

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

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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 past-time activity. 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 it gives an idea of potential interventions.

The Kayuni Dairy Cooperative is located in Monze District, about 20 0km from the capital city, Lusaka and 100 km from the provincial capital of Southern Province, Choma. It is engaged in the collection, bulking and chilling of milk collected from farmers. The dairy farmers producers in Kayuni are categorized as traditional farmers, small-scale farmers and commercial farmers. Together these farmers face many challenges in terms of livestock production and milk production. This assessment was conducted in order to identify the problems these farmers are facing, to understand the farming systems and dairy genetic issues for further action.

## Process and sample description

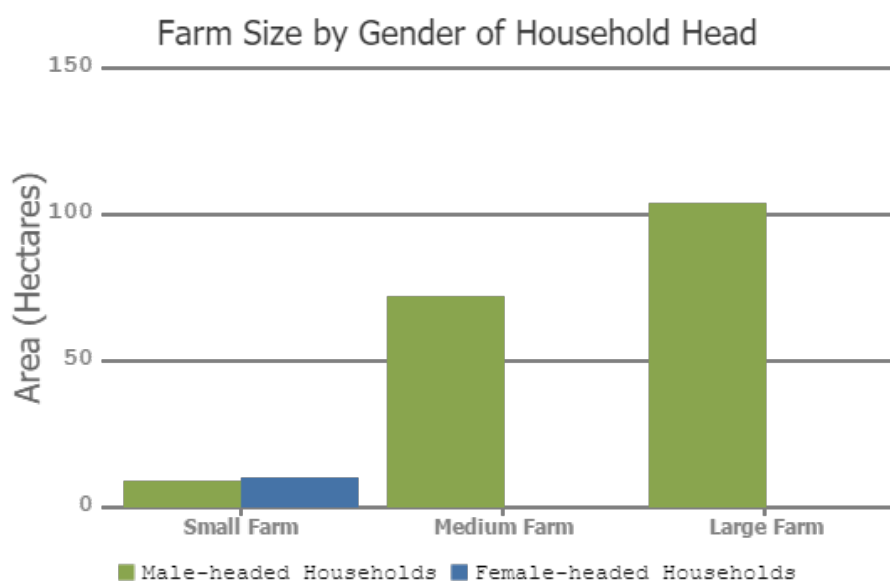
The exercise was carried out at the Kayuni Smallholder Dairy Farmer's Cooperative Society in Mazabuka District of Southern Province, Zambia. One focus group discussion (FGD) for women was carried out consisting of 14 participant. The G-FEAST exercise lasted for three hours and thereafter nine respondents were selected for individual interviews based on different wealth categories using land holdings 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 Kayuni is mainly traditional extensive mixed crop and livestock system. Average farm sizes in this are about 55 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 nine 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 own the largest proportion of land. Most of female-headed households fall in the small-scale farms category whereby female-headed household have on average 10 ha of land. This implies that women in Kayuni area do not have similar land rights as men. In the G-FEAST discussion group for women, there was a consensus, that women cannot own land in the same way that men do.

Figure 1: Farm size by household type.



Common land tenure systems the Kayuni include freehold systems whereby is owned by the community. Figure 2 shows land ownership by gender within a household. The results indicate that men own most of the land. However, in other households, land is jointly owned by the men and their spouses. Women in this area do not own land.



Figure 2: Land ownership by gender.



Households in the area commonly grow a variety of food crops as shown in Figure 3. The most dominant food crops include maize (*Zea mays*), sweetpotato (*Ipomoea batatas*), cowpea (*Vigna unguiculata*), groundnuts (*Arachis hypogaea*) and sunflower (*Helianthus annuus*). Maize is the most dominant cultivated food crop with average of 3 ha committed to its cultivation. Female-headed households are more likely to cultivate sweetpotatoes, maize, groundnut and cowpea, and less likely to grow sunflower.

