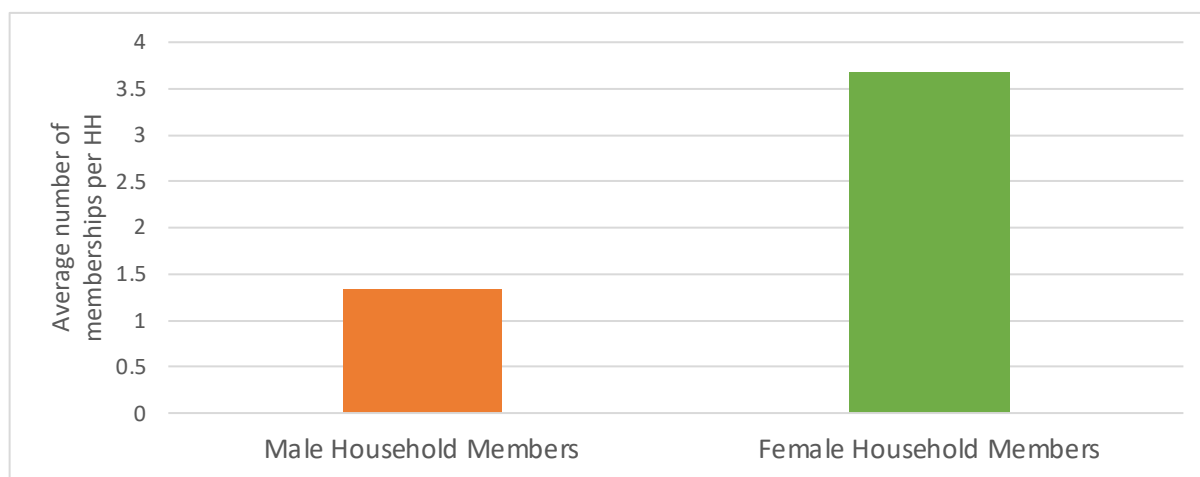
Major diseases of cattle are black leg (umkono), lumpy skin disease and tick borne diseases. Poultry are affected by diseases such as New Castle disease, fowl pox, infectious bursal disease, and eye infection. They are also affected by lice, mite and tampans. Goats suffer from foot rot, liver fluke infestations, pulpy kidney (siyezi), heart water (nyongo) and eye infection problems. Farmers access veterinary consultation services within their communities for free, but they have to buy drugs. Farmers also access free consultation from local people on use of traditional medicines for treating livestock diseases.

The community has no access to artificial insemination services and hence mainly uses natural service to breed their cattle. The major reproductive problems include general oestrus, dystocia as well as abortions. The farmers also described myths related where farmers who own bulls and are said to use traditional medicines to make mated cows to either abort or have stillbirths. They cited this as a major problem when cattle graze communally and bulls mate freely with any cow that may be on heat.

Decision-making on livestock is made jointly by men and women for cattle and goats while for poultry decision-making is made by women alone in 66.7% of households and jointly decided in 33.3% of households. They get inputs such as fertilizers and seeds from government. Veterinary medicines are accessed from veterinary offices and local stores. However, farmers indicated that these medicines are not available most of the time. Lack of credit facilities and limited supplies of veterinary medicines affect female and male headed households in a similar manner.

