

Characterization of livestock production systems and the potential of feed-based interventions to improve livestock productivity in Ugunja sub county, Siaya county, Kenya

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In partnership with the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) and the International Potato Center (CIP), International Livestock Research Institute (ILRI) will lead the implementation of AVCD. The three CGIAR centres will work closely with partners—county governments, NGOs, CBOs, private sector actors and other USAID-funded projects/programs, as well as leverage knowledge and best practices from academic institutions and foundations.

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Introduction

This is an assessment of livestock production systems in Ugunja to determine whether livestock production is a significant livelihood activity and determine extent of feed resource challenges to device appropriate interventions. The study was carried out in Ugunja sub county, Siaya County, Kenya on 25th May 2016 to assess the livestock production systems among farmers and community at large. Livestock feed resources were assessed for availability in different seasons, their quality and quantity alongside other factors affecting dairy production to develop livestock feed using Farmer Centered Diagnosis (FCD). The end product of the study is a report which includes description of challenges, recommendations and interventions on livestock feeds. Recommended interventions will be prioritized in Techfit based on context scores. The prioritized interventions will then be presented back to the community and relevant stakeholders and partners for buy in followed by development of actual implementation plan. The actual implementation of the strategies will be followed by regular or periodic follow ups, monitoring and evaluation of the implementation plan.

Methodology

A scoping exercise was done to select a venue for interviews and identify farmers to participate in focus group discussion and individual interviews. Data was collected from 20 farmers; 11 males and 9 females using the focus group discussion and individual interview guides. Quantitative and qualitative data was entered in the FEAST application to produce charts and graphs used to compile a farmer centered diagnosis report.

Findings

General farming system description

Ugunja Sub County has an average of 120 households in every village. 60 percent of the households have small land holdings of less than one acre. However, among the respondents who participated in the focus group discussion, 30% own less than one acre, 40% own between 1 and 2 acres and 30% own more than 2 acres (figure1). Farmers practice mixed crop and livestock farming.

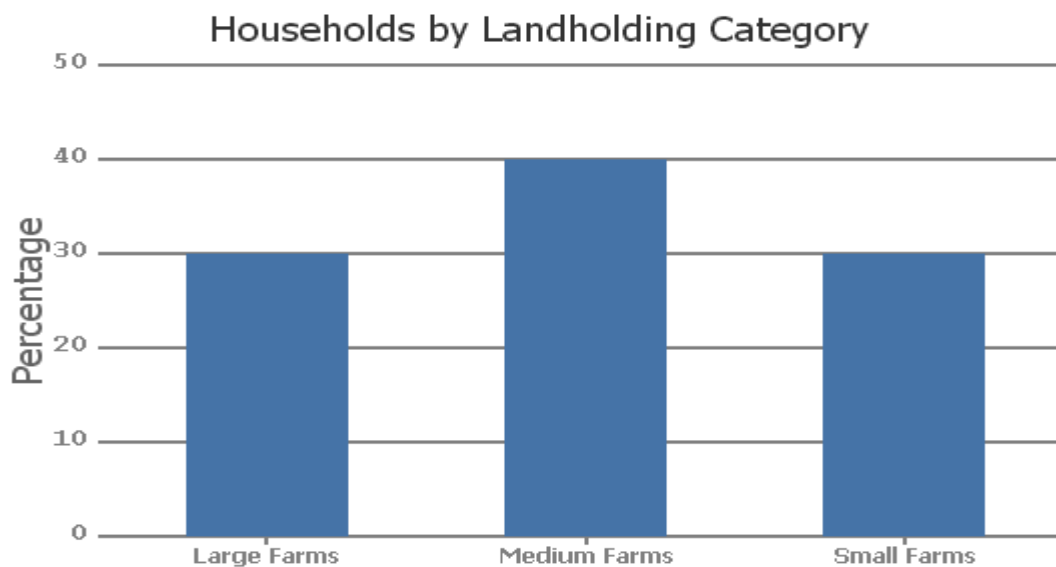


Figure 1: Households land holding categories

Availability of water

Water is an essential resource for crop and livestock production. Water access is easy in Ugunja Sub County and farmers do not practice irrigation. Water sources include rivers, springs, shallow wells, boreholes and some own water tanks for roof water catchment. Planting of crops occurs during long rains and short rains while harvesting is done during dry periods.

