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Evaluating livestock production systems using the Gendered Feed Assessment Tool (G-FEAST) in Magoye, Southern Province, Zambia

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December 2021



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

Citation: Mubita, M., Buumba, M. and Sikacey, N.N. 2021. *Evaluating livestock production systems using the Gendered Feed Assessment Tool (G-FEAST) in Magoye, Southern Province, Zambia*. Nairobi, Kenya ILRI.

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Introduction

Livestock farming and farming, in general, is one occupation that is frowned upon by many Zambians as it is associated with the uneducated and the poor in society. It is often looked upon as an activity reserved for those who failed to make it into formal employment and is sometimes seen as a pastime. This is, however, changing as government and the private sector are vigorously championing job creation in Zambia's agriculture sector. People are being encouraged and empowered to venture into full-time farming as an occupation as well as a source of income.

The Gendered Feed Assessment Tool (G-FEAST) has been designed to facilitate assessment of local availability and use of feed resources and designing site specific interventions in the context of water, land, labour, knowledge, cash and inputs availability (Duncan et al. 2012). The G-FEAST tool further facilitates participatory research through a two-stage process. Focus group discussions (FGDs) are held at community level to describe the general farming system followed by individual interviews with a subset of farmers from the FGDs. The data from the FGDs and individual interviews is then analysed in the G-FEAST data application to generate graphs and figures in a report that describes the farming system in a specific community. From the analysis, we can determine if livestock feed is an issue and come up with potential interventions.

The Magoye Smallholder Dairy Farmer's Cooperative Society is located in the Mazabuka District, in the Southern Province of Zambia about 100 km from the capital city, Lusaka. It is engaged in the collection, bulking and chilling of milk collected from farmers. The dairy producers in Magoye fall into three categories: traditional farmers, small-scale farmers and commercial farmers. Together these farmers face many challenges in terms of milk production. This assessment was conducted in order to identify the problems these farmers are facing, to understand the farming systems and dairy genetics issues for further action.

Process and sample description

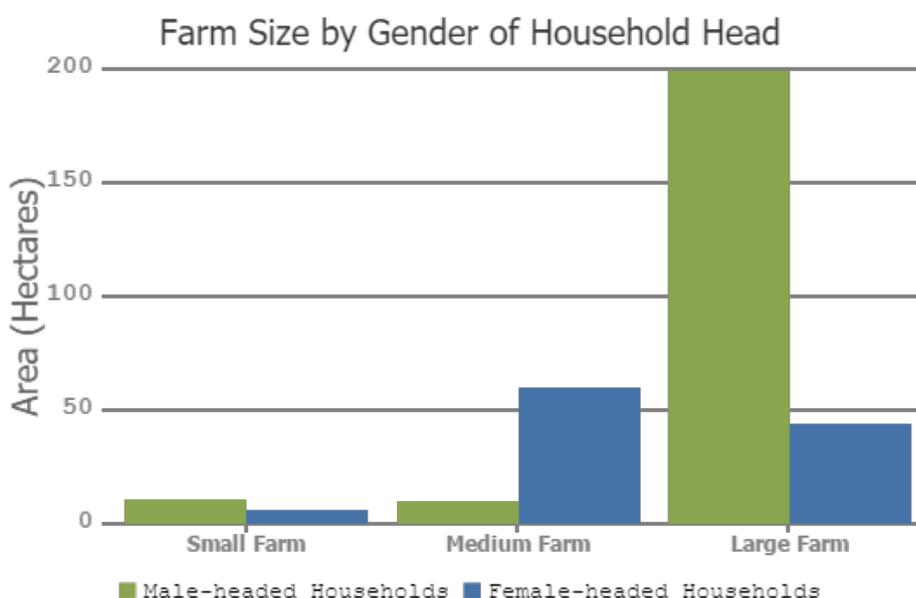
The exercise was carried out at the Magoye Smallholder Dairy Farmer's Cooperative Society in Mazabuka District of Southern Province, Zambia. One focus group discussion (FGD) for women was carried out consisting of 14 participants. The G-FEAST exercise lasted for three hours and thereafter nine respondents were selected for individual interviews based on different wealth categories using landholding as a determinant. The G FEAST exercise team was comprised of a facilitator, note taker and timekeeper. The facilitator led the discussion making sure that all major topics of concern were addressed and enforced the group rules, the note taker took the records of the discussion and the timekeeper managed time.

Results

Farming systems

The farming system in Magoye is primarily traditional mixed crop and livestock system. Average farm sizes are about 50 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 eight people per household. Figure 1 presents farm sizes by gender of the household head. We can observe that across the three land holding categories, men and women own land. The largest proportion of female-headed households falls in the medium-scale farms category whereby female-headed household have on average 50 ha of land. This implies that women in Magoye can have similar land rights as men.

Figure 1: Farm size by gender of household head.



The common land tenure systems in Magoye include freehold systems whereby farmers have bought land from the government (both local and national) and communal land (Mailo land) where land is owned by the community. Figure 2 represents land ownership by gender within a household and the results indicate that men own most of the land. However, in other households, land is jointly owned by the men and their spouses and in others, women own land up to 10 ha.

Figure 2: Land ownership by gender.

