RESEARCH PROGRAM ON Livestock

More meat, milk and eggs by and for the poor

Characterization of the livestock feed resources and potential for enhancing dairy productivity in Masopo, Choma District, Zambia

Beatrice Mwilima[1], Nchimunya Mulindi[1], Lauraine Mwansa[1] and Noah Ngoma Sikaceya[2]

[1]Independent enumerator
[2]Alliance of Bioversity-CIAT

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The Program thanks all donors and organizations which globally support its work through their contributions to the CGIAR Trust Fund

Editing, design and layout—ILRI Editorial and Publishing Services, Addis Ababa, Ethiopia.

Photo credit: ILRI/MFL, GIZ.

Citation: Mwilima, B., Mulindi, N., Mwansa, L. and Sikaceya, N.N. 2021. *Characterization of the livestock feed resources and potential for enhancing dairy productivity in Masopo, Choma District, Zambia*. Nairobi, Kenya: ILRI.

Patron: Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

Box 30709, Nairobi 00100 Kenya
Phone +254 20 422 3000
Fax +254 20 422 3001
Email ilri-kenya@cgiar.org

ilri.org
better lives through livestock

ILRI is a CGIAR research centre

Box 5689, Addis Ababa, Ethiopia
Phone +251 11 617 2000
Fax +251 11 667 6923
Email ilri-ethiopia@cgiar.org

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Acknowledgements

This project is funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) commissioned by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) through the Fund for International Agricultural Research (FIA). We thank Ben Lukuyu of the International Livestock Research Institute (ILRI) for training on G-FEAST and providing technical input into the report.

Introduction

The Gendered Feed Assessment Tool (G-FEAST) was implemented to characterize the livestock production systems in Choma District of Zambia at the Masopo Dairy Cooperative to be specific. The G-FEAST tool combines both qualitative and quantitative research approaches to identify if farmers/communities perceive feed as a problem and the potential solutions. The G-FEAST exercises elicit the viewpoints and perspectives of women farmers in the community regarding feeding practices and general crop and livestock production. It considers the pitfalls that households face such as the labour burden on women and their limited access to and control over resources.

The Masopo Dairy Cooperative Society is located 11 km from Choma town centre. The agricultural system in the area is classified as traditional extensive cattle production characterized by medium-large farms, poorly developed grazing systems, unimproved grasses and large herds of cattle. Over time, cattle production has gradually changed from predominant beef production to dairy production. There are a number of dairy cooperatives developed through the government of Zambia and development partners such as the GIZ and the International Livestock Research Institute (ILRI). The G-FEAST exercise was conducted on 4 March 2021 at the Masopo Dairy Cooperative milk collection centre. This report presents the findings of the assessment and conclusions for further action regarding interventions to improve the dairy value chain in Choma district.

Process and sample description

A scoping exercise was conducted with the help of the local livestock officer to identify individual and groups livestock farmers in the project sites. One gendered focus group discussion (FGD) was carried out, it constituted of 16 men only participants. The G-FEAST exercise lasted for 5–6 hours and was held at Masopo Milk Collection Centre. Thereafter, nine respondents were selected for individual interviews from the group. Selection of the participants for individual interviews was based on different wealth categories using landholding as a proxy. This was considered for both male-headed and female-headed households. The composition of the sample is shown in Table 1. The group had a woman facilitator for the G-FEAST session. Before the interviews with the farmers, permission was sought in the local language and an assurance of ethical use of information was given. Each session had a note taker to record the proceedings and a timekeeper to manage time as well as take photographs. Subsequently, the notes were transcribed into in English in a hard copy notebook.

Table 1: Female respondents for individual interviews by farm size

Individual interviews	Women respondents
Small farm size (0-5ha)	3
Medium farm size (5-15ha)	3
Large farm size (15ha and above)	3
Total	9

Farm systems

The farming system in the area is traditional extensive mixed crop and livestock system. Average farm sizes in Masopo area of Choma District are about 15 ha, with most of the land being used for grazing activities and smaller proportions dedicated to crop production (both food and fodder crops). The average household size is six people per household.

Table 2 indicates the percentage in terms of ownership of land. It shows that the majority of farmers that have land in the area that fall under the medium category, which is represented by a higher percentage (40%), those with large farms have 25% and those with small farms have 20% of the land. Figure 1 depicts the average farm sizes of the farmers present in the meeting. Farmers who registered to own small farms had a landholding just under 5 ha and the largest farm was just slightly bigger than 20 ha. According to the focus discussion, it showed that most of the people owning large plots of land are males and a small percentage of females. The men are mostly found on the medium and large land size categories. Common land tenure systems in the study sites include communal land, where land is owned by the community. The results indicate that men own most of the land. However, in other households, land is jointly owned by the men and their spouses.