Long rains occur in March, April, May and June while short rains occur in September, October and November (figure 2). Rainfall patterns have however changed due to the effect of climate change.

Availability of feeds is high during long rains but majority farmers don't practice feed conservation therefore during the dry seasons, scarcity of feeds often constrains milk production leading to a drop in milk production (figure3).

Name of season	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
Long rains												
Short rains												
Dry season												

Figure 2: Rainfall distribution in a year

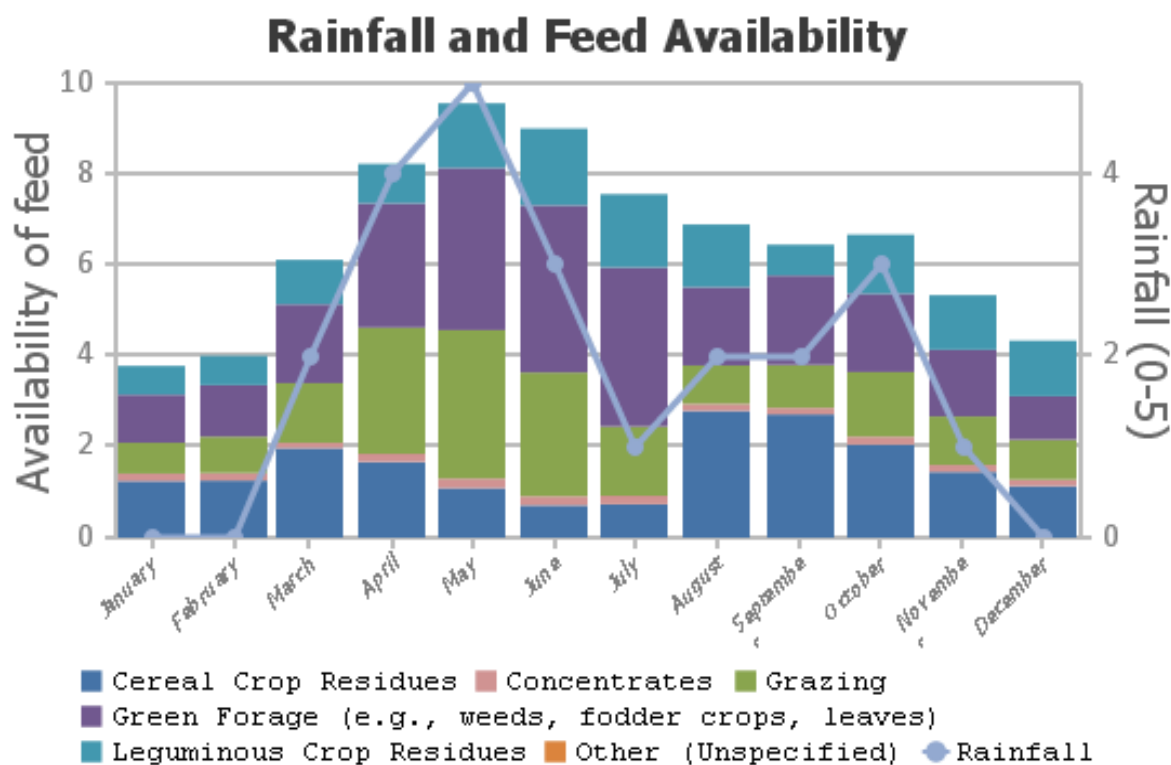


Figure 3: Rainfall distribution and corresponding feed availability over a year

Availability of labour

Labour is an essential factor of production and adequate manpower is required in livestock production and fodder production. Labour demand varies and it is highest during planting, weeding and harvesting. Labour cost is constant across gender (figure 4) and only varies with labour demand. Labour is however constrained by out migration of youth in search of employment, education and their negative attitude towards agriculture which keeps them from actively participating in farming.