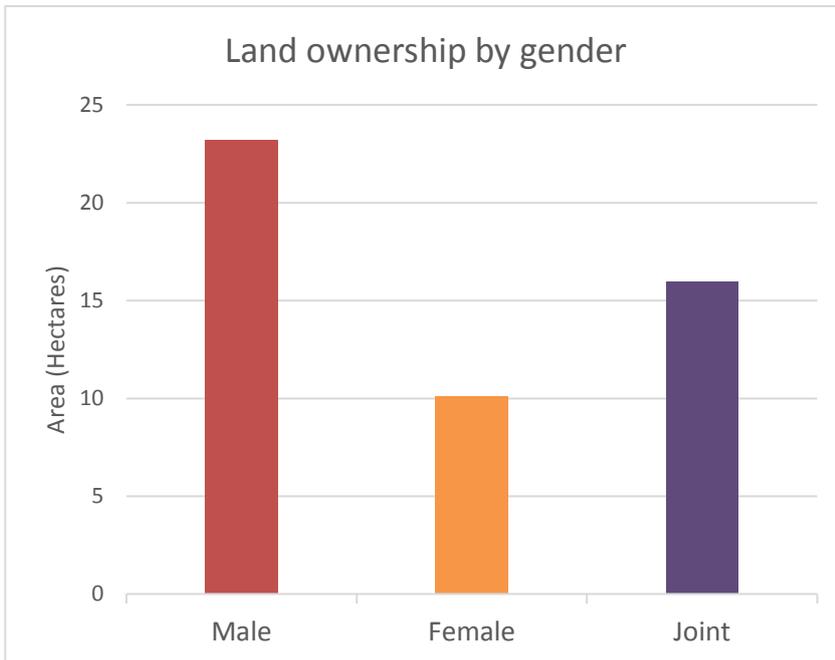


Figure 3 shows the variety food crop grown in the area. The most dominant food crops include maize (*Zea mays*), groundnuts (*Arachis hypogaea*), soybean (*Glycine max*), sunflower (*Helianthus annuus*) and cowpea (*Vigna unguiculata*). Maize is the most dominant cultivated food crop with average of 5.6 ha committed to its cultivation. Female-headed households mainly cultivate maize groundnuts and soybean and are less likely to grow sunflower and cowpea.

Figure 3: Dominant crop types cultivated (ha) by gender of household head.

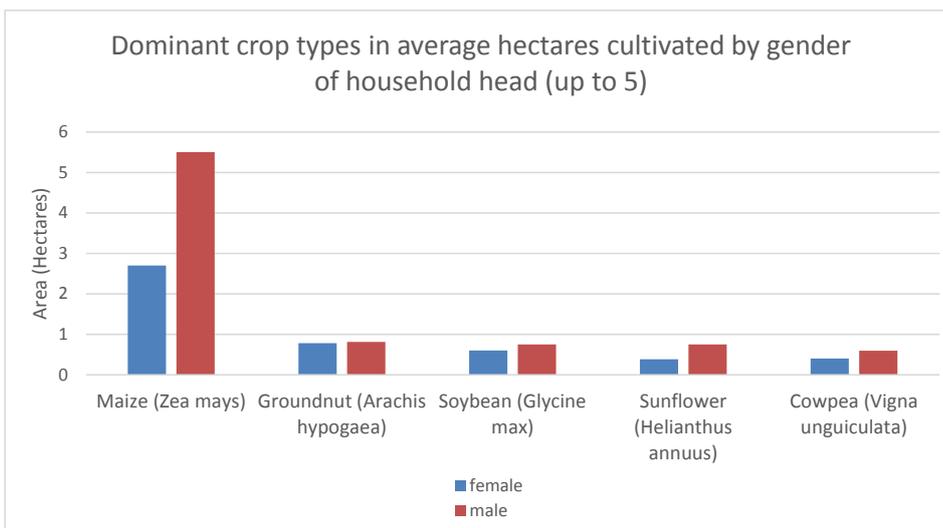


Figure 4 indicates the most dominant fodder crops cultivated by livestock producers. Rhodes grass and Napier grass are mostly grown for silage production on an average land size of 0.79 ha and 0.51 ha, respectively.

Figure 4: Dominant planted forage types (ha).

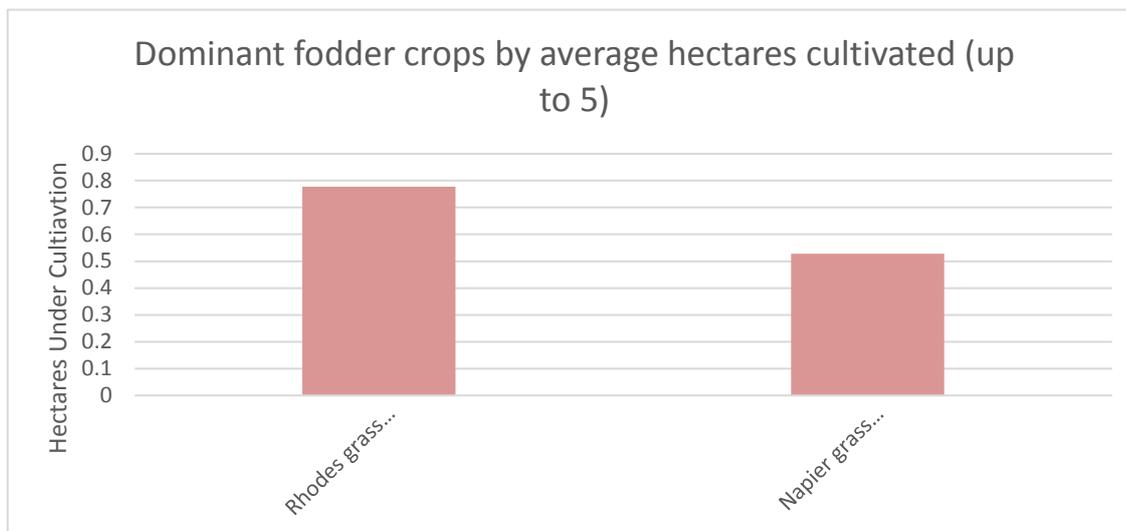


Table I shows the rainfall pattern by season. Rainfall levels are generally adequate to support agricultural activities during the cropping seasons in a year. However, farmers reported that over the years there was some change in rainfall pattern, which has threatened reliance on rain-fed agriculture. The change in rainfall pattern has also threatened livestock production, which relies mostly on grazing of natural grasses and bushes.