Table 2: Percentage of land ownership by household in Masopo, Choma District

Category	Range of land size (ha)	% of Households that hall in category	% of male-headed households (MHH) and female-headed households (FHH) that fall in category	
			MHH	FHH
Landless	0	15	30	70
Small	<5	20	60	40
Medium	<15	40	80	20
Large	>25	25	90	10
Total		100		

Figure 1: Farm size by household type in Masopo, Choma District

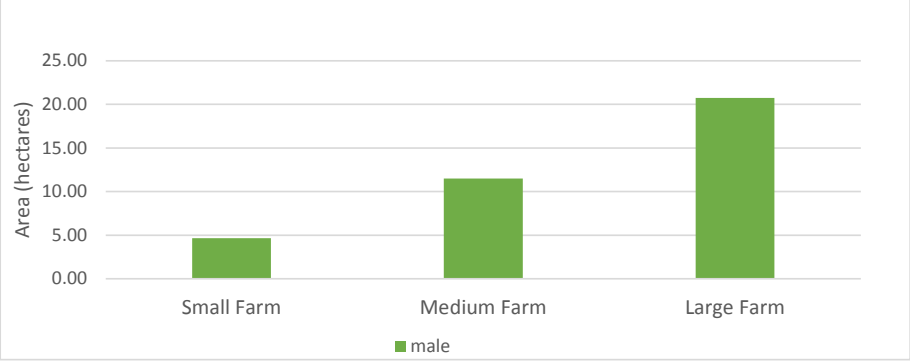
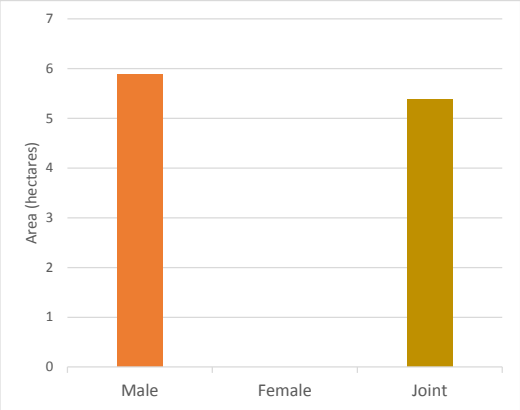


Figure 2 shows land ownership by gender within a household. The results indicate that the higher percentage of land is men-owned land. The land owned jointly is less than the land owned by men. Hence, Figure 3 shows that in cases where women control land, it is mostly jointly owned.

Figure 2. Land ownership by gender in Masopo, Choma District.



Households in the area commonly grow a variety of food crops as shown in Figure 3. The most important and dominant food crops include maize (*Zea mays*) followed by sunflower (*Helianthus annus*) cowpea (*Vigna unguiculata*), sweetpotato (*Ipomea batatas*) and groundnut (*Arachis hypogea*). Maize is cultivated on an average area of 1.5 ha. Female-headed households are more likely to cultivate maize, sunflower and cowpea and less likely to grow sweetpotatoes and groundnuts.

Figure 3: Dominant crop types cultivated (ha) by gender of household head in Masopo, Choma District .

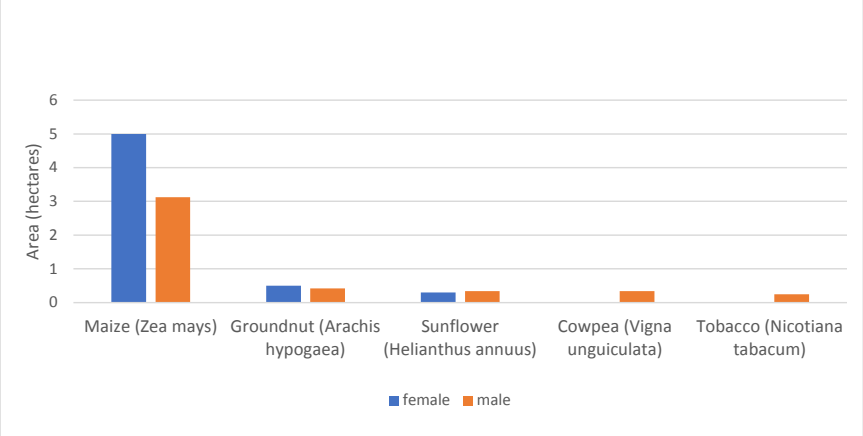
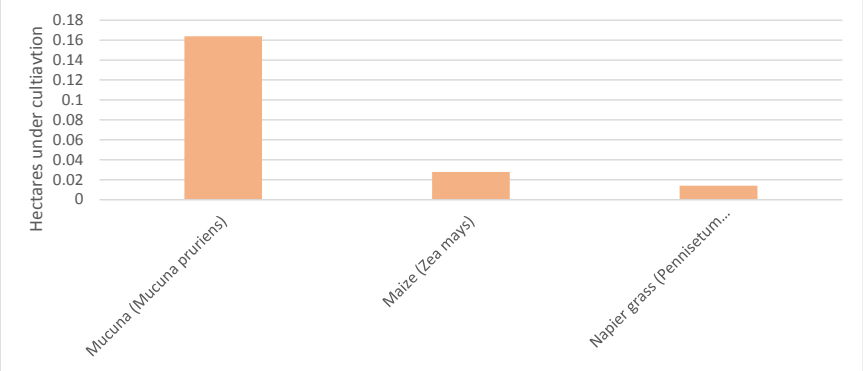