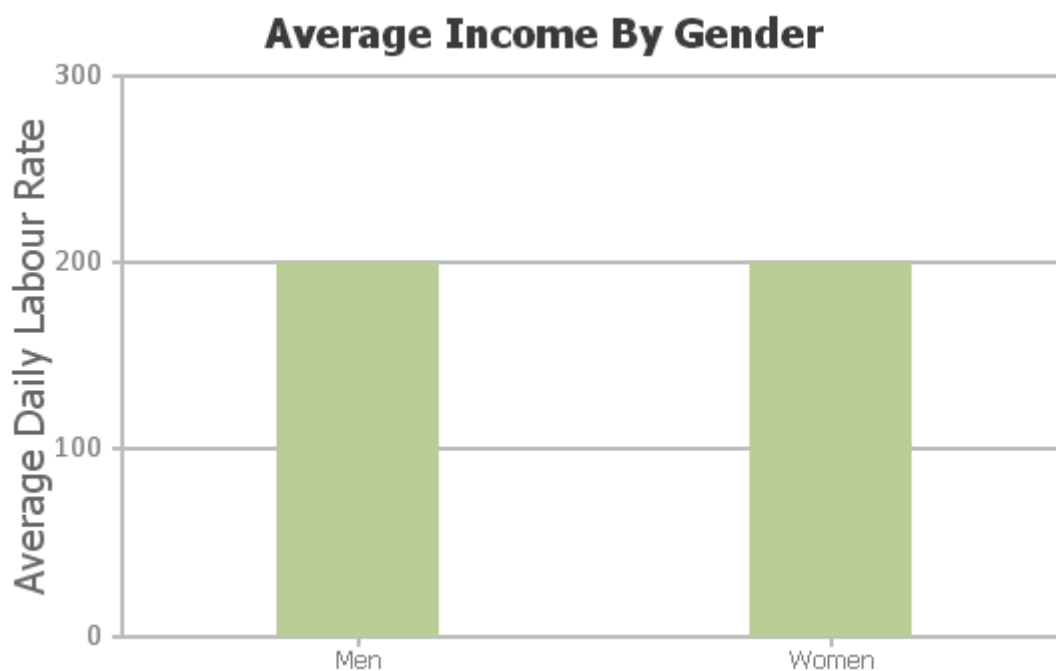


Figure 4: Labour rate by gender

Availability of credit

Access to credit ensures farmers have sufficient financial resources to access agricultural inputs including seeds, fertilizer, pesticides and farm machinery. 70% of farmers are able to access informal credit while 30% of farmers can access formal credit. Farmers access farm inputs from firms e.g. One Acre Fund that provide farmers with certified seeds, fertilizers and pesticides which are repaid after farmers sell their produce.

Crop production

Farmers practice mixed farming which includes crop production, tree planting, fish farming and livestock keeping. Crops grown include maize (*Zea mays*), common beans (*Phaseolus vulgaris*), sugarcane (*Saccharum officinarum*), finger millet (*Eleusine carocana*), cassava (*Manihot esculenta*), sweet potato (*Ipomea batatas*) and groundnuts (*Arachis hypogaea*) (figure 5).

Fodder crop production

Fodder crops are annual and perennial crops grown to feed livestock. Fodder crops grown in the study area include: Napier grass (*Pennisetum purpureum*), mullato (*Brachiaria*

ruziziensis), calliandra (*calliandra calothyrsus*), green leaf desmodium (*Desmodium intortum*) and maize (*Zea mays*) (figures 6 and 7). Farmers offer their animals fresh fodder which is cut and brought to animals.