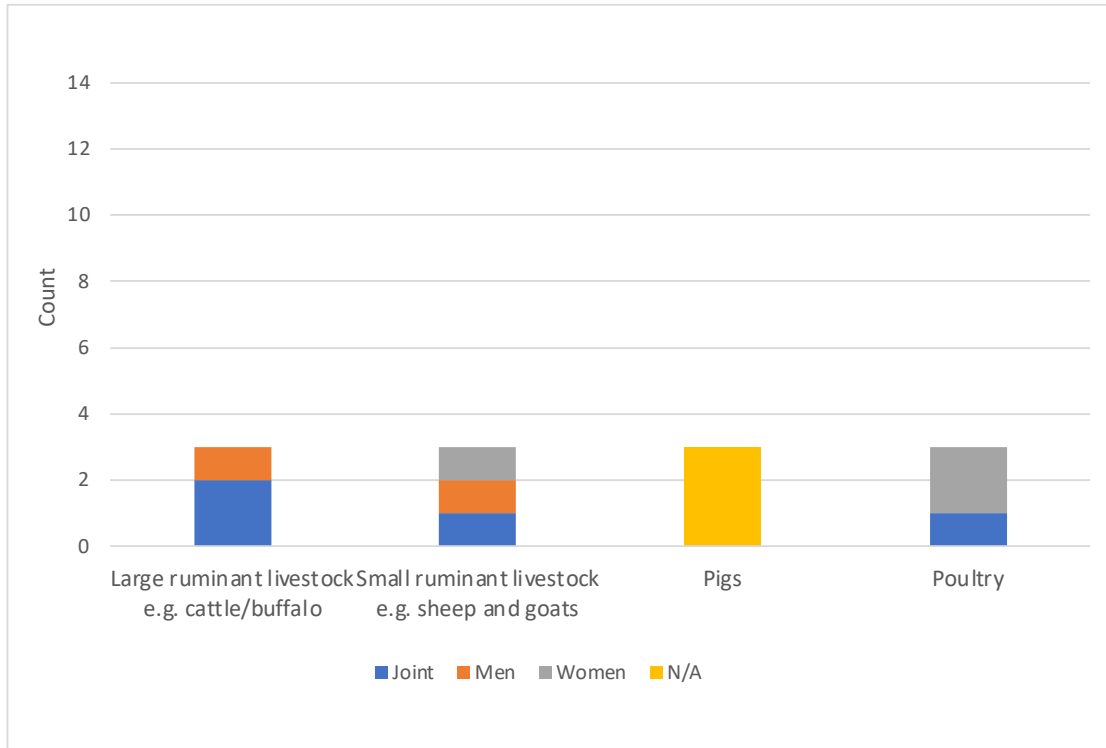
Farmers have no access to credit facilities. They however belong to local poultry and goat production clubs. They use proceeds from these clubs to finance non-agricultural activities. Membership to these cooperatives is higher for women than men (Figure 7). This could be explained by the fact that most men work elsewhere and may be home a few times in a year.

Figure 7. Membership to cooperative/farmer organization by gender.



Gendered decision-making on livestock is presented in Figure 8. Decision-making on large ruminants is done jointly or by women and men separately in different households. Decision-making on small ruminants is variable and peculiar to household with equal representations of households where decisions are made jointly, women alone and men alone. For poultry women make decisions in 67% of the households while decision is made jointly in 33% of households. There were no households keeping pigs among farmers who participated in individual interviews.

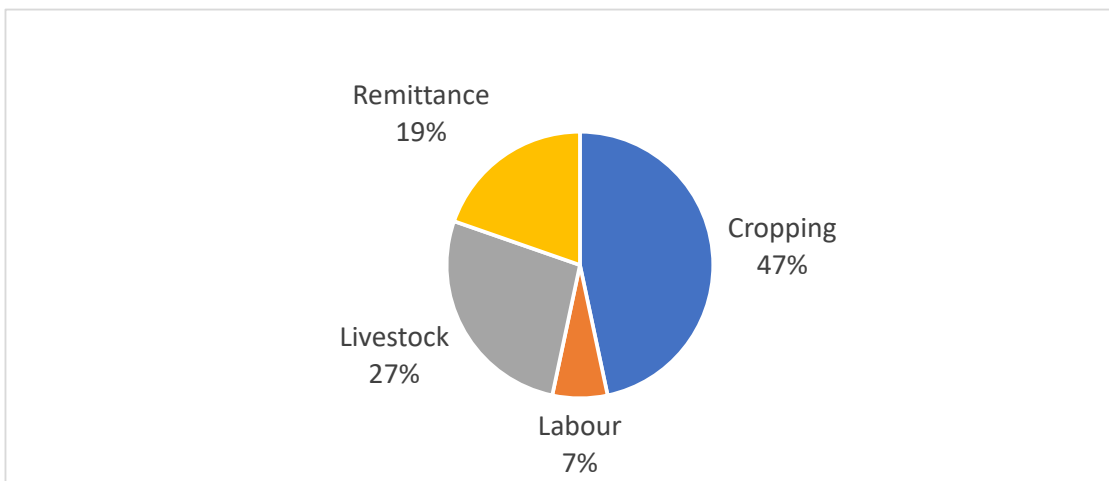
Figure 8. Gendered decision-making on livestock.