Figure 4 indicates the most dominant fodder crops cultivated by livestock producers in Masopo. Mucuna is mostly grown for silage production on an average land size of 0.16 ha, followed by Maize (*Zea Mays*) at 0.02ha, and Napier grass at 0.009ha.

Figure 4: Dominant fodder crops by average hectares cultivated.



Rainfall levels are generally adequate to support agricultural activities during the three major cropping seasons in a year. However, farmers reported that over the years, unpredictable weather patterns have threatened reliance on rain-fed agriculture. It has also threatened the livestock production, which relies heavily on grazing of natural grasses and bushes. Table 2 shows the rainfall pattern by season.

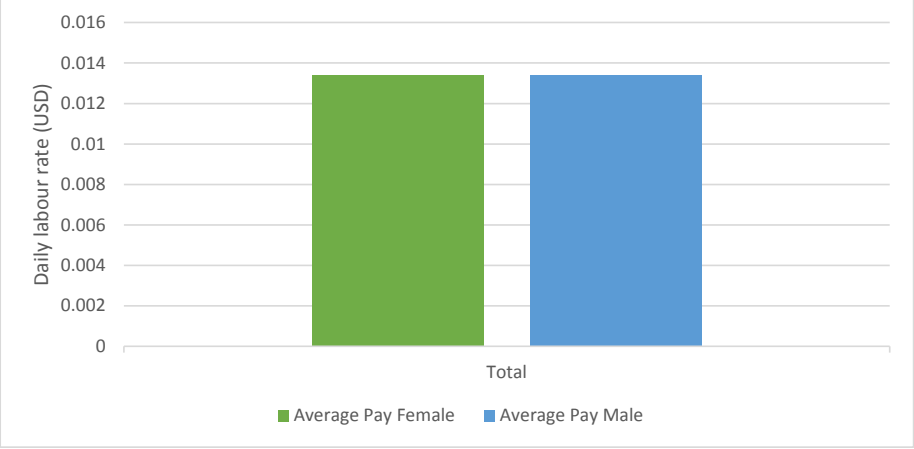
Table 3: Seasonal cropping patterns in Masopo, Choma District

Name of cropping season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain season (Mainza)												
Cool/dry season (Kutontola)												
Hot/dry season (Ciindi cakupya)												

The first cropping season of the year is known as 'Mainza,' which is characterized by heavy and moderate rain. It starts in months of November through to May. The most common farming activities during this time include seeding, ploughing, harvesting and weeding. The second cropping season is the cold season and is characterized by coldness with no rainfall. The cold season starts in late April and lasts up to July. Major crop farming activities at this time include harvesting, gardening, shelling and storing. During the dry season, farmers are preparing their land for cultivation, gardening and others marketing of their products.

Labour is not always available as and when required by farmers. The minimum annual labour costs is ZMW4, 800 (USD295) and the maximum rate is ZMW14, 400. This translates to a minimum and maximum daily rate of about USD0.82 and USD2.46 respectively. Figure 5 shows there is no difference in the wage rate paid to a man compared to a woman. The labour costs vary with the type of farming activity and labour become scarce during the planting season. The scarcity of labour is because of rural urban migration by the youth looking for paid jobs. More than 20% of youths in Masopo migrate to urban centres for work majority of whom are women.

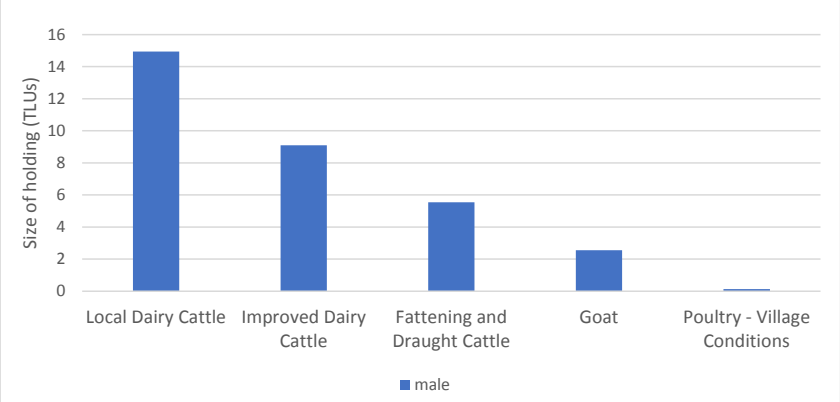
Figure 5: Average daily labour rates by gender in Masopo, Choma District.