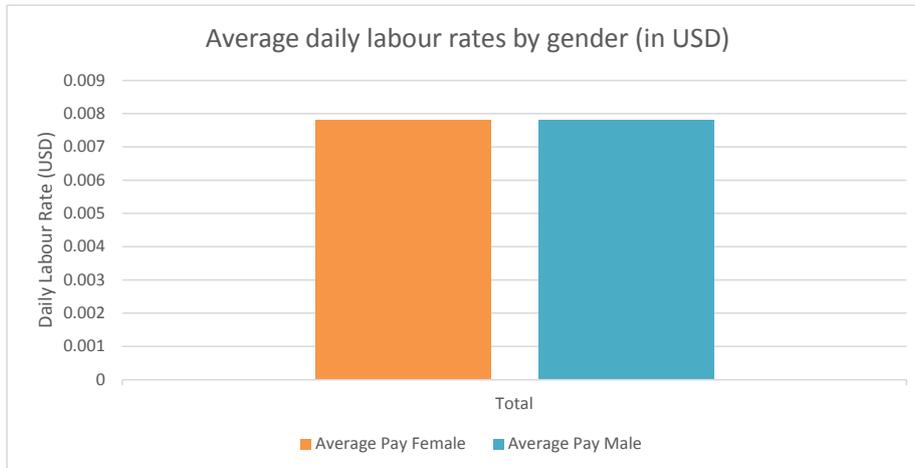
Table I: Seasonal cropping patterns in Mazabuka District

Name of cropping season	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rain season	█											█
Cold/dry season					█							
Hot/dry season									█			

The main cropping season is the rain season and is characterized by long and heavy rainfall. It starts in November and ends in April. The major crop farming activities include ploughing, seeding, applying fertilizer and weeding. The cold dry season starts in May and ends in July. The major crop farming activities include harvesting, gardening and marketing of cash crops. The hot dry season starts in the late August and ends in October, the major crop farming activities include land preparation and ploughing.

Labour is not always available as and when required by farmers. The minimum daily labour costs is ZK200 and the maximum rate is ZK800. The labour costs vary with type of farming activity and it becomes scarcer during the planting season. The scarcity of labour is because of rural urban migration by the youth looking for paid jobs. The percentage migration of youths from Magoye is over 70% with men being the majority migrators. Additionally, there is no difference in the wage rate paid to a man compared to a woman. Figure 5 shows that on average, a man earns about USD0.0078 and a woman earns USD0.0078. This may mean that men and women work the same amount of hours and they all do a similar quality of work in farm labour jobs.

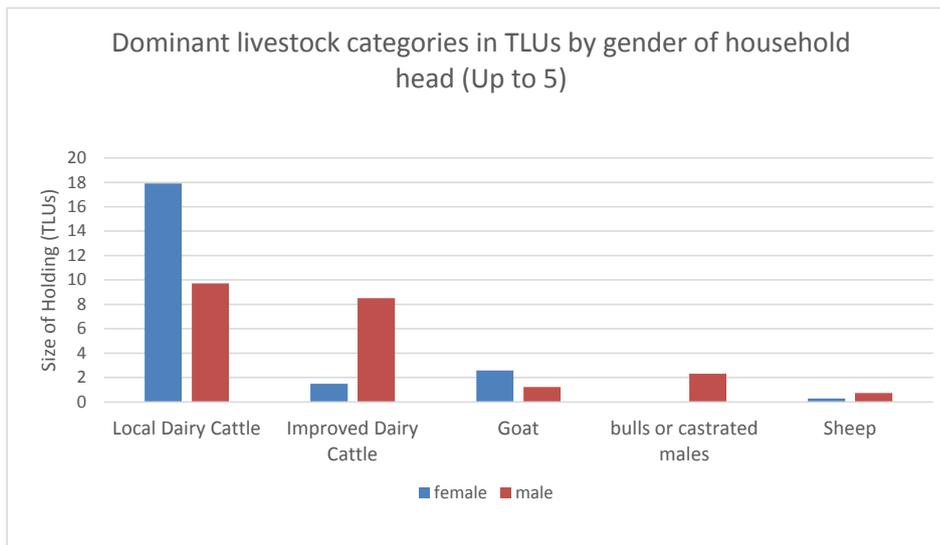
Figure 5: Average daily labour rates by gender (in USD).



Livestock production system

Local dairy cattle are the most dominant type of livestock kept by livestock farmers in Magoye camp (Figure 6). Farmers also rear improved dairy cattle (crossbreeds) for milk production. Other livestock types kept include bulls or castrated male, goats, and sheep. Most cattle are kept for milk production and sales of live animals. Goats are mainly kept as a source of income through sale of live animals for chevon (goat meat). Sheep are also kept for income through sale.

Figure 6: Dominant livestock categories (TLUs) by gender of the household head.

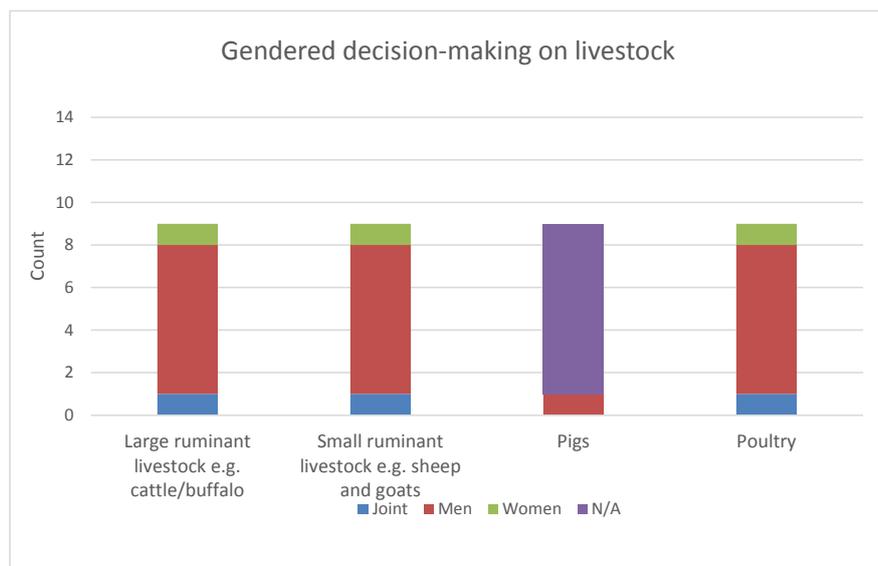


In Magoye camp, male-headed households dominate in large ruminant cattle production, small ruminant goat, poultry and some few household in pig production. Large ruminants are mainly for beef and milk. Female-headed households mainly keep poultry, and large and small ruminant livestock for income through sale of live animals. 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 East Coast fever (ECF) and tick-borne diseases. Farmers rely mainly on public and private veterinary officers in the area. Public veterinary officers are much cheaper than private veterinarians but they are not

readily available. The farmers reported that artificial insemination (AI) services are not readily available with a score of 2/5. However, majority of farmers (over 70%) often rely on bull services. Farmers mainly use improved breeds of bulls. Some of the challenges with bull services is increased inbreeding.