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

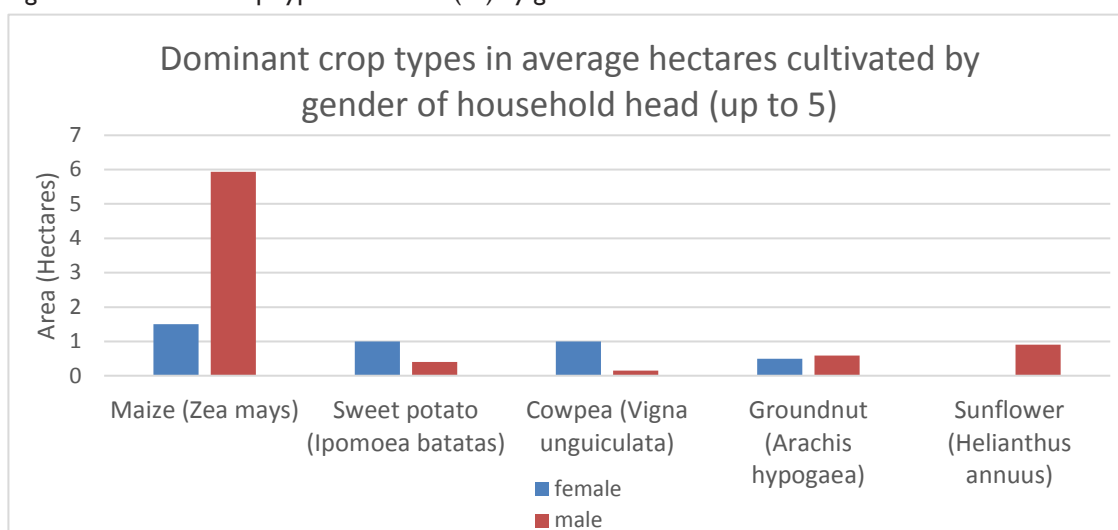


Figure 4 indicates the most dominant fodder crops cultivated by livestock producers in Kayuni camp. Maize (*Zea mays*) is mostly grown for silage production on an average land size of 0.11 ha. Rhodes grass (*Chloris gayana*) and Napier grass (*Pennisetum purpureum*) are grown on less than 0.1 ha as cut-and-carry forages.

Figure 4: Dominant planted forage types (ha).

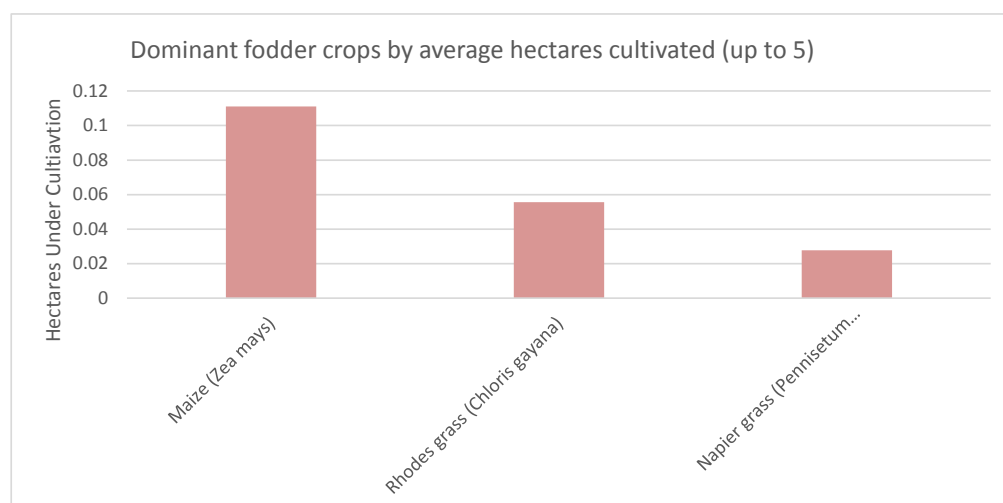


Table 1 shows the rainfall pattern by season. Rainfall levels are generally adequate to support agricultural activities during the cropping seasons in a year. However, farmers reported that over the years there was some change in rainfall pattern which have threatened reliance on rain-fed agriculture. The change in rainfall pattern has also threatened the livestock production, which relies mostly on grazing of natural grasses and bushes.

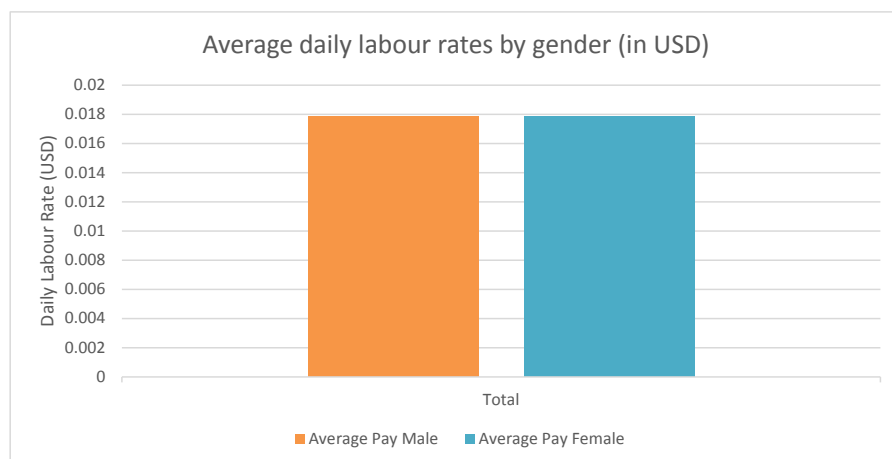
Table 1: Seasonal cropping patterns in Mazabuka District

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 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 ZK300 and the maximum rate is ZK500. The labour costs vary with type of farming activity and labour 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 Kayuni is over 50% with men being the majority of 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 would earn about USD0.01788 and a woman would also earn USD0.01788. This may mean that men and women work the same hours and they all do a similar quality of work in farm labour jobs.