Livestock production system

Local dairy cattle are the most dominant type of livestock kept by livestock farmers in the Masopo area of Choma district. The most dominant breeds are local and crosses. Other livestock types kept include goats, fattening and draught cattle, improved dairy cattle, goats and pigs. Most cattle are kept for milk production and sale as fattened cattle for beef. Goats are mainly kept as a source of income through sale of live animals for goat meat. Figure 6 indicates that local dairy cattle have a high frequency rate in that most of the farmers have them and both men and female have equal access to this type. Fattening is dominated by male farmers, but women farmers also fatten cattle and keep draught animals.

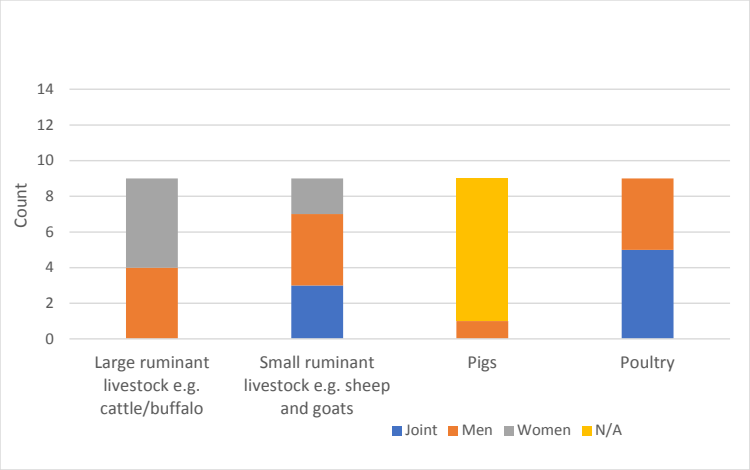
Figure 6: Dominant livestock categories (TLUs) by gender of the household head in Masopo, Choma District.



In Masopo area of Choma District, male-headed households dominate in large ruminant cattle production and mainly for beef compared to female-headed households who mainly keep improved dairy cattle for milk production. Poultry and small ruminant are largely kept by women. Livestock, especially cattle, are mainly grazed in open pasture fields most of the day. However, farmers confine and feed their animals with supplements and with cut-and-carry fodder such as Napier grass on feed troughs from late afternoon. The most common livestock diseases include foot-and-mouth disease (FMD), East coast fever (ECF), lumpy skin and anaplasmosis. Farmers rely mainly on public and private veterinary officers in the area to treat their livestock. Public veterinary officers are much cheaper than private veterinarians; however, they are not readily available. Farmers sometimes supplement veterinary services with traditional remedies within the community. This is common in treating abortion and mastitis. The focus group discussion revealed that artificial insemination (AI) services are not available with a score of 0/5. Animal health services include vaccinations.

The men managed to list the input suppliers for livestock production. However, it was noticed that the men are the ones who are mostly responsible for procuring many of such inputs and services The trend can be reflected in the decision-making processes on livestock as shown in Figure 7.

Figure 7: Gendered decision-making on livestock in Masopo, Choma District.



The main sources of financial service (credit) include banks, village saving and loan, dairy cooperatives, and local moneylenders ('Kaloba'). In most cases, credit is obtained for the purchase of land, medicines, farm inputs and other household needs. Informal credit sources dominate in the credit share compared to formal credits sources. There are no groups that give loans in the area. Farmers reported that there are some people that offer loans within Choma town but most of them have never had contact with them because they believe the conditions given for accessing such loans (e.g., collateral) are unfavourable.

Major income sources

Figure 8 presents major sources of household income within Masopo area. Results indicate that livestock-related activities, predominantly dairying, contribute the highest share to household income. Dairying contributes the highest share within the livestock category at 54%. Cropping (food crops) contribute about 36% to household income. This mainly includes sale of maize, cowpeas, sunflower, sweetpotatoes and groundnuts.

Figure 8: Primary sources of household income by category in Masopo, Choma District.