The farmers observed that there was a gendered pattern in terms of access to input and services. The services include training, vaccinations and farm visits. This means that the farmers are knowledgeable about the needs in livestock production. The trend can be reflected in the decision-making processes in household whereby men and woman make most decisions jointly or individually (Figure 7).

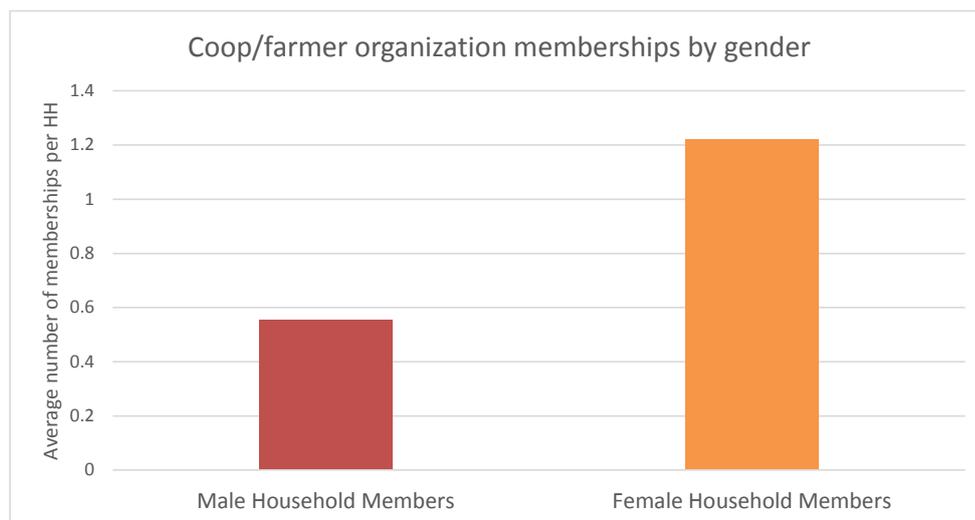
Figure 7: Gendered decision-making on livestock.



The main sources of financial service (credit) include village banking, neighbour/friends and the dairy cooperative. In most cases, credit is obtained for buying drugs, farm inputs e.g. hiring a truck and buying feed. Formal credit sources dominate in the credit share (90%) compared to informal credits sources (10%). The conditions of accessing credit vary according to the source. Some of the common conditions for obtaining credit for agricultural production include trust/surety, barter exchange, interest rate and an agreement on when to finish paying the loan. About 50% of the farmers are estimated to have access to credit. On a scale of 0-4, they estimated it at 4. The reason is that most farmers belong to formal groups through which they access loans. Therefore, there seemed to be equality in accessing credit regardless of the gender but the sources differed.

Figure 8 shows membership in cooperatives or farmer groups by gender. Both women and men are members of cooperatives and farmer organizations. Female household members are more likely to belong to cooperatives or farmer organizations than male members. In a random household sample, at least 1.2 female members will belong to farmer organizations compared to men (0.5).

Figure 8: Average number of household members of cooperatives and farmer organizations by gender



Major income sources

Figure 9 presents major sources of household income within Magoye camp. Results indicate that crop-related activities mainly food crop farming, contribute the highest share (48%) to household income. Food crops contribute the highest share within the crop category (48%). Livestock contribute about 47% to household income. This mainly includes sale of dairy products. Off-farm business contributes about 5%.

Figure 9: Primary sources of household income by category.

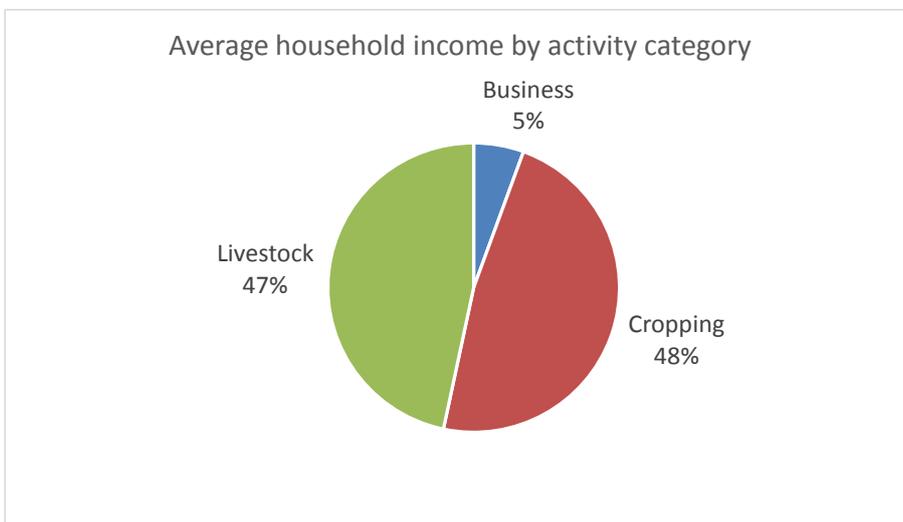


Figure 10 shows relative contribution of major sources of income to household and women's income. Dairying, cash crops and charcoal making contribute the highest share of household income. Poultry meat, food crops and fattening cattle contribute the highest share to the women's income.

Figure 10: Relative contribution of income sources to household and women's income.