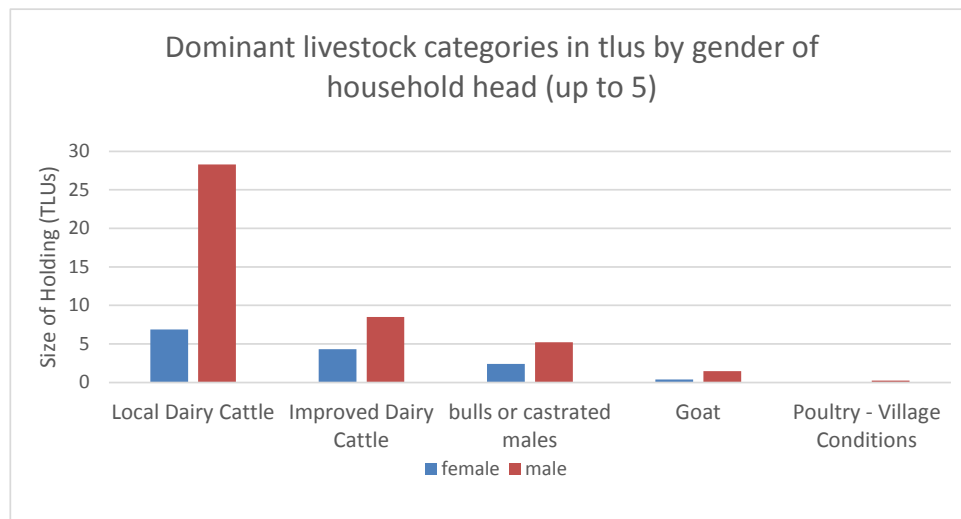
Figure 5: Average daily labour rates by gender (in USD).



## Livestock production system

Local dairy cattle are the most dominant type of livestock kept by livestock farmers in Kayuni camp (Figure 6). The most dominant breed is the Tonga breed. Farmers also rear improved dairy cattle (crossbreeds) for milk production. Other livestock types kept include bull or castrated males, goats and poultry-village condition. 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). Poultry is also kept for source of income through sale.

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

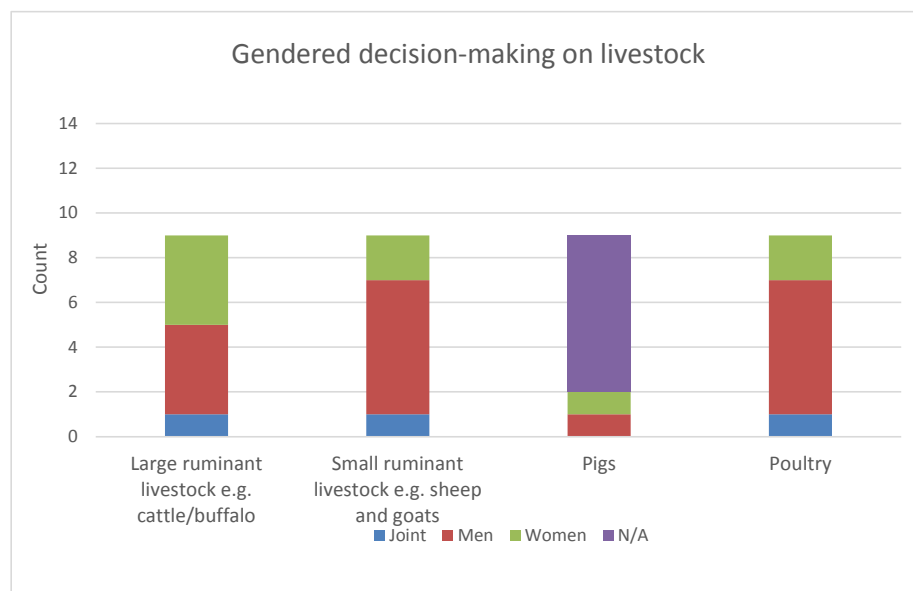


In the Kayuni camp, female-headed households dominate in large ruminant cattle production and mainly for beef production compared to male-headed households that mainly keep small ruminant livestock (e.g. sheep) mainly as a source of income through sales of live animals. Poultry and small ruminants are mainly kept by men. 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), foot-and-mouth disease (FMD), tick-borne diseases, and lumpy skin. 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. Farmers sometimes supplement veterinary services with traditional veterinary 'doctors' services. This is common in treating abortion and mastitis. The farmers reported that artificial insemination (AI) services are not readily available with a score of 2/5. However,

majority of farmers (over 90%) often rely on bull services. Farmers mainly use improved breeds of bulls such as Friesians. Some of the challenges with bull services is increased incidence of brucellosis and inbreeding.