4 Major income sources

The major sources of income for households are the sale of crops and livestock, remittances, labour services and hiring out of draught power (Figure 9). Nearly half of the income comes from crop production, income from livestock come from sale of goats, chicken, cattle and eggs as well as hiring out of draught power. Milk from cattle is produced for home consumption and not for commercial sale.

Figure 9. Average household income by source.



Livestock contribute more than half of income for women (Figure 10). Most of this income comes from sale of goats, chickens and eggs and hiring out of donkeys. Cropping also contributes a significant amount of income to women while labour contributes just over 6% of the women's income.

Figure 10. Major sources of income for women.

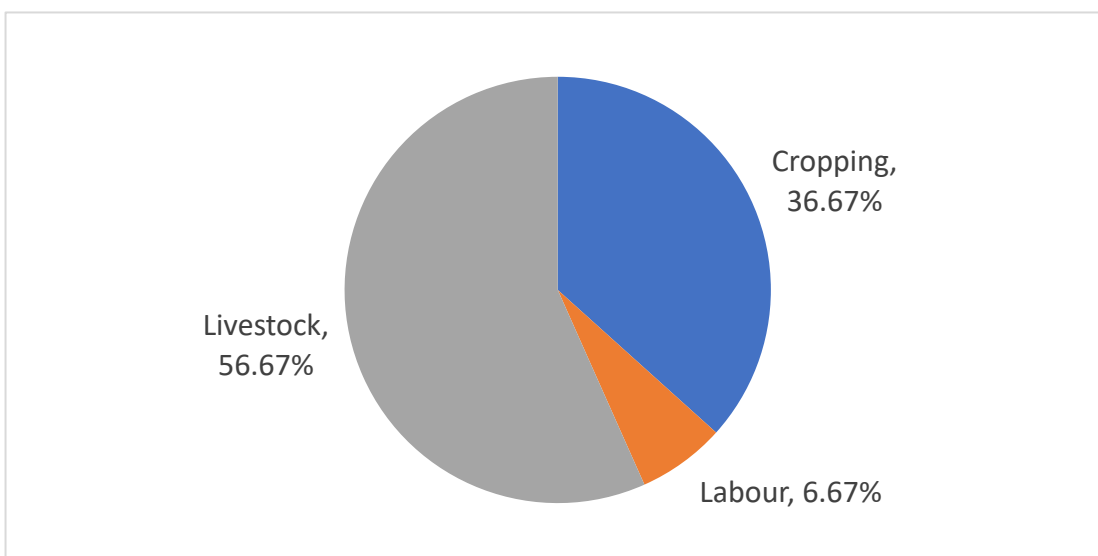
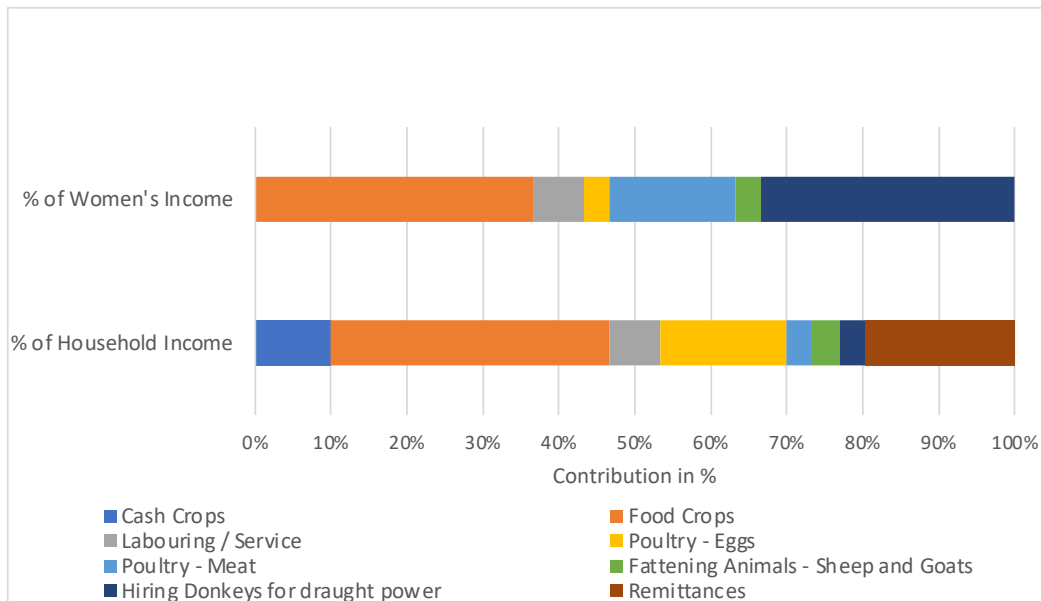