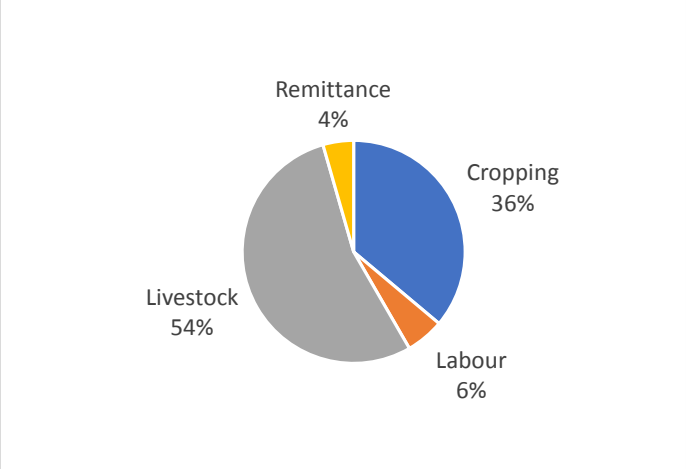


Figure 9 shows relative contribution of major sources of income to household and women's income. Dairying (28%), fattening animals, food crops and cash crops (56%) contribute the highest share of household income. Food crops and dairying contribute the highest share to the women's income. Men also derive income from poultry (7.8%) fattening of sheep and goats. Dairying and food crops give more to the women income.

Figure 9: Relative contribution of income sources to household and women's income in Masopo, Choma District .

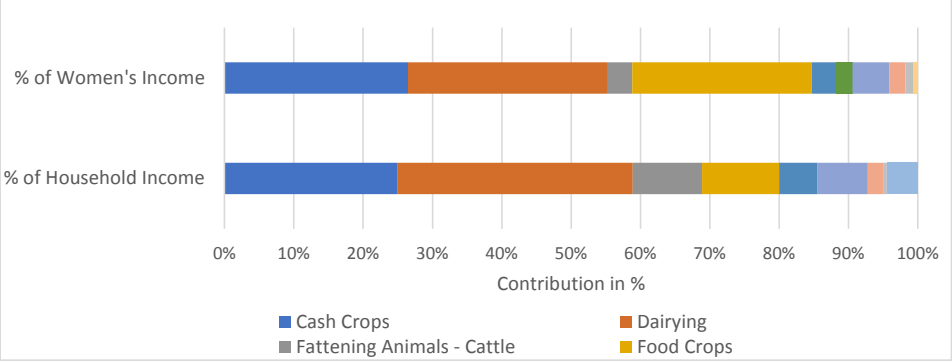


Figure 10 indicates that men make decisions on income from cash crops, dairying, poultry, fattening animals and remittances. The figure indicates that the decision on food crops is done jointly but with a small percentage of men involved. Men make most of the decisions alone on dairying, fattening, labouring/service. This means that women can make decisions on use of income but only minimally.

Figure 10: Gendered decision-making on major sources of household income in Masopo, Choma District.

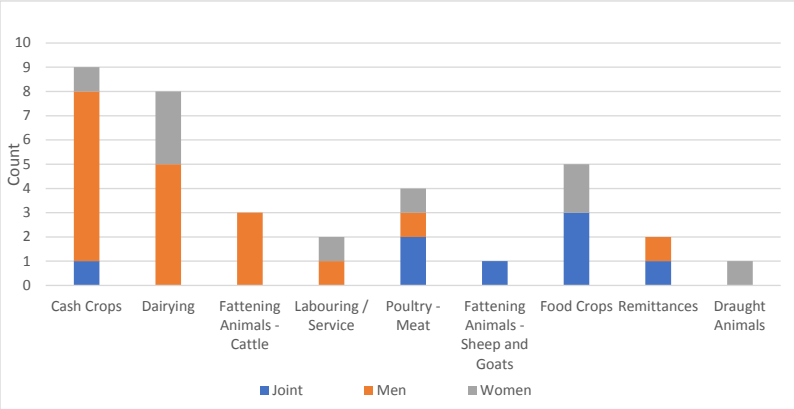
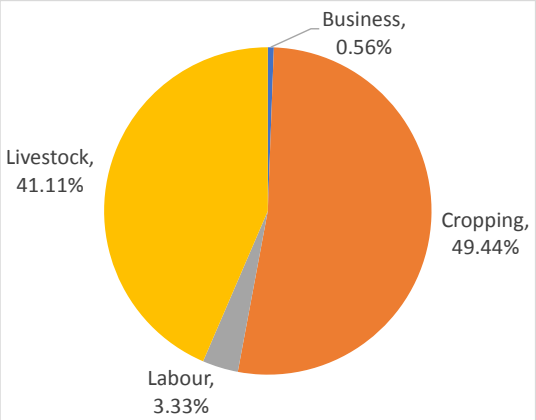


