



## **Characterization of the Livestock Production Systems and the Potential of Feed-based Interventions for Improving Livestock Productivity in Longisa Division, Bomet County (Kenya)**

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### **Introduction**

Sot Dairy Plant Company limited a dairy Producer Organization that was started in 2008 comprising of individuals, nine cooperatives and St Kobar women group. The current membership is 2386 members. The company is located in Longisa Division and Bomet Central Division of Bomet County (S; 00°45' 406. E 035°06'216. Elevation; 1842m). Its membership covers six locations namely; Kembu, Chemaners, Kapkimwolo, Tegat, Kimuchul, and Kibiyosit. The current daily milk collection is 4500 liters, however during the dry spell, the company collects a minimum of 1200 liters per day and in the highest that have ever collected during the rainy season is 10500 liters per day.

The Feed Assessment Tool (FEAST) was used to characterize the feed-related aspects of the livestock production system in Sot Dairy Plant Company limited catchment area. This was done to help design feeding system interventions that are specific to Sot Dairy Plant Company limited catchment area. The exercise was done November 2014. This study was carried out by East Africa Dairy Development project (EADD-P) in collaboration with the Ministry of Agriculture, Livestock and Fisheries and the extension staff Sot Dairy Plant Company. The main objectives of this study were to get;

- i) an overview of the farming systems,
- ii) identify major feeds and feeding related production problems, existing opportunities and potential interventions that would inform estimation of the feed gaps in the area

This will enable the management develop an implementation plan that will address dry season feed gaps and improve livestock the production and productivity in the area. .

## **Methodology**

### *Sampling*

Farmer representatives both male and female were randomly selected from each of the seven locations to participate in the participatory rural appraisal (PRA) focused group discussion. The selection was done based on the size of land holding. Two (FGD) were undertaken one in Kapkimwolwo with 17 (12 male, 5 female) farmers and another one in Kembu having 21 farmers 13 Male and 8 Female). From each category of land holding size in the discussion groups, key informant farmers were purposively selected and individually interviewed in the seven Locations. These were 6 farmers, 2 from each category of land holding small scale, medium scale and large scale.

### *Data collection*

The assessment was carried out using qualitative and quantitative methods of data collection. Focused group discussions (FGDs) were used to gather qualitative information on farmers perceptions about; farm sizes, household sizes, farm labour availability, annual rainfall pattern, irrigation availability, types of animals raised, general animal husbandry, access to credit, access to farm inputs, problems issues and opportunities within the livestock system. An interview using a structured questionnaire was used to collect quantitative information. The structured questionnaire was administered to nine key farmer representatives owning small, medium and large scale farms. The issues covered in the questionnaire were; dominant breeds, types of food and cash crops grown, how the crop residues are utilized, types of fodder crops grown and how much each feed resource contributes to the diet

### *Data Analysis*

The qualitative information gathered during the focused group discussions was and reported. The quantitative data collected from individual key informant farmers were entered into the FEAST excel template ([www.ilri.org/feast](http://www.ilri.org/feast)) and analyzed

## Key Findings

The following are the findings of the assessment, and existing opportunities in the area.

### Farming system

From the results, the area has a mixed crop- livestock farming system. Maize is the dominant crop in area. Majority of the household have a land holding that ranges from 0.9 to 3.2 hectares. The average family size is 8 people per house hold.