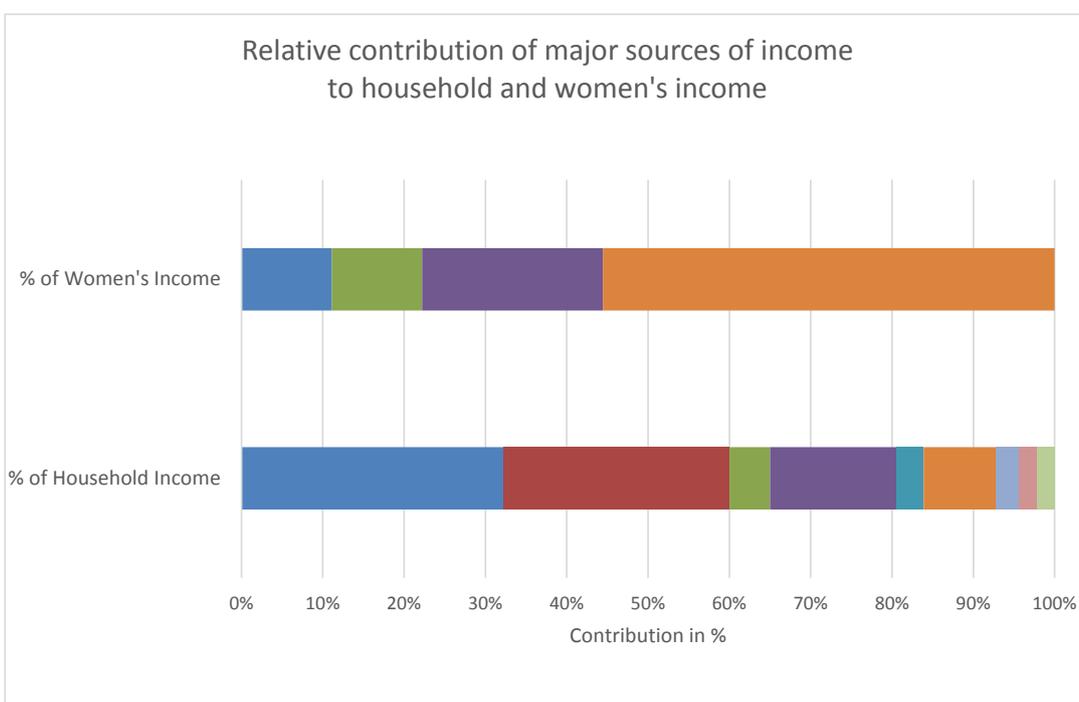


Figure 11 indicates that men make decisions on income from cash crops, poultry meat, dairy and food crops. Women make most decisions on cash crops, food crops and draft animals. Joint decisions on income are mainly from fattening animals, off-farm businesses, charcoal making and dairying.

Figure 11: Gendered decision-making on major sources of household income.

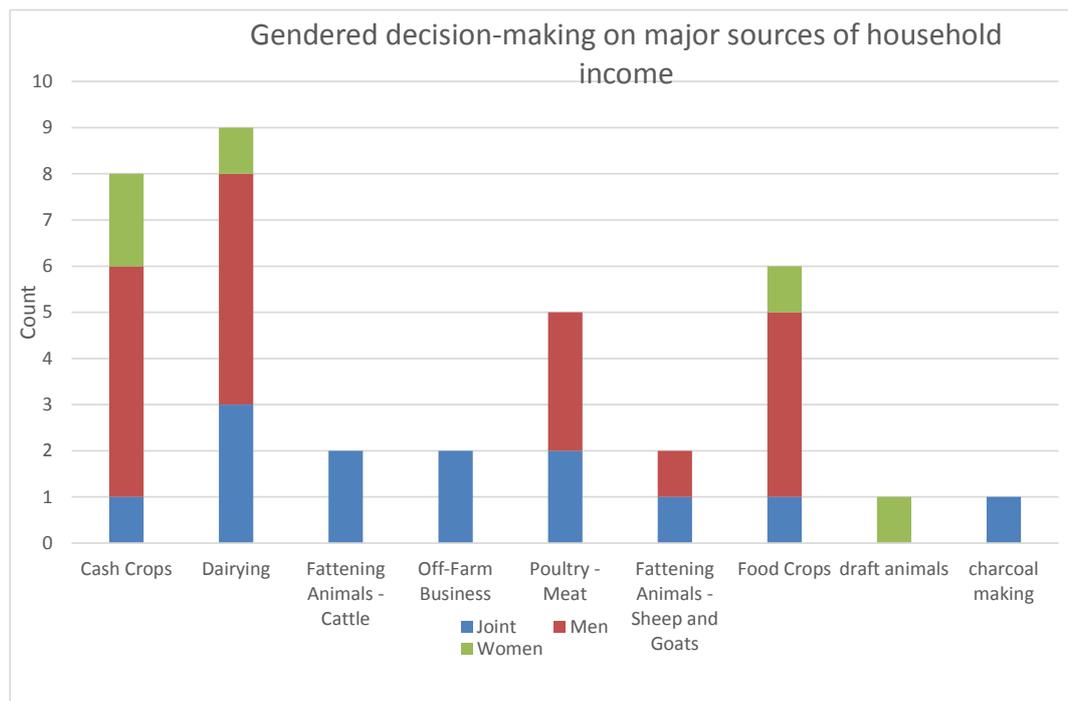
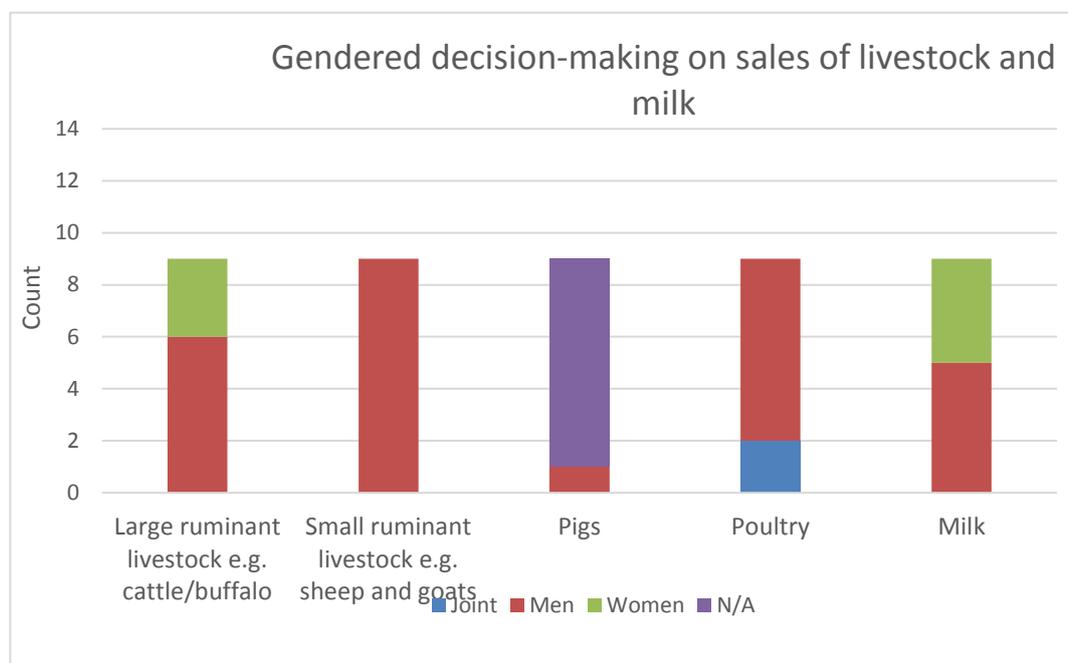