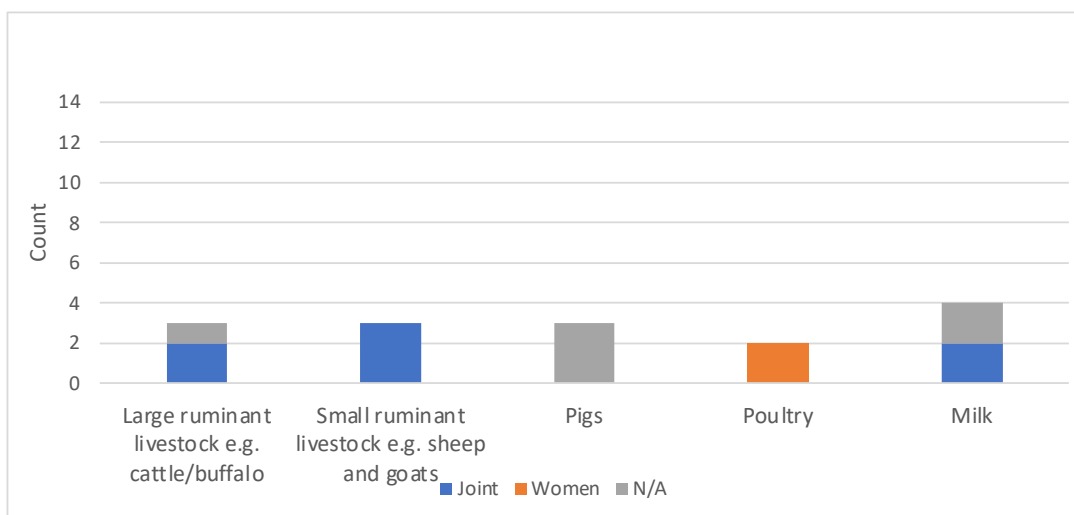
Figure 11 shows that nearly 57% of women’s income is derived from livestock, the major contribution coming from hiring out of donkeys, chicken meat and egg sales and goat meat. Sale of food crops contributes nearly 37% of women’s income.

Figure 11. Relative contribution of major sources of income to women’s income.



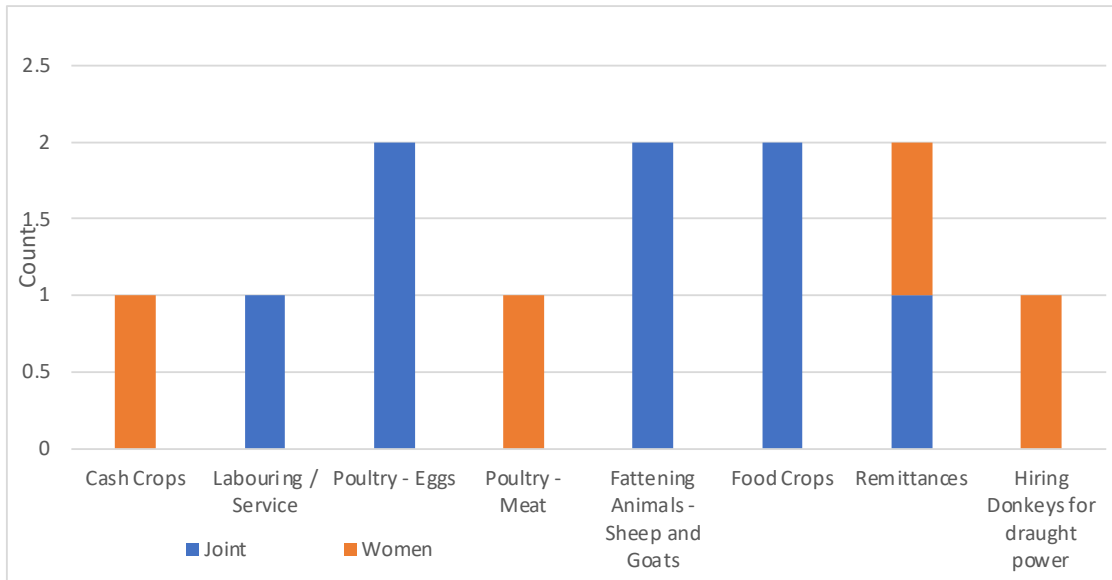
For households who own large and small ruminants, decision-making of sales of livestock and milk is made jointly, while for poultry decision-making is done by women in 67% of the households (Figure 12) and jointly in the remaining 33%.