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

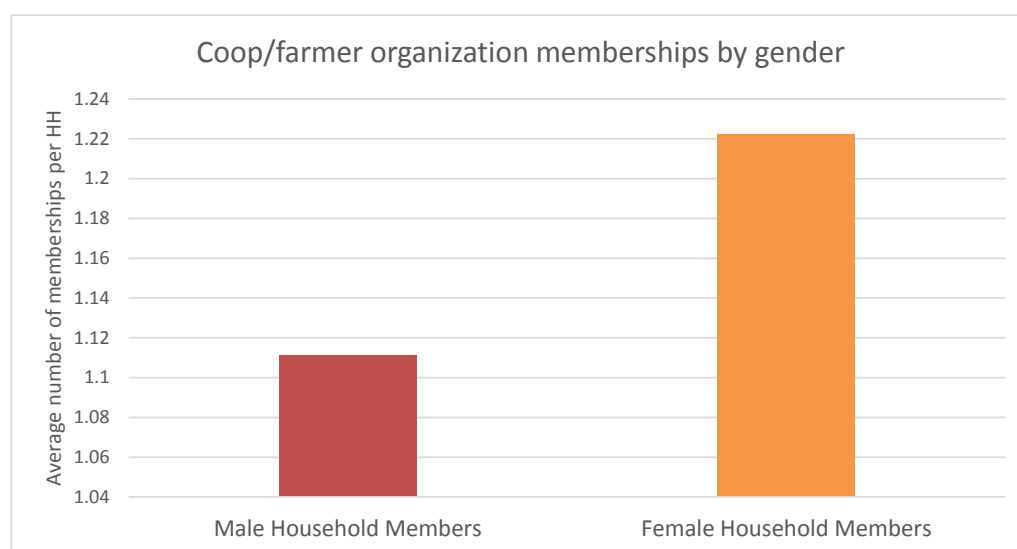
Figure 7: Gendered decision-making on livestock.



The main sources of financial service (credit) includes village saving, neighbour/friends and the dairy cooperative. In most cases, credit is obtained for tuition fee, capital, farm inputs and other household needs. Informal credit sources dominate in the credit share (55%) compared to formal credits sources (45%). The conditions of accessing credit vary according to the source. Some of the common conditions for obtaining credit for agricultural production include trust/surety and membership card. About 40% 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 women belong to informal groups through which they access loans and they concluded that as long as an individual has security both men and women can access credit. 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 2 female members will belong to farmer organizations compared to men (1).

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 Kayuni camp. Results indicate that livestock-related activities, predominantly dairying, contribute the highest share (60%) to household income. Dairying contributes the highest share within the livestock category (60%). Cropping (food crops) contribute about 33% to household income. This mainly includes sale of sunflower, maize and groundnuts. Off-farm business contributes about 7%.

Figure 9: Primary sources of household income by category.

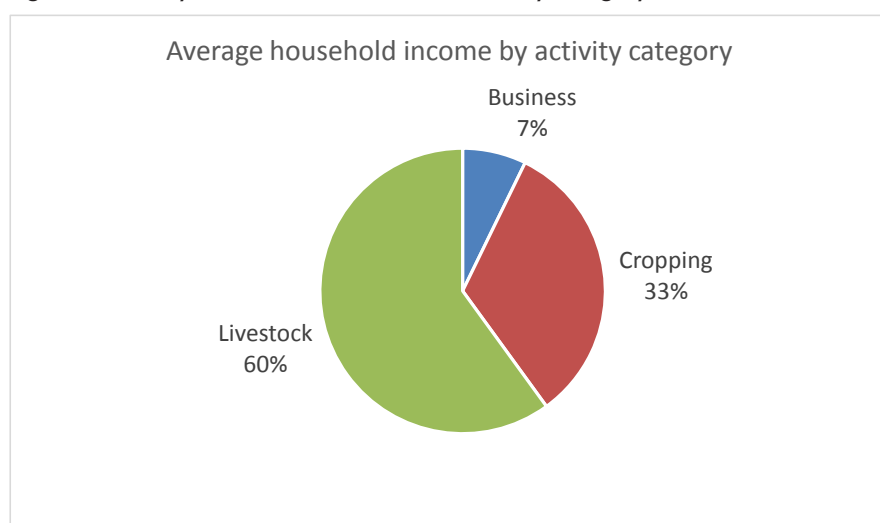


Figure 10 shows relative contribution of major sources of income to household and women's income. Dairying, fattening animals, food crops, cash crops and charcoal making contribute the highest share of household income. Poultry meat, poultry eggs and gardening contribute the highest share to the women's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