Figure 12 shows gendered decision-making on sales of livestock and milk and it is observed that men make most decisions on milk sales, small ruminants, poultry, large ruminant and few in pig sales. Women make most of the decisions on large ruminant sales and milk sales. There is, however, joint decision-making in the sale of poultry. This implies there is a lot of inclusivity on the use of income from poultry.

Figure 12: Gendered decision-making on the sale of livestock and milk.



Major feed sources

The livestock diets are primarily grazing, 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 diet. Farmers utilize their expansive land to graze their animals on naturally occurring grasses. Grazing intensity increases during the wet season (January-April) and (November-December). During the dry season, cereal crop residues and legumes are found in the diet in larger quantities. Green forages are incorporated more during the wet season. Concentrates are used in small quantities and appear higher in the month of November and May compared to the rest of the year.

Figure 13: Seasonal availability of feeds in relation to rainfall patterns in Magoye throughout the year.

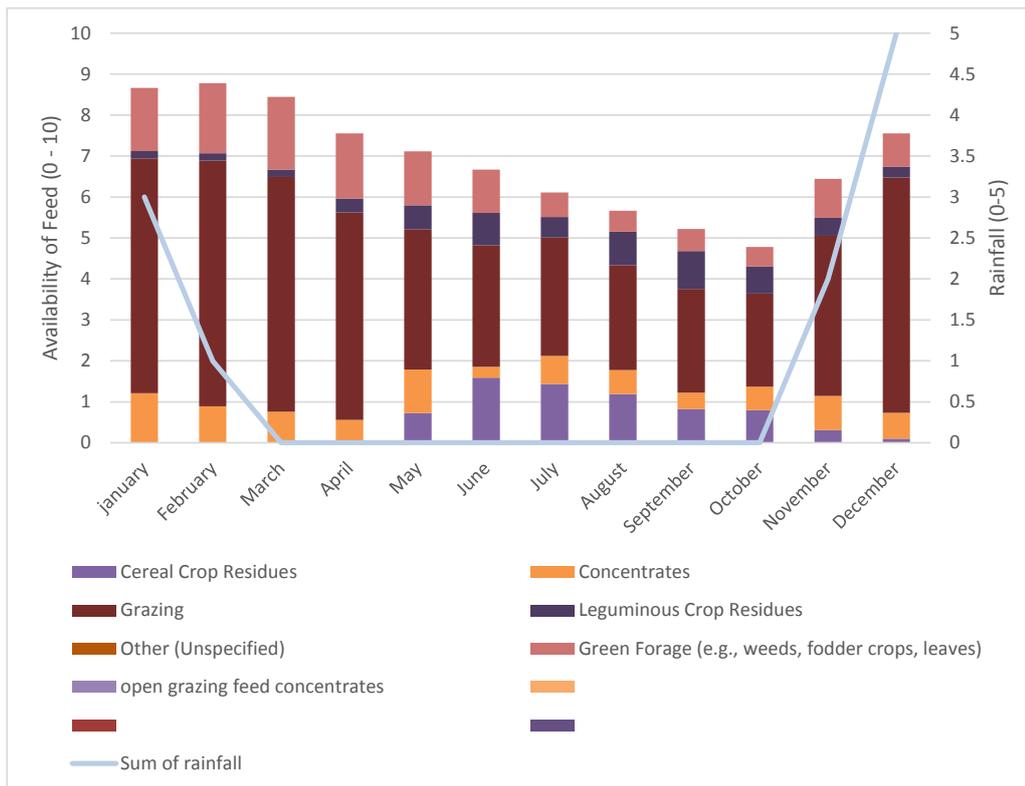
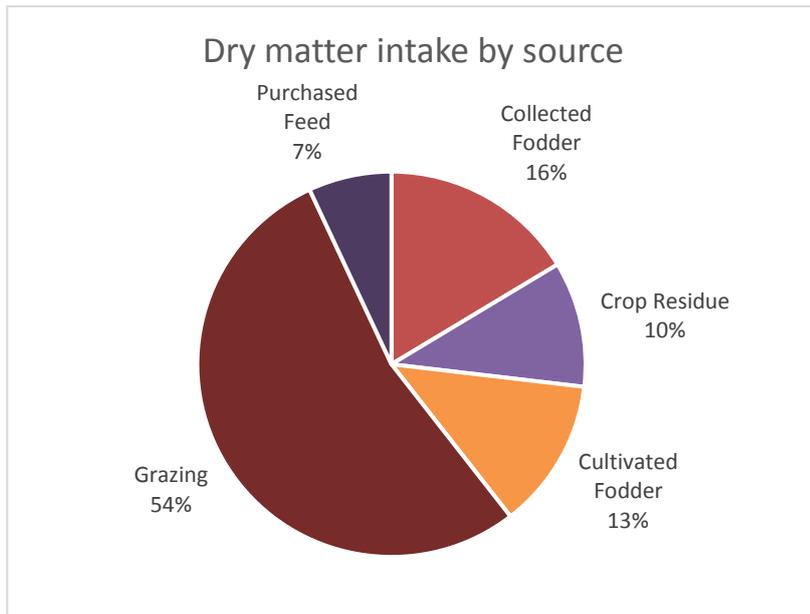


Figure 14 shows that grazing contributes 54% to the total dry matter intake on farms followed by collected fodder (16%). Cultivated fodder contribute 13% and mainly include Rhodes grass and Napier grass. Crop residues contribute about 10% and consist of residues from cereal crops.