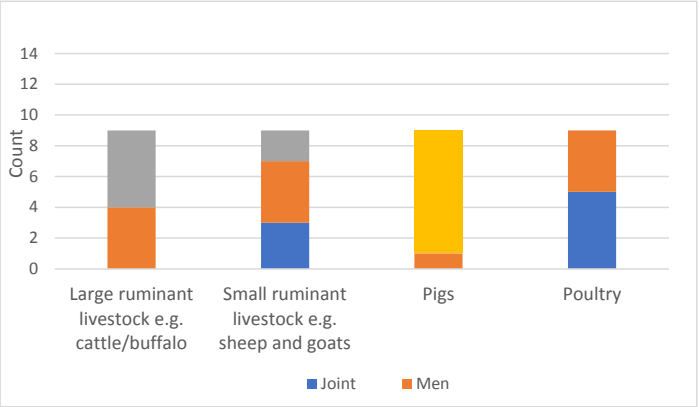
Figure 11 indicates that the major contributor of income for women comes from the cropping activities 49.4% followed by livestock activities 41.1%. This means that women contribute a share the total income in a household.

Figure 11. Major income sources for women in Masopo, Choma District



According to Figure 10, if we focus on income from the sale of livestock, women make minimal decisions on the use of income from sales of large ruminants and small livestock except poultry. Men make most decisions on large ruminants, milk sales, small ruminants and pigs. There is, however, joint decision-making on the sale of livestock and milk (Figure 12). This implies there is a lot of inclusivity in decision-making on income from livestock.

Figure 12: Gendered decision-making on the sale of livestock and milk in Masopo, Choma District



Major feed sources

The livestock diets are primarily grazing on pastures, crop residues, green forages, legumes, and concentrates as shown in (Figure 13). The contribution made by these feed sources to the diet varies throughout the year. Grazing contributes the most significant share in animal diets. Farmers utilize their expansive land to graze their animals on naturally occurring grasses. Grazing intensity increases during the wet season (December to March). During the dry season, cereal crop residues and legumes are found in the diet in larger quantities. Green forages and collected feeds are incorporated more during the wet season. Concentrates are used in very small quantities and appear higher in the month of December compared to the rest of the year.

The figure also shows that there is a poor rainfall curve in Masopo with the rains starting around October and improving in November at 2/5. There was also rain in January and that often peaks in February at a score of 5/5. After February, the rains dropped and the rest of the months from May to September had no rain (score of 0/5) leading to drought hence causing lack of water for animals and that is the reason why feed is a problem because it leads to reduced milk production.

Figure 13: Seasonal availability of feeds in relation to rainfall patterns in Masopo, Choma District throughout the year.

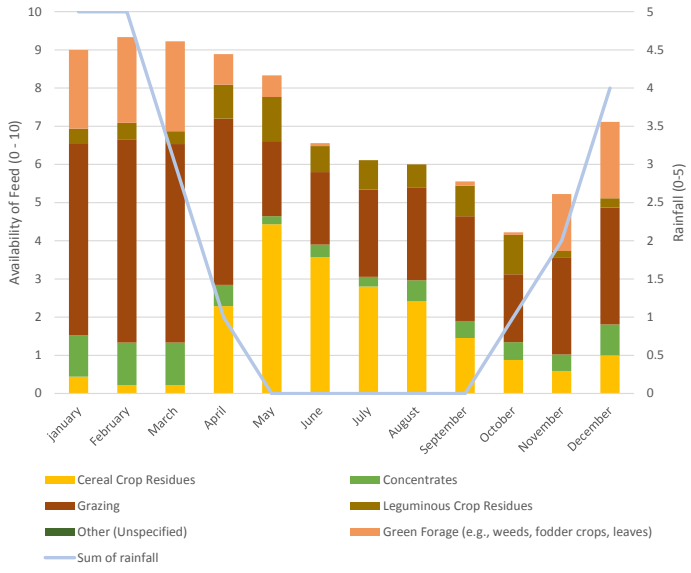
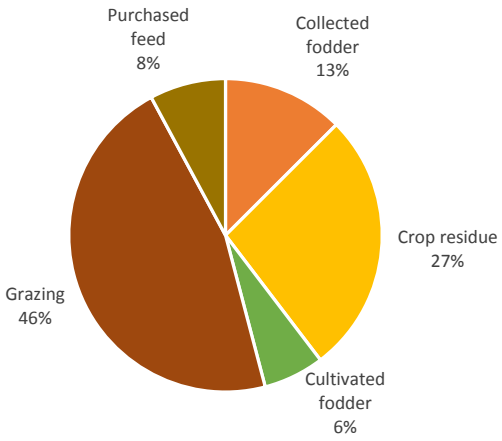


Figure 14 shows that grazing contributes 46% to the total dry matter (DM) intake on farms followed by crop residue (27%) comprising of maize. Collected feeds contributes 13% of the dietary dry matter. Cultivated folder contributes about 6% and consists of residues from cereal crops. Purchased feeds contributes 8% and includes maize bran.