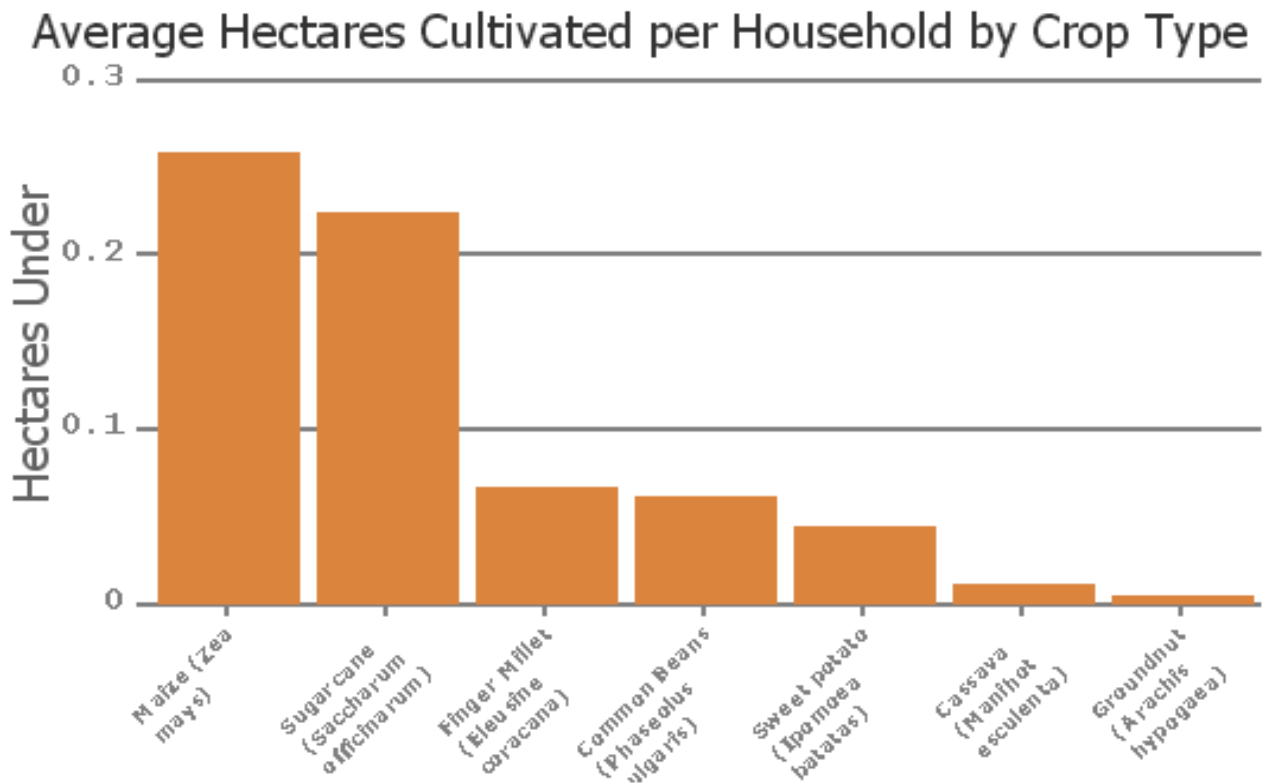


Figure 5: Average hectares cultivated by crop type

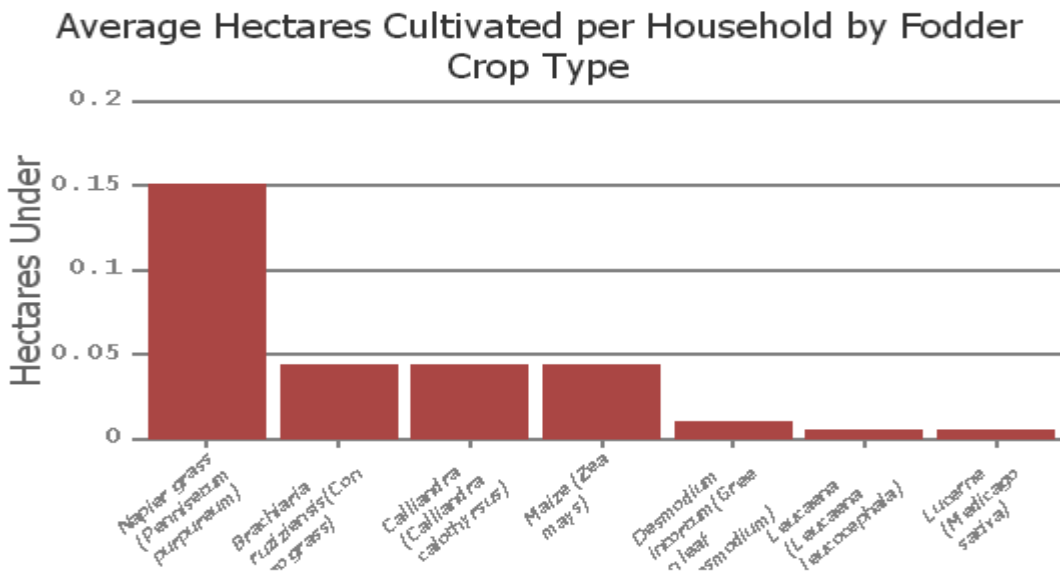


Figure 6: Average hectares cultivated by fodder crop type

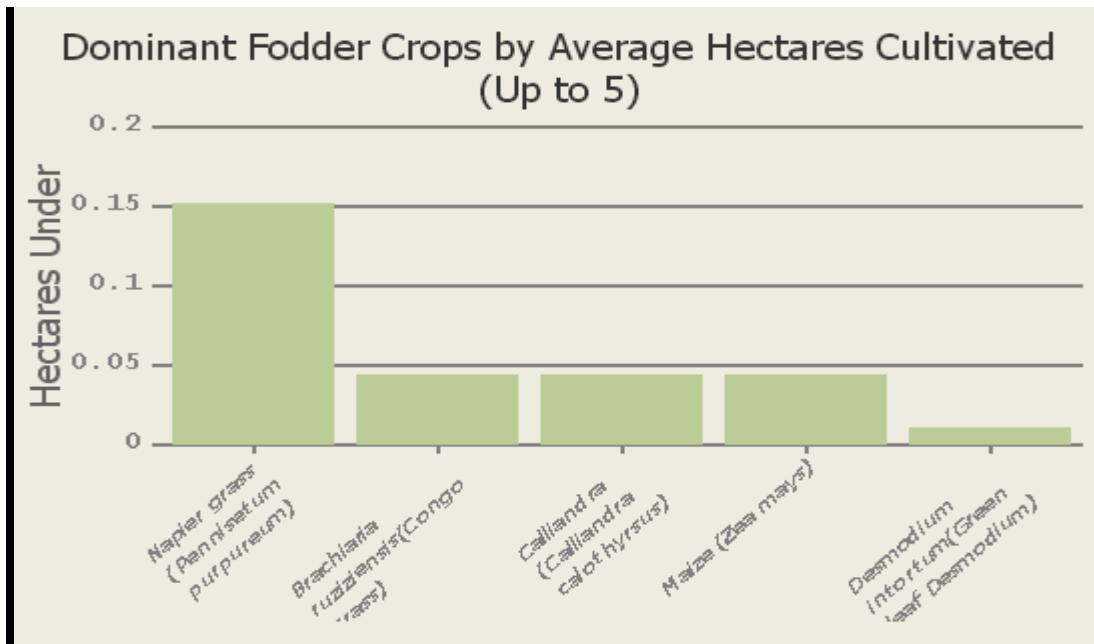


Figure 7: Dominant fodder crops by hectares cultivated

Animal diet and nutrition

Animal diet is mainly contributed by purchased feed, cultivated fodder, collected fodder, grazing and crop residue (figure 8).