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

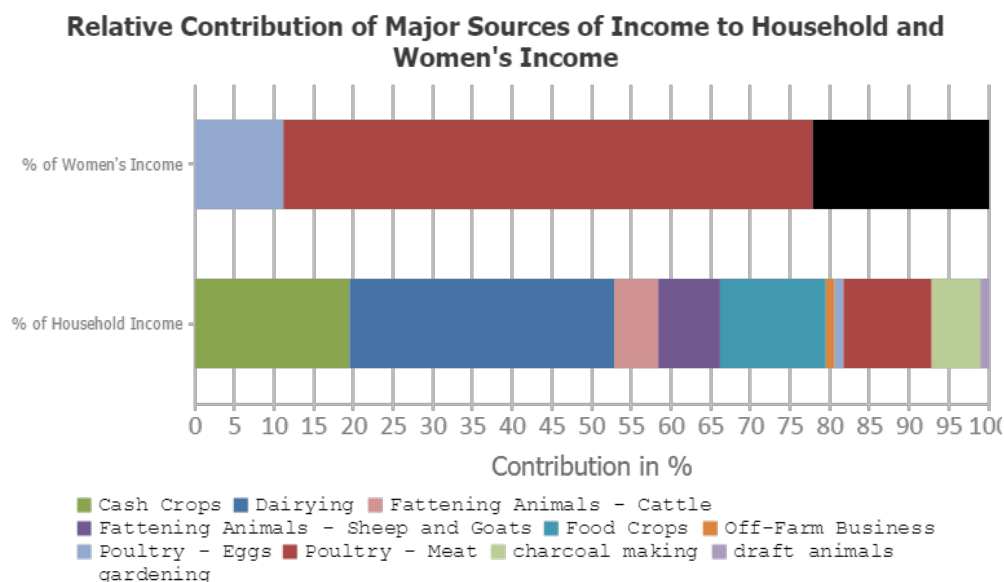


Figure 11 indicates that men make decisions on income from dairying, fattening animals, cash crops, poultry eggs, charcoal making and food crops. Women make most decisions on poultry meat, cash crops, food crops and dairying. Joint decisions on income are mainly related to poultry meat.

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

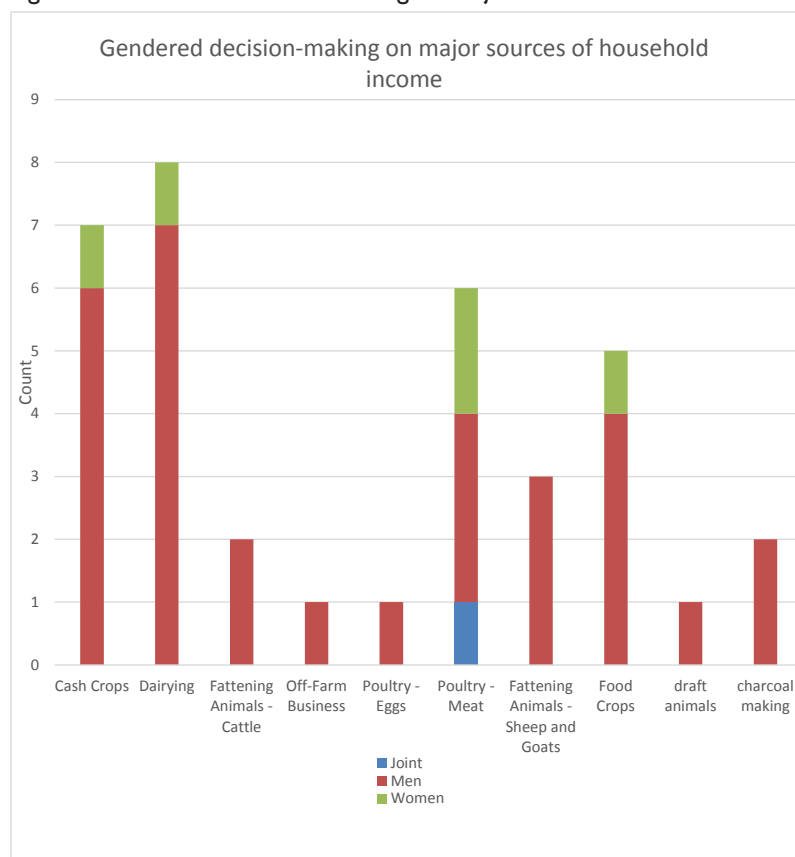
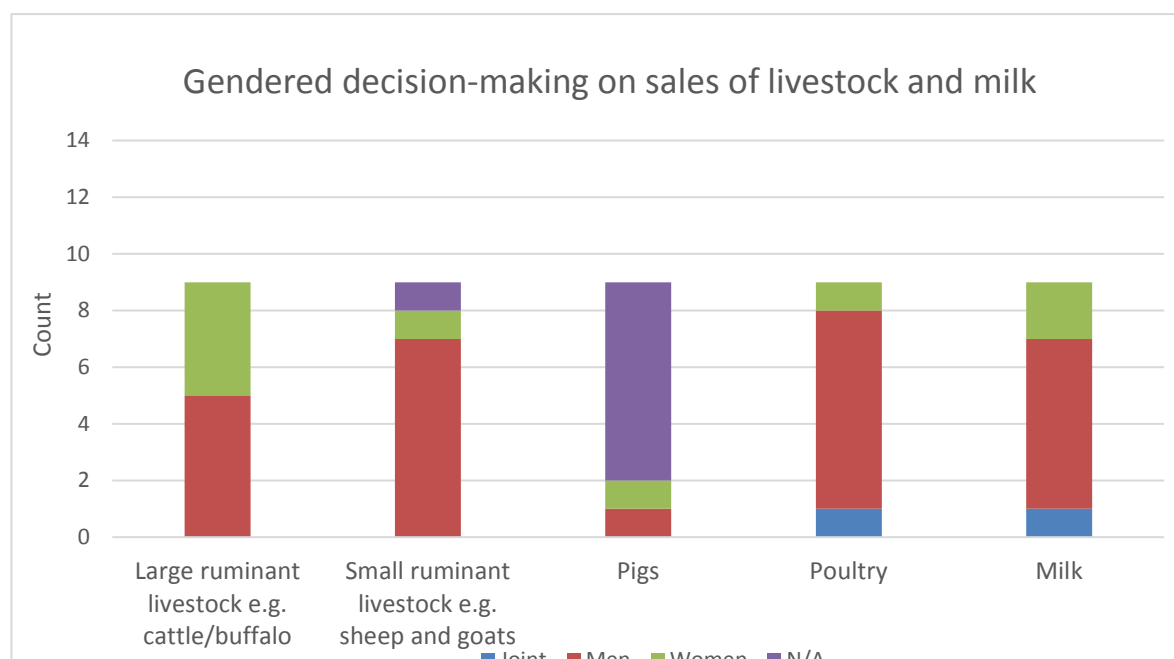