Figure 14: Contribution of dietary dry matter (DM) to the total livestock diets by feed source on farms in Masopo, Choma District.



The contributions of total metabolizable energy (ME) (MJ/kg) and crude protein (CP%) are shown in Figures 15 and 16, respectively. As observed, grazing contributes the highest share in terms of ME (MJ/kg) at 43% and crude protein at 42%. Cultivated fodder is the lowest contribution to the animal diets with 7% of the total ME (MJ/kg) and a crude protein content of 9%.

Figure 15: Contribution of Metabolizable Energy (ME/Kg) to the total livestock diet by source on farms in Masopo, Choma District.

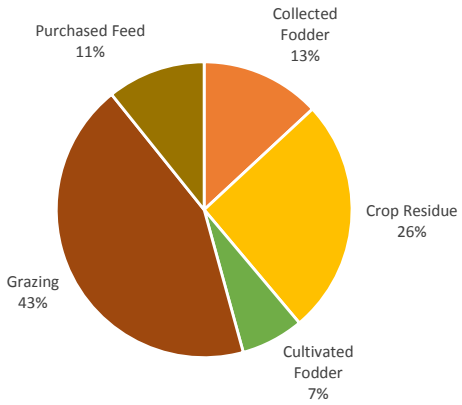
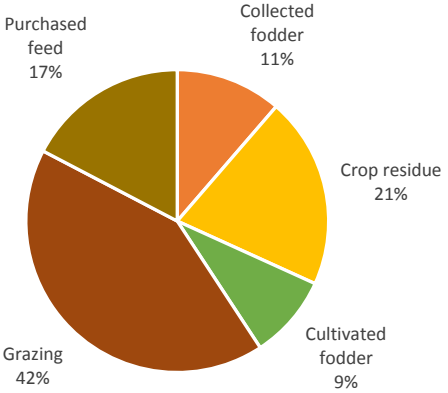


Figure 16 shows that collected fodder contributes 13% to the total ME (MJ/kg) and 11% to crude protein. Crop residue contributes 26% and 21% to the total ME (MJ/kg) and crude protein respectively. Purchased feed also contributes 11% to the total ME (MJ/kg) with a crude protein contribution of 17%.

Figure 16: Contribution of crude protein (CP%) to the total livestock diet by source on farms in Masopo, Choma District



Gender division of labour and gendered decision-making on livestock, feeding and sales

Figure 17 shows the different roles of children and youth, women, and men in forage production activities. Men dominate land preparation, purchasing of feed and mixing feed ingredients. Women are mostly involved in, planting, processing of feed, weeding forage crops and storage of feeds, harvesting. They are also involved in collecting of off-farm forages, feed harvesting and mixing feed ingredients. Children and the youth are mainly involved in cleaning livestock feeding and watering equipment, collecting off-farm forages and watering. In general, it is observed that all household members provide considerable labour in the production and management of forages and livestock and women in this area showed that they do more especially when the men are away.

Figure 17: Gender division of labour in feed production, harvesting and feeding practices on farms in Masopo, Choma District.

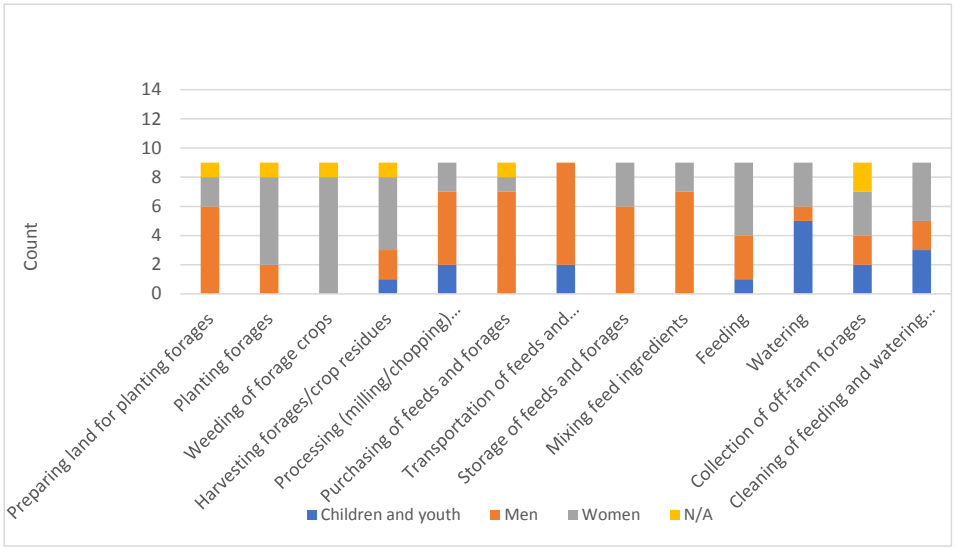
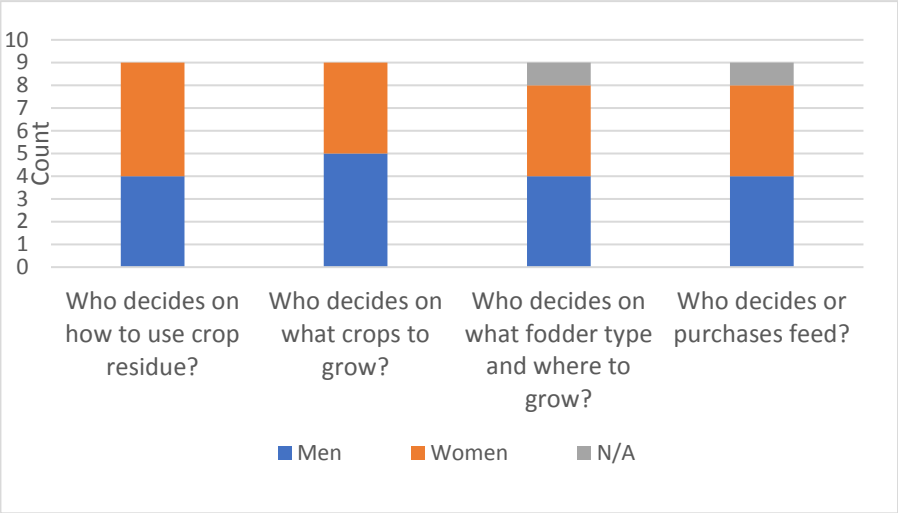