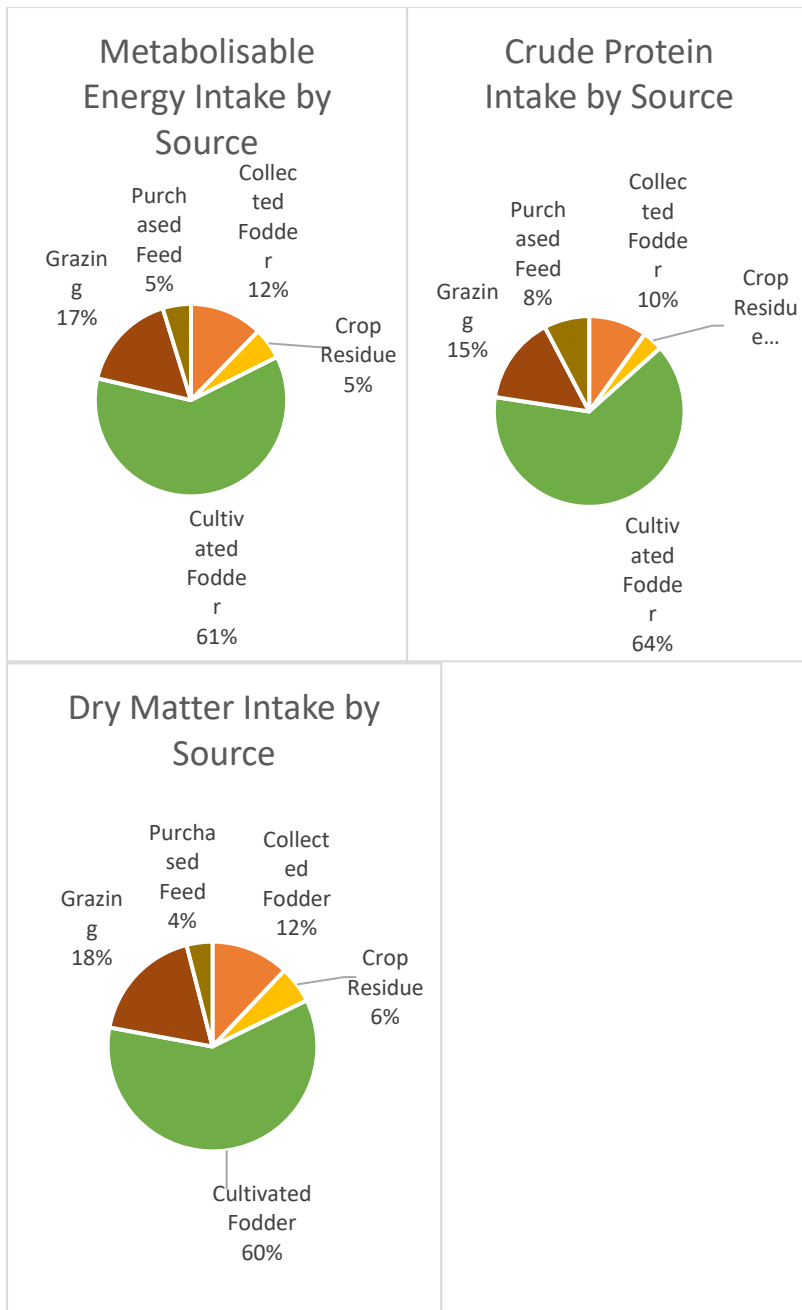


Figure 8: Dry matter, Crude protein and Metabolisable energy sources

Sources of household Income

Sources of household income as indicated by the respondents are cash crops like sugarcane and horticultural crops which include tomatoes, onions, and kales. Other sources of income include sale of fattening cattle, sheep and goats, sale of food crops, laboring /service, off

farm business, sale of eggs and chicken and remittances (figure 9).

Average Household Income by Activity Category

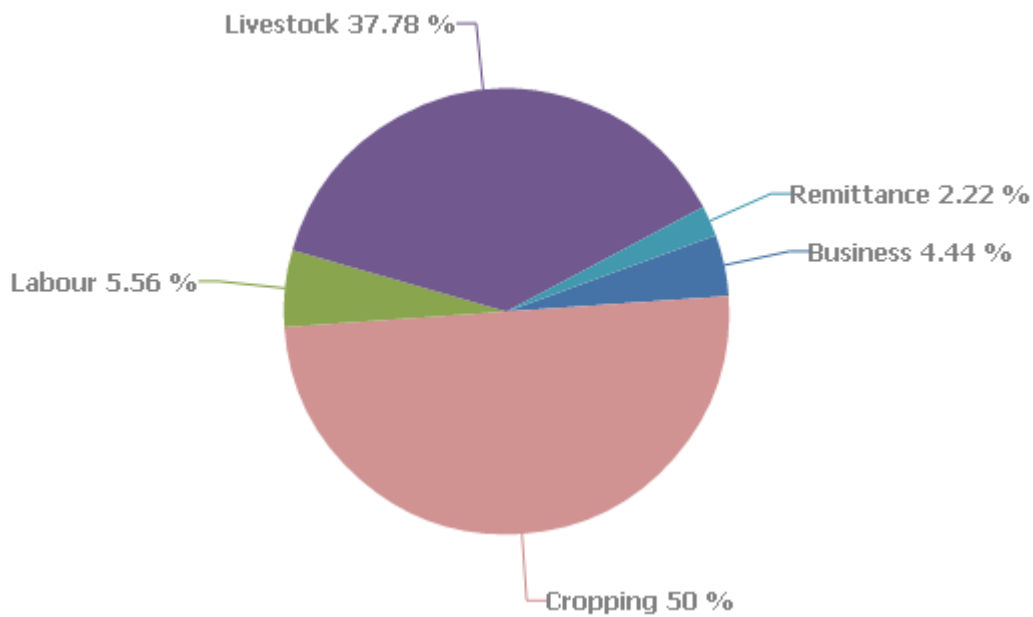


Figure 9: House hold sources of income

Milk yield and milk prices

Milk yield usually falls below the demand and further drops when there is shortage of feeds especially during the dry periods. During the dry period the animals are offered crop residues and hay. Milk productivity is highest during the rainy seasons when feeds are abundant and drops during dry seasons as shown in figure 10. Price of milk is constant irrespective of variation in milk yield (figure 10).