Figure 12. Gendered decision-making on sales of livestock and milk.



Households employ joint, men only and women only decision-making on income sources. Joint decision-making is employed on hiring out of labour, sale of poultry eggs, fattening of sheep and goats as well as sale of food crops. Women make decision on cash crops, poultry meat and hiring donkeys out as draught power. Decision on remittances is made jointly in 50% of households and by women in the rest of the households (Figure 13).

Figure 13. Gendered decision-making on major income sources.



5 Major sources of feed

The major sources of livestock feed are grazing, collected fodder, crop residues and purchased survival feed. Their contribution to feed resources is shown in Figure 14. The feed resources such as grazing are abundant during the rainy season and early dry season. Grazing is complemented by crop residues, collected feed and survival feed in the dry season. The major crop residues are derived from cereal and legume crops and they become available from April up to November. The critical months in terms of feed shortage are September to November which coincides with the driest part of the year (Figure 15).

Figure 14. Major feed sources for livestock.

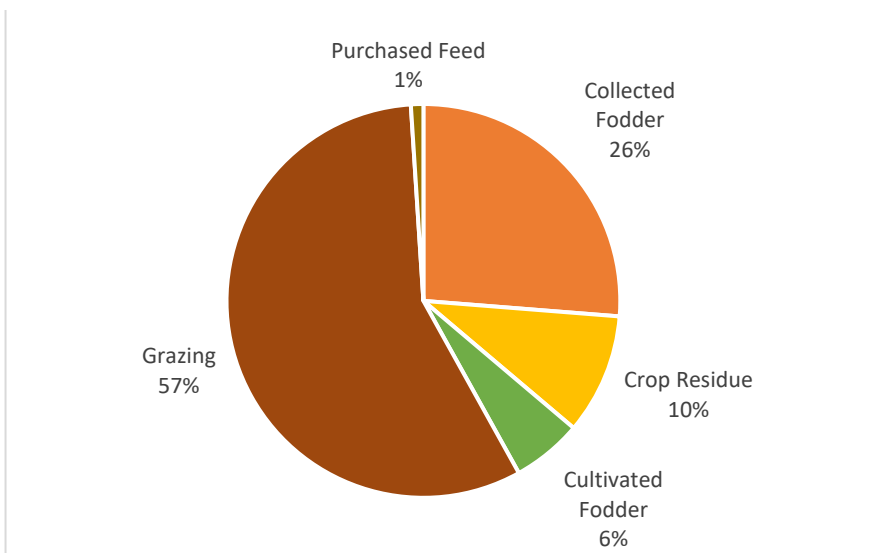
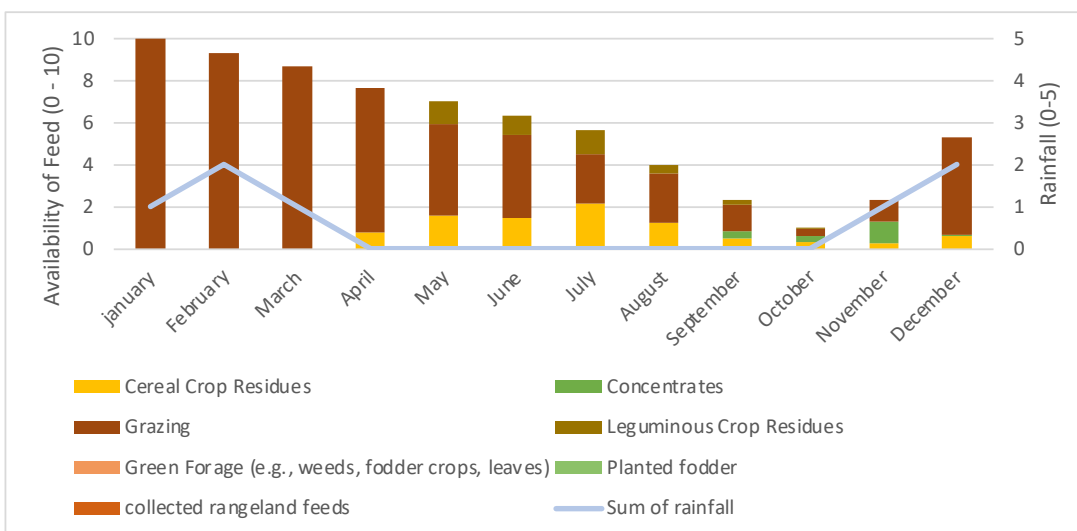
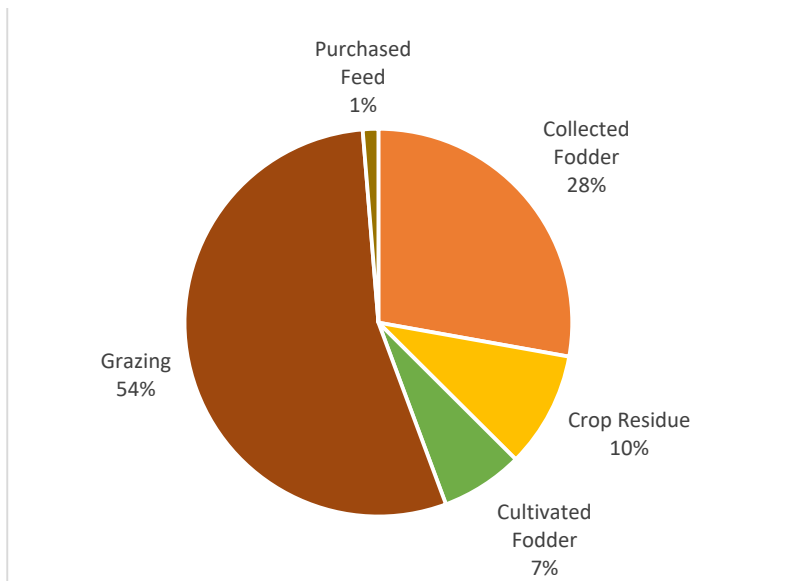