Figure 12 shows gendered decision-making on sales of livestock and milk. It is observed that men make most decisions on milk sales, small ruminants, poultry, large ruminant and fewer in pig sales. Women make most of the decisions on large ruminant, small ruminant milk and some on pig sales. There is,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

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 December compared to the rest of the year.

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

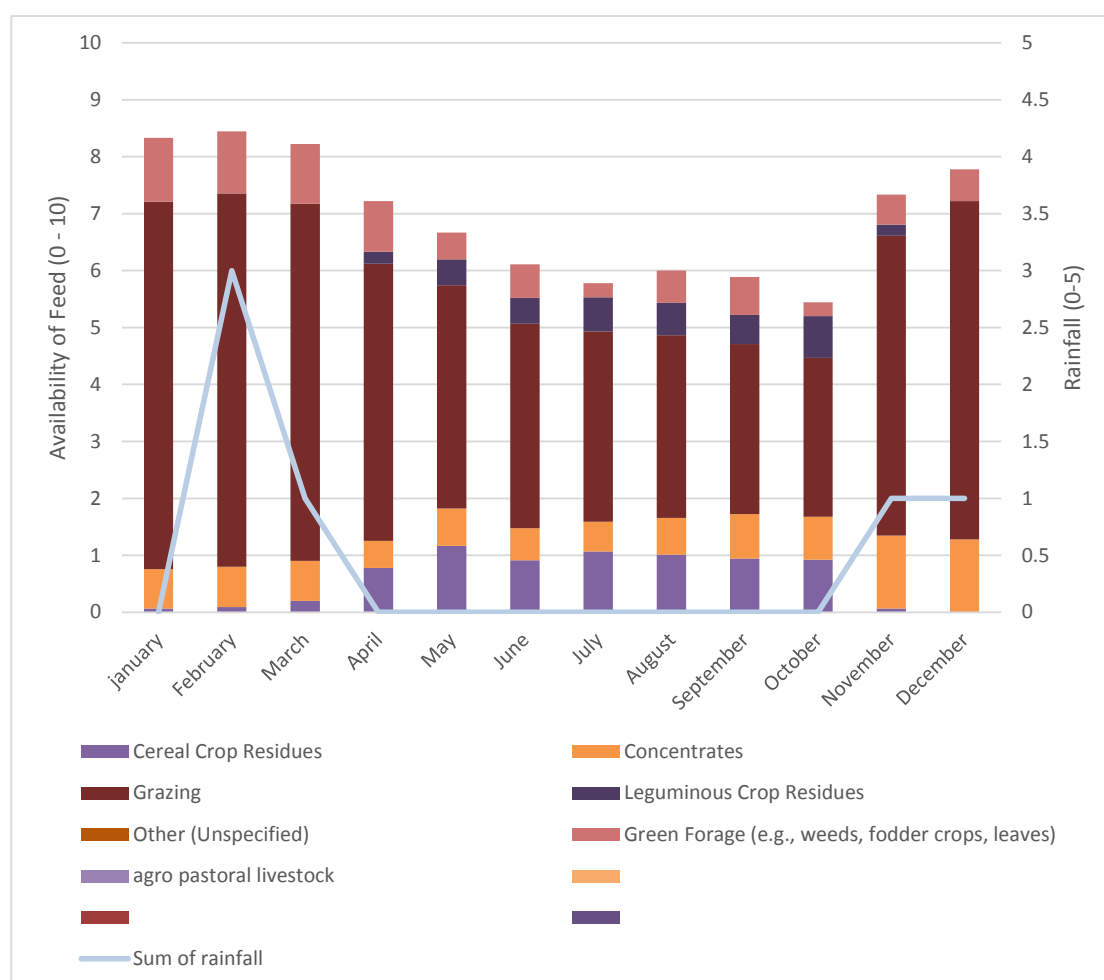
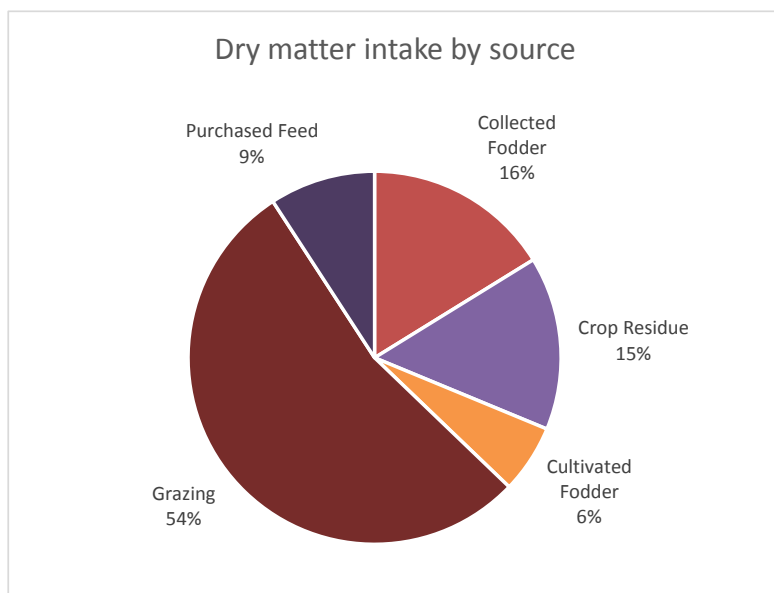