Purchased feeds contribute 7% and mainly include maize bran and sunflower cake.

Figure 14: Contribution of dietary dry matter (DM) to the total livestock diets by feed source on farms in Magoye camp.



The contributions of total 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 52 % and crude protein at 45%. Cultivated fodder contributes 12% to the total ME (MJ/Kg) and 17% crude protein.

Figure 15: Contribution of dietary metabolizable energy (ME, MJ/Kg) to total livestock diet by source on farms in Magoye camp.

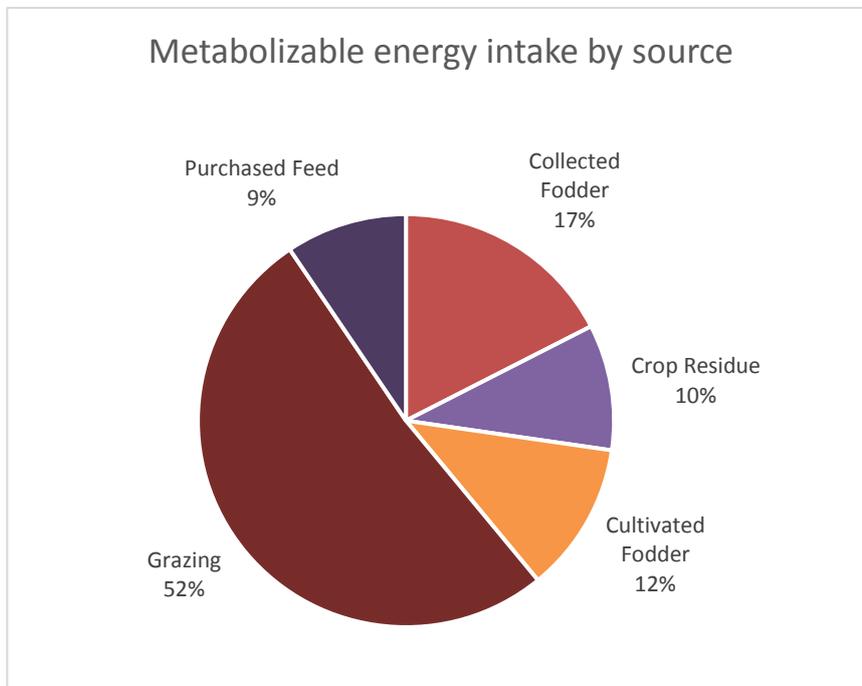
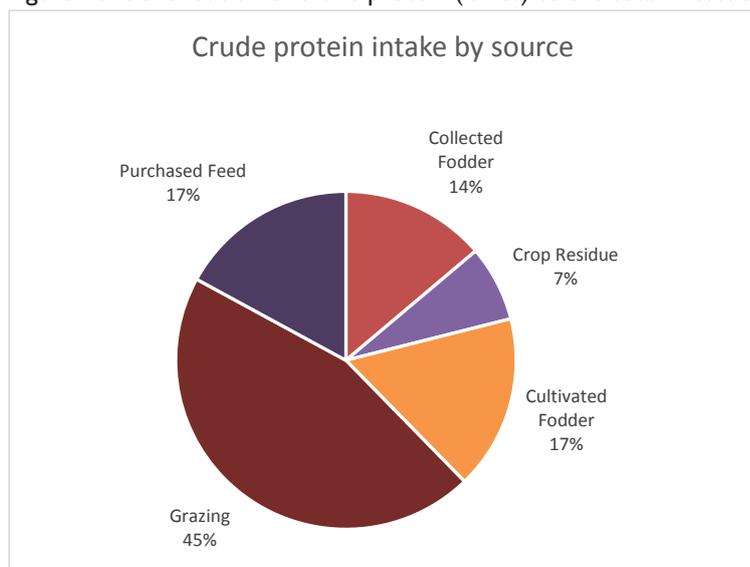


Figure 16: Contribution of crude protein (CP %) to the total livestock diet by source on farms in Magoye.



Collected fodder contributes 17% to the total ME (MJ/Kg) and 14% to crude protein. Crop residue contributes 10% and 7% to the total ME (MJ/KG) and crude protein, respectively. Purchased feed also contributes 9% to the total ME (MJ/Kg) with a crude protein contribution of 17% (Figure 15 and 16).

Gender division of labour and gendered decision-making on livestock, feed-related activities

Figure 17 shows the different roles of children and youth; women and men in forage production activities. Men dominate in purchasing of feed, transportation, processing feed, preparing land and planting. Women are mostly involved in weeding forage crops, planting, feeding, storage of feed, and cleaning of feeding and watering facilities. Children and the youth are mainly involved in storage of feed, mixing feeds, 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.

Figure 17: Gender division of labour in feed production, harvesting, and feeding practices on farms in Magoye camp.