Figure 15. Months in terms of feed shortage.



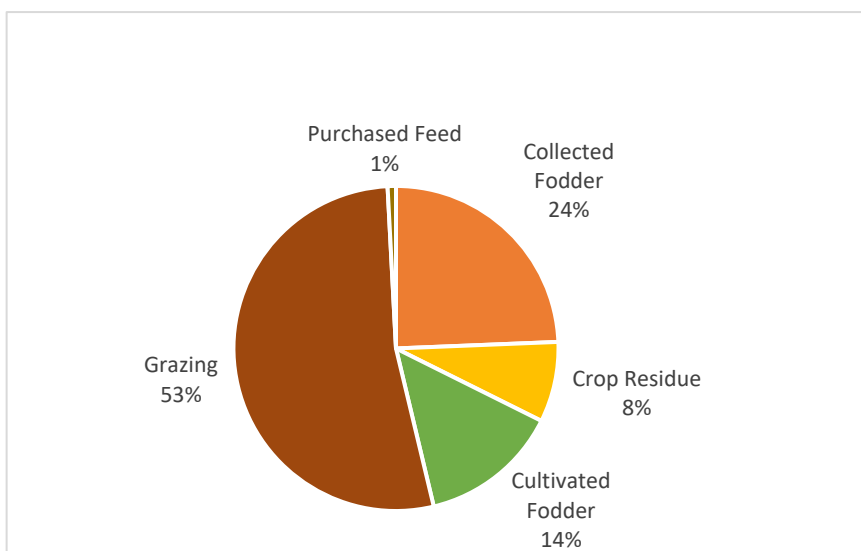
Grazing contributes the major nutrients to livestock, i.e. metabolizable energy (Figure 16 and crude protein Figure 17). The contribution to nutrients follows the same pattern as the proportional contribution of different feeds to the livestock diets.

Figure 16. Major sources of metabolizable energy.



Grazing is the main source of crude protein. It is complemented by other local feed sources such as collected fodder which includes grasses, tree pods and weeds, cereal and legume crop residues as well as cultivated fodder. Purchased feed contribute a very small proportion to feed supply for livestock (Figure 17).