Figure 14 shows that grazing contributes 54% to the total dry matter intake on farms, followed by collected fodder (16%). Cultivated fodder contributes 6% comprising Napier grass and Rhodes grass. Crop residues contribute about 15% and consist of residues from cereal crops. Purchased feeds contribute 9% and include maize bran.

Figure 14: Contribution of dietary dry matter (DM) to the total livestock diets by feed source on farms in Kayuni 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 51 % and crude protein at 42%. Cultivated fodder contributes 6% to the total ME (MJ/Kg) this is the same crude protein.

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

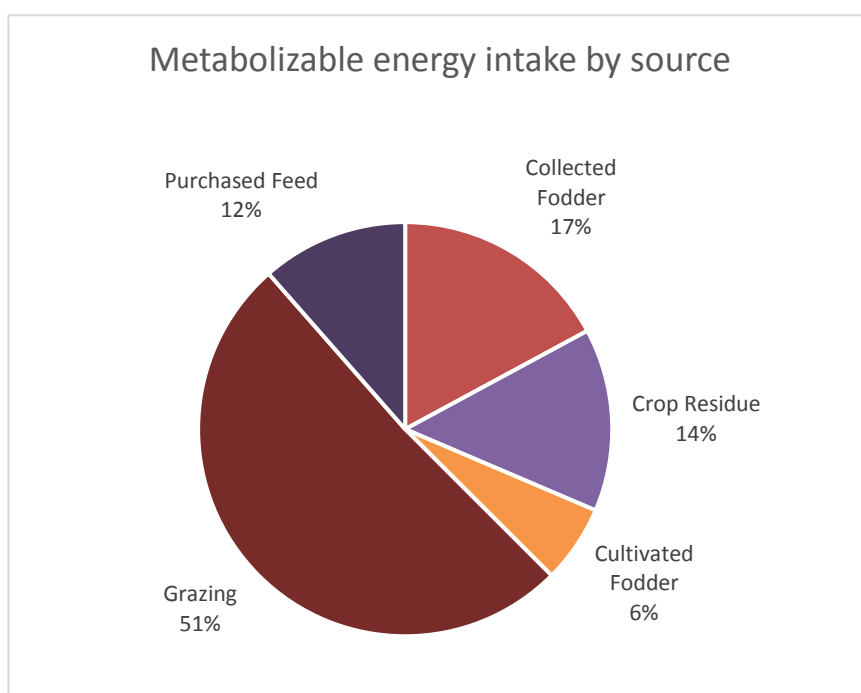
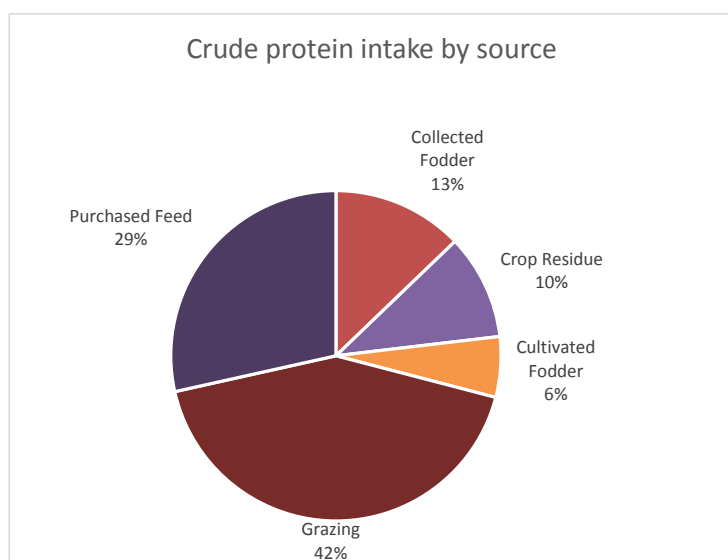




Figure 16: Contribution of crude protein (CP %) to the total livestock diet by source on farms in Kayuni camp.