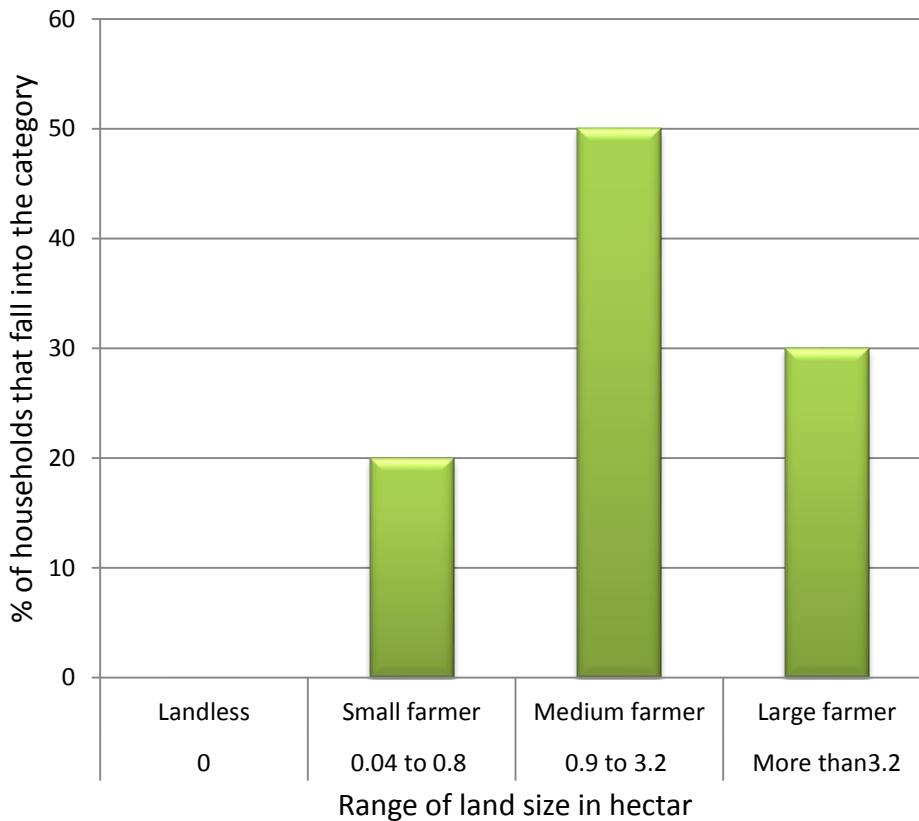


Figure 1: Average land sizes owned by farmers in various categories

The area experiences long rains from February to May and short rains begin from July, August September and again in November and December. The area has two maize planting seasons one starting in November and the second season starting in March.

Table 1: Cropping Seasons in the area

Name of Season	Jan	Feb	Mar	April	may	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Long rains		■	■	■	■							
Short rains							■	■	■		■	■
Dry months	■					■				■		

Maize is the dominant food crop grown in all the six locations Kembu, Chemaners, Kapkimwolo, Tegat, Kimuchul, and Kibiyosit (Figure2). The maize crop is mainly grown for food, the surplus grain and green maize is sold for income. Both the dry maize stover and green maize stover collected after selling green maize is fed to livestock. .

Farmers in all the six locations Kembu, Chemaners, Kapkimwolo, Tegat, Kimuchul, and Kibiyosit depend on rain fed agriculture as irrigation is not practiced. Labor is easily available and is mostly required during planting of maize and irish potatoes, weeding and harvesting. The price of labor ranges from Ksh 1200 (13USD) to Ksh1600 (18USD) per acre depending on the workload. Price of harvesting maize is Ksh 150 (1.6USD) per day per person. Majority of the farmers do use family labor.