Figure 18 shows the decision-making roles between men and women regarding crops and feeding. It is evident that in a household, both men and women make joint decisions about what to grow, where and how. With respect to decisions relating to feeds (type of fodder, where to grow, what to purchase) women are the sole decision makers. However, women are involved either as sole decision makers or in joint decision-making regarding cropping and feeding.

Figure 18: Gendered decision-making on crops and feeding in Masopo, Choma District



Potential interventions

Table 4 gives a summary of problems and challenges farmers in Masopo area face and possible solutions, as suggested by farmers.

The main challenges identified by men in the community are long distance to water, long distance to feed sources, lack of improved breeds, lack of extension service, lack of knowledge on livestock managements high cost of drugs.

Problems and opportunities

Table 4: Problems, issues and proposed farmer solutions within production systems in Masopo, Choma District

Main problem	Who is affected most? (Small/medium/ large farms; men/women; MHH/FHH etc.)	Proposed farmer solutions	Ranking by men
Long distance to water source	All	Construction of dams in the area	4
Lack of improved breeds	All	AI should start being used	1
		Provide community bulls	
Lack of capital to invest	All	Diversity in business	5
		Negotiation for better loan conditions	
High cost of drugs	All	Add value to the milk by making sour milk or yoghurt so that the price of milk and dairy products increases	1
		Higher milk price would enable farmers afford drugs	
Lack of knowledge on livestock management	All	Need training	1
		Need more extension officers	

Potential interventions

The proposed interventions include:

- Training farmers on proper feed management practices such as feed conservation and processing (e.g., haymaking and silage making).
- Selecting knowledgeable farmers who could act as lead farmers to train other farmers during field days, based on their experience because the theory says that a farmer learns 10% from the extension officers, 70% from others farmers, and 20% from research or new technologies.
- Training farmers on how they can utilize the crop residues from the maize fields by adding molasses, salt, and urea treatments.

- Coming up with focus farms that are well equipped so that farmers can hold training sessions through field days to share experiences.
- Training using fact sheets, which are simple and well interpreted. These can cover topics such as mastitis, and how to reduce cost of production etc.
- Introducing new fodder varieties with higher nutritive quality adapted to the agro-ecological production system.
- Training farmers on proper fodder husbandry/production techniques on-farm through demonstration plots.
- Training farmers on animal nutrition for increased production of high-quality milk (emphasis on concentrates and other minerals).
- Building capacity of farmers through the local dairy cooperatives on value addition of milk to improve on market access and increase price stability.
- Training farmers on the importance of water harvesting and proper storage and use of water.

Conclusion

Farmers in the Masopo area are inclined to milk production and fattening cattle but most of them farmers lack improved knowledge in dairy farming, and many of the farmers do not keep records to know if they are making profit or loss, and for reference purposes.

AI services are needed in order to improve the types of breeds these farmers have and more training on practical demonstrations are required to convince them that it is possible to increase milk production. With good management disease outbreaks can also be reduced, and they will need training in use of feeds so that they can feed their livestock strategically (e.g., according to milk production needs) and utilize the locally available feed resources. With training farmers can make homemade concentrate to cut on the cost of production.