Collected fodder contributes 17% to the total ME (MJ/Kg) and 13% to crude protein. Crop residue contributes 14% and 10% to the total ME (MJ/Kg) and crude protein, respectively. Purchased feed also contributes 12% to the total ME (MJ/Kg) with a crude protein contribution of 29% (Figure 15 & 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 storage of feed, purchasing of feed mixing feed ingredients and feeding. Women are mostly involved in weeding forage crops, land preparation, processing feeds, watering and cleaning of feeding and watering facilities. Children and the youth are mainly involved in harvesting, transportation of feeds collecting off-farm forages, weeding and processing feed. 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 Kayuni camp.

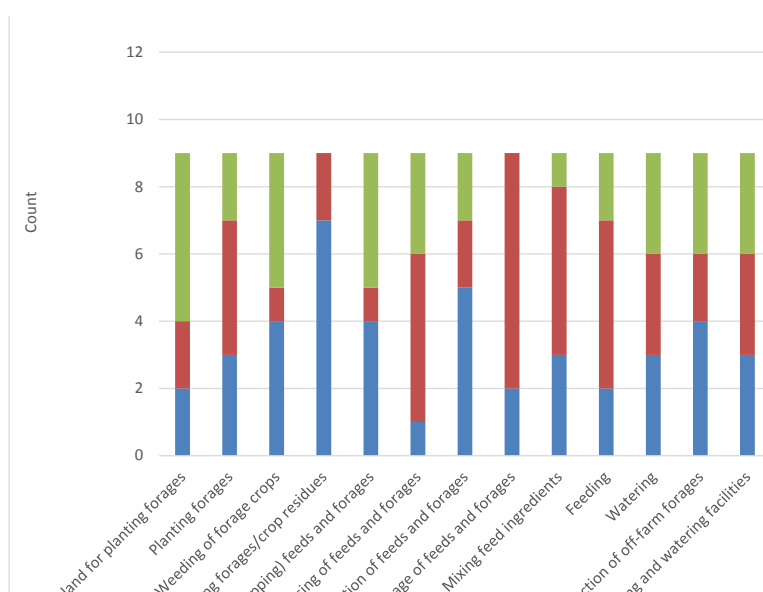
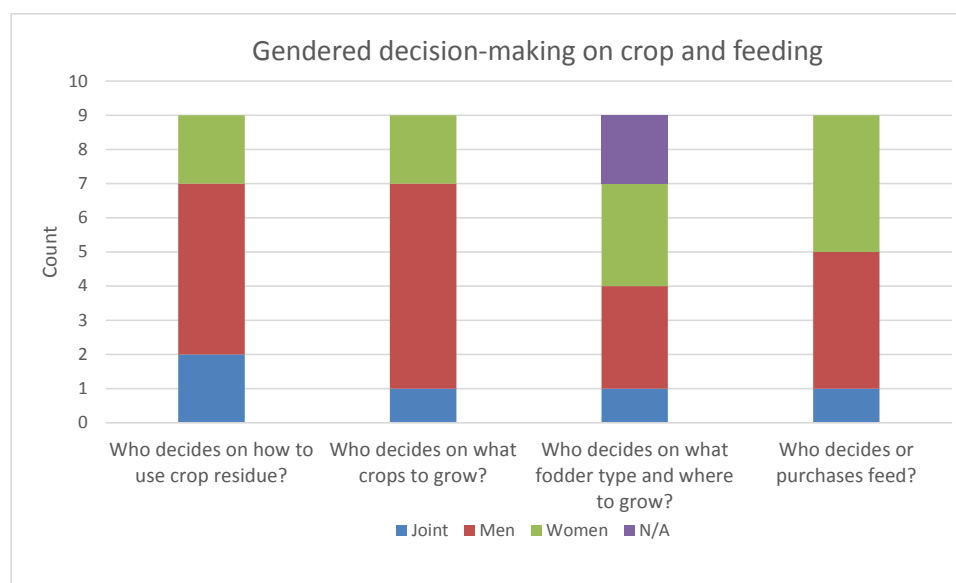


Figure 18 shows the decision-making roles between men and women regarding crops and feeding. It is observed that men make most decisions about what to grow, and how to use crop residues. Women make most decision on feed purchasing and what fodder type/ where to grow. In some households it is observed that men and women make joint decision 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 East Coast fever (ECF) and other diseases, high cost of drugs, limited water availability, high cost of feed and lack of transport to the markets.

Table2: Problems, issues and proposed farmer solutions within production systems in Kayuni 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 dip tanks to the farmers in order to reduce on disease incidences.
- Letting the government help the farmers so that they can be buying drugs at a fair price.
- Providing more water points (e.g. dams, boreholes etc.) in order to reduce water scarcity during the cropping period.
- Building market facilities near to the community.

## Conclusion

Kayuni farmers are mainly into dairy production and crop production 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 forage production and management as well as pasture improvement. Promotion of AI services and introduction of improved cattle breeds would improve productivity 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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