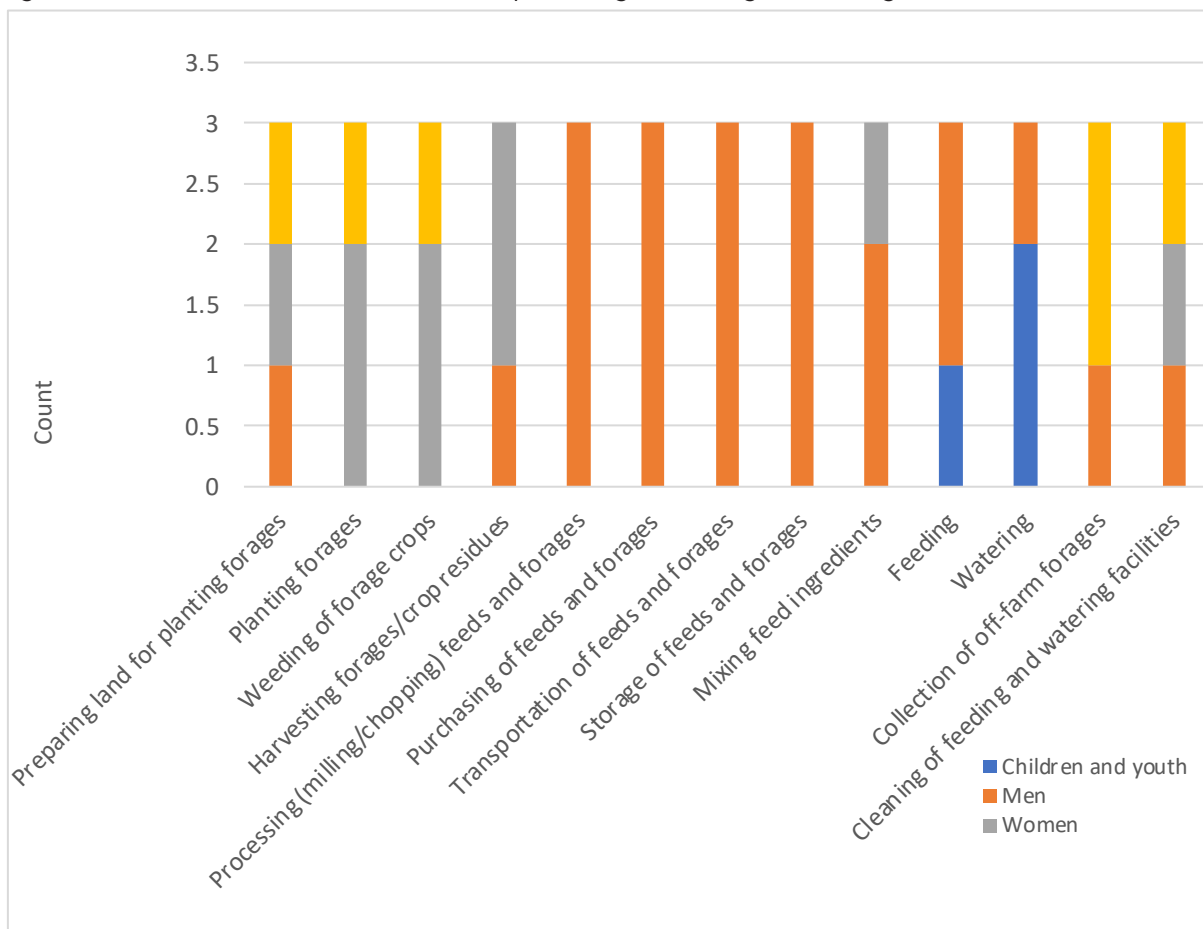
Figure 17. Sources of crude protein supply.



6 Gendered division of labour and gendered decision-making in producing and feeding fodder crops

Producing forages is done by both men and women. Preparing land is done by women in 50% of households growing fodder crops. Planting and weeding are done by women while harvesting of fodder is done by men and women in 67 and 33% of households, respectively. Processing, purchasing, transporting, collecting and storing feeds are done by men in all households. Activities that involve mixing feed are done by men and women in 67 and 33% of households, respectively. In 50% of households with livestock, cleaning of watering and feeding facilities is done by either men or women (Figure 18).

Figure 18. Gendered division of labour in feed producing, harvesting and feeding.