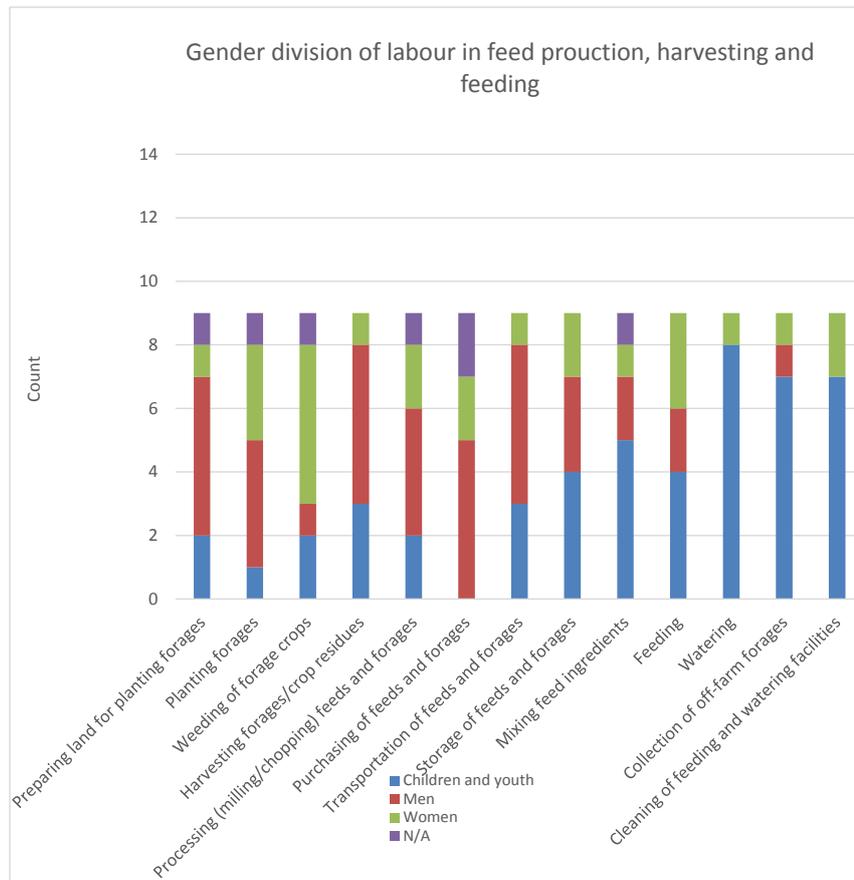
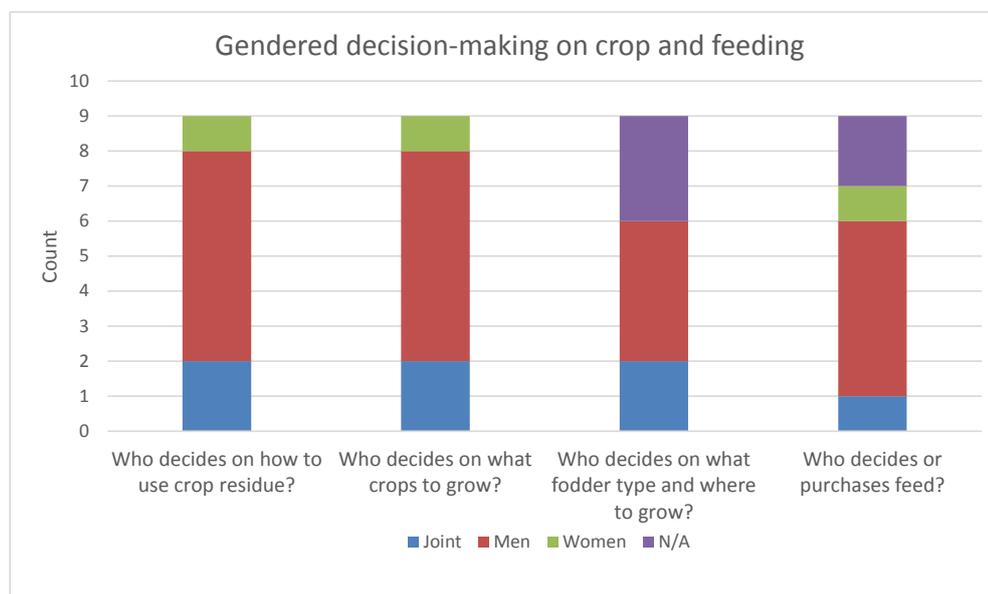


Figure 18 shows the decision-making roles between men and women regarding crops and feeding. It is observed that men make most decisions about what to grow, how to use crop residues, what fodder type to grow and purchased feed. Women make most decision on feed purchasing and how/what crop to grow. In some households it is observed that men and women make joint decisions on how, what and where to grow fodder and also on purchasing feed.

Figure 18: Gendered decision-making on cropping and feeding activities.



Problems and opportunities

Table 2 shows a summary of the problems and challenges farmers face and possible solutions, as suggested by farmers.

- The main challenges identified by women farmers in the community are foot rot diseases, high cost of drugs, limited water availability, lack of good-quality feed and theft.

Table2: Problems, issues and proposed farmer solutions within production systems in Magoye camp

Main problem	Who is affected most? (Small/medium/large farms; men/women; male-headed/female-headed households etc.)	Proposed farmer solutions	Ranking women
Diseases (e.g. ECF)	All	More dip tanks	2
High cost of drugs	All	To let the cooperative sell the drugs on fair prices	1
High cost of feed	All	Training on how to make and mix feed ingredients.	2
Water scarcity	All	Provide more water points and dams	3
Lack of transport to the market	All	Bringing selling points near to the community.	4

Potential interventions

The proposed interventions include:

- Training farmers on how to make and process feed ingredients such as silage and hay.
- Providing more drugs to the farmers in order to reduce disease incidences.
- Letting the government help the farmers by bringing drugs to the collection centre so that farmers can buy drugs at a fair price.
- Provide more water points (e.g. dams, boreholes etc.) in order to reduce water scarcity during the cropping period.
- Government to bring security guards near to the community.

Conclusion

Magoye farmers are more into maize production and dairying in traditional extensive systems; introduction of improved forages species in existing pastures should be encouraged. Farmers should be exposed to improved forage varieties and offered training in forage production and management as well as pasture improvement. Promotion of AI services and introduction of improved cattle breeds would improve productivity of milk in the area. Farmers should also receive training on animal nutrition on better use of forages, and balanced feed ration formulation for increased livestock production.

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