Average Daily Milk Yield (L) vs. Avg. Price Received per Litre



Figure 10: Average annual milk yield trend and corresponding price

Rainfall and feed availability

Feed availability varies and is directly proportional to rainfall availability. Feeds are abundant during the months of March, April, May and June and scarce in December, January and February (figure 11).

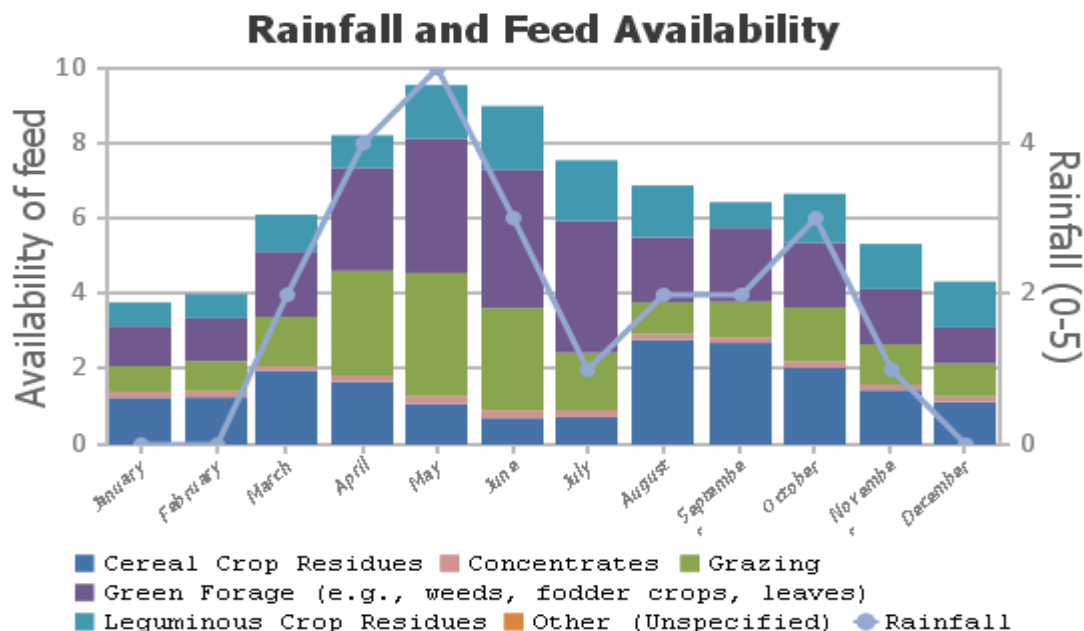


Figure 11: Annual rainfall and corresponding feed availability

Access to inputs and credit

Agricultural inputs are easily accessed by farmers from local agro vets, credit firms like One Acre Fund, ICS and the county government. Some farmers access inputs like seeds and fertilizers from National Cereals and Produce Board. However farmers don't have access to credit to support livestock production, mostly credit offered only supports crop production. Farmers qualify for credit by belonging to a farmers group and contributing regularly and only qualify to borrow after saving for a specific period and accumulating a certain agreed amount.

Veterinary and animal health services

Veterinary service provision is critical to livestock production. Transmission of notifiable diseases adversely affects animal trading as consumption of the animal products poses great human health risk. It is therefore important to detect disease occurrence early and offer treatment in time to prevent spread of the diseases. Ugunja Sub County has only one veterinary Technologist but there is no veterinary laboratory in the entire county. The county however has four private animal health assistants but veterinary drugs are very expensive leading to high cost of treatment. Farmers face high cost of breeding services as well as treatment which has made farmers to shy away from keeping improved breeds that are high yielding since they have low resistance to animal diseases. Traditional veterinary practices applied by farmers include use of boiled ober leaves mixed with table salt to treat bloat, mixing magadi and omo detergent given to treat grain overload, salad oil used to treat bloat, Orenge tree leaves boiled treats diarrhea, eye infection treated using Sodom apple (*Solanum incanum*) secretion.