7 Problems and opportunities

Farmers in Zwabagamba cited stock theft, finance, feed availability, markets and animal health as constraints in order of importance in producing livestock. These problems affect both male and female headed households in a similar way. Farmers ranked feed availability as a third constraint to stock theft and availability of finance. The reason for this was that stock theft was difficult to contain as suspected thieves use proceeds from sales of stolen animals to bribe the defence lawyers in court. In addition, the thieves are daring as they steal livestock from the kraals and sometimes do it in broad daylight. Finance poses a limitation to expanding livestock enterprises as well as to purchasing dry season feed supplements. Health was ranked last because farmers felt that it was pointless to invest in the health of animals which had a high risk of being stolen.

7.1 Key feed constraints and opportunities

Farmers cited poor rainfall as a key constraint to availability of adequate feed resources. The rainfall in the area is low and was scored between 1 and 2 on a scale of 1–5. The low rainfall limits fodder production leading to low yield of forages and pastures. Feed constraints are severe in the dry season and farmers have to travel and make temporary camps in faraway places in search of more grazing. Farmers reported that they have adequate land, but they are not growing fodder crops to a large extent. They cited limited and late supply of forage seed as the major reasons for low adoption of fodder production. Water is available for livestock and for producing cash crops. None of the farmers are using the water to irrigate fodder crops. Constraints to feed availability may be overcome by efficient collection and storage of crop residues, training farmers in fodder production while making sure forage seeds and planting material are available locally. Farmers can plant fodder crops such as lablab, velvet beans and cowpeas. There may be need to augment these with other improved forage grasses to enhance yield and quantity of fodder supply.

There were no apparent social constraints to producing livestock. However, livestock production in the area is constrained by puddling of the dam during the dry season. At this time livestock face the risk of being stuck in the mud resulting in death if help is not availed in time. Few markets and limited number of buyers is also a big problem as farmers get low prices for their livestock. Lack of credit facilities limits farmers from expanding livestock production. While the community is near the veterinary services offices, animal health is affected by erratic supplies of veterinary medicines. Few farmers belong to farmer organizations, which make it difficult for farmers to articulate problems that they need to be addressed. Fodder production is fairly new in the communal areas hence farmers need to be trained in producing fodder so that they can improve quantity and quality of feed supply to livestock.

A summary of problems and farmer proposed solutions are shown in Table 4. The problems identified by women were livestock theft, animal health, drought, feed availability, low prices at markets and lack of credit facilities, lack of knowledge on producing fodder. On further refining with farmers drought and lack of knowledge were imbedded in limited feed availability so that the final list of five major problems was inclusive of stock theft, animal health, feed availability, low prices at markets and lack of credit facilities.

Table 4. Problems and farmer proposed solutions

Main problem	Who is affected most? (small/medium/large farms; men/women; MHH/FHH etc.)	Proposed farmer solutions	Ranking in men FGD	Ranking in women FGD
Livestock theft	All	Farmers had no solution because they had exhausted all possible channels for intervention		1
Animal health	All	Training farmers and making veterinary drugs available at nearby service centres		5
Markets	All	Engaging councillors to facilitate participation of many buyers		4
Feed availability	All	Farmers should grow their own livestock feeds AGRITEX should train farmers on producing fodder		3
Finance	All	Availing service providers at service centres		2

8 Potential interventions

The constraints to inadequate feed availability is made worse by low rainfall and droughts, which limit forage production in the rangelands. The rainfall is available for about six months from November to April during the year. The dry season follows thereafter from May to October. Farmers can mitigate against feed shortages by growing summer forages which can be conserved as hay or silage for feeding in the dry season. Since land is not limiting farmers could also set aside land to put permanent pastures to minimize on labour required for planting annual fodder crops. The other constraint farmers raised was limited and untimely forage seed supply. Farmers could solve this problem by producing their own seed for use as well as for sale to neighbouring communities. The seed plots could be established in gardens that have access to irrigation to guard against crop failure during droughts. Training in producing fodder and preserving techniques can assist farmers in ensuring consistent feed supply for livestock throughout the year. Farmers could also enhance supply of quality of crop residues from cereal crops by better preservation methods, processing and using urea or urea–molasses treatment. This would ensure using maize stover and straws from small grain crops such as sorghum and pearl millet that farmers often leave in the fields or burn.

9 Conclusion

The findings of this study show that while limited feed availability is a problem to farmers in Zwabagamba, there are problems of stock theft and lack of finance that must be solved to motivate farmers to employ suggested interventions to improve forage supply. The availability of land and irrigation water make it feasible for farmers to grow their own fodder crops.

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