Breeding services

90 % of farmers use bull for breeding which has resulted in low conception rate, inbreeding, high incidence of breeding diseases (Brucellosis, Leptospirosis, Trichomoniasis) and poor breeds with low

milk productivity. 10% use Artificial Insemination (AI) for breeding but they complained of high cost of this service. The high cost of breeding is associated with the long distance covered by artificial inseminators, high cost of nitrogen gas used for semen preservation and gender selected semen.

Management of livestock species

Semi intensive farming system is practiced where farmers allow the sheep, goats and cattle to graze freely when grasses are available especially during the rainy seasons while during dry seasons they cut feed and take to their animals for stall feeding. Housing structures used as zero-grazing units are either temporary or permanent for improved breed cows where feeding and drinking points are provided.

Bedding is not provided by all farmers but the livestock structures are well ventilated and have adequate spacing with feeding troughs and drinking troughs in place for zero grazing units. Feed processing is done by a few farmers where 40% of the farmers do processing by chopping Napier grass, desmodium, calliandra to feed dairy cattle, dairy goats and other livestock.

Livestock production challenges and proposed solutions by farmers

Table 1 below details livestock production challenges encountered by dairy farmers and proposed solutions.

Table 1: Summary of livestock production challenges and proposed solutions

	Problem	Solution
1	Unreliable and unaffordable Artificial Insemination services	Employment of more Artificial inseminators Facilitation of Artificial Inseminators
2	Unreliable extension services	Employment of more extension officers Facilitation of extension officers by provision of motorbikes.
3	High cost of veterinary services	Reduction in prices of veterinary drugs and vaccines Employment of more veterinary staff Facilitation of veterinary service providers
4	Lack of quality feeds	Training of farmers on pasture establishment and pasture management. Training of farmers on feed formulation.
5	Lack of adequate feeds	Training of farmers on feed conservation(Silage making and hay baling) Training on residue use and treatment of crop residue

Problems mentioned above were ranked using pairwise matrix in table 2 below:

Table 2: Pairwise ranking for prioritization of livestock production challenges

PROBLEM	No of times mentioned as more important	Ranking
1	0	5
2	3	2
3	1	4
4	4	1
5	2	3

Farmers cited lack of adequate feeds as the most serious problem that they wanted dealt with immediately which could be addressed through the following interventions:

- Training of farmers on feed formulation using locally available feed resources.
- Training of farmers on feed conservation (hay baling and silage making) to be used during dry season.
- Training of farmers on use of crop residue and on proper storage of crop residue to maintain feed quality.
- Training of farmers on pasture establishment and pasture management.
- Provision of new clean planting materials.

Conclusions

Livestock production is major source of livelihood and source of income to most smallholder farmers in Ugunja Sub County. Smallholder farmers lack access to credit to buy agricultural inputs and machinery to improve their productivity. Smallholder farmers further own small sizes of land and sometimes lease land in order to farm. The high cost of agricultural inputs and machinery limits adoption of various technologies that would improve livestock production and crop production, including improved seeds for fodder crops and legumes.

Development agencies including the national government and the county governments should therefore assist the farmers by reduction of taxes especially on agricultural inputs including seeds, fertilizer, herbicides, feeds and mineral supplements. Bank interest rates should also be reduced and policies that encourage credit acquisition promoted.

Additionally, farmers can improve their livestock productivity by attending trainings, field days and agricultural shows, working together as a team to adopt new technologies in farming, forming associations and cooperatives for ease access of credit, marketing and bulk sourcing of agricultural inputs.

Annex 1: Context attribute scores

S/NO	Context attribute	Score(0-4)		Reference
1	Availability of credit	2		Question 1.8 FEAST question guide
2	Availability of input delivery	4		Question1.10 FEAST Discussion guide
3	Availability of knowledge	2		Based on facilitator's best judgement
4	Availability of labour	2		Question1.6 FEAST discussion guide
5	Availability of land for fodder cultivation	1		Question 1.9 FEAST discussion guide
6	Availability of water in growing season	4		Question 1.5.2 FEAST discussion guide