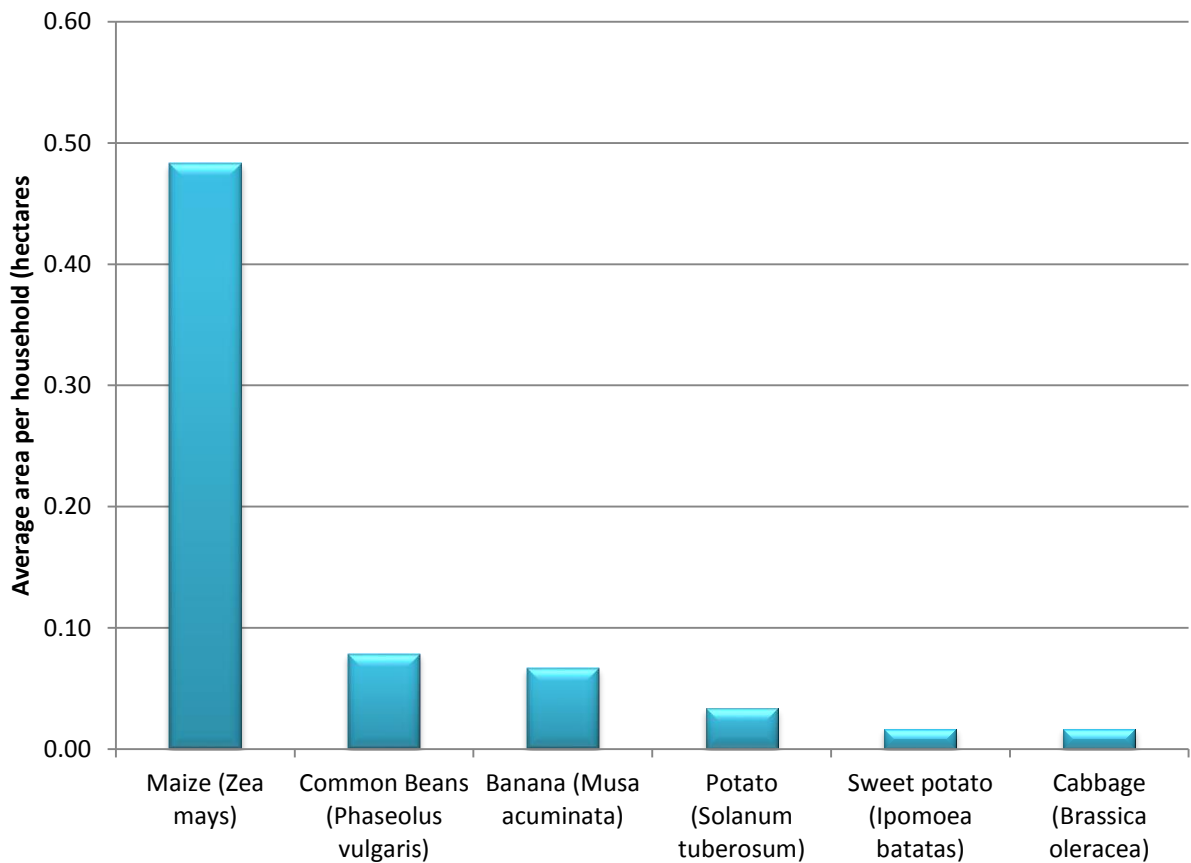


Figure 2: average area per major crops grown by farmers

### Income sources

Dairy production is the main source of income contributing 70% to the household income followed by crops (maize and beans and potatoes) production at 22%.

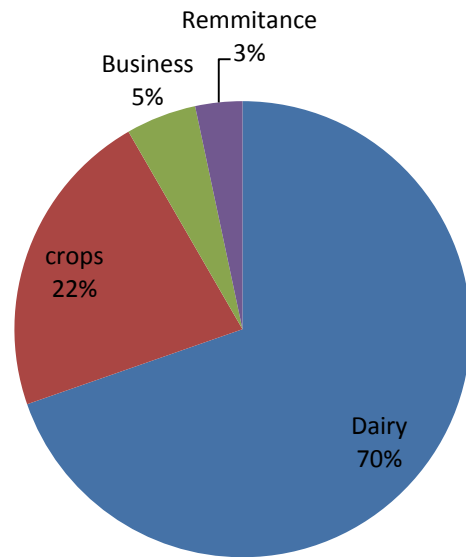


Figure 3: Contribution (%) of livelihood activities to household income

### Livestock production systems

Improved dairy cattle are the most preferred livestock and are managed under semi intensive system(Figure 4). From the EADD2 baseline survey, the average milk production per cow in the area is 4.5 Cattle are mainly kept for the purpose of milk, income from sale of culls and heifers; other benefits are manure payment of bride price. Draught cattle are kept for plowing, income and payment of bride price while donkeys are kept for transportation. A few farmers keep fattening cattle. There also exist local dairy cows that are kept for, milk and payment of bide price. From the farmers response 1% of the households have zero grazing units and majority do not house their livestock at night. 60% practice mainly grazing with a little supplementation while the rest practice open grazing. In Kembu location, about 49% practice tethering. Open grazing is practiced by close to 90% in Kapkimwolo, tethering 5% and zero feeding 5%. The supplementary feeds offered include; dry maize stover, Napier grass, bean haulms, Rhodes grass, and green maize Stover. The main form of feed processing is chopping using chuff cutters and pulverizers. Close to 20% of the households mix the feed with agro industrial by products (Bran molasses, maize germ) purchased from agro vet shops.

Veterinary and Artificial insemination services are available to households who are registered members of sot dairies. The most predominant disease is East Cost Fever (ECF) and its treatment costs an average of Ksh 2000 (22USD) or more depending on the extent of the

disease. The prices of A.I range from 1200 Ksh (13USD) to 6000 (65.9USD) depending on the type of breed, company supplying and whether the straws are sexed or not. Close to 40% of the farmers use improved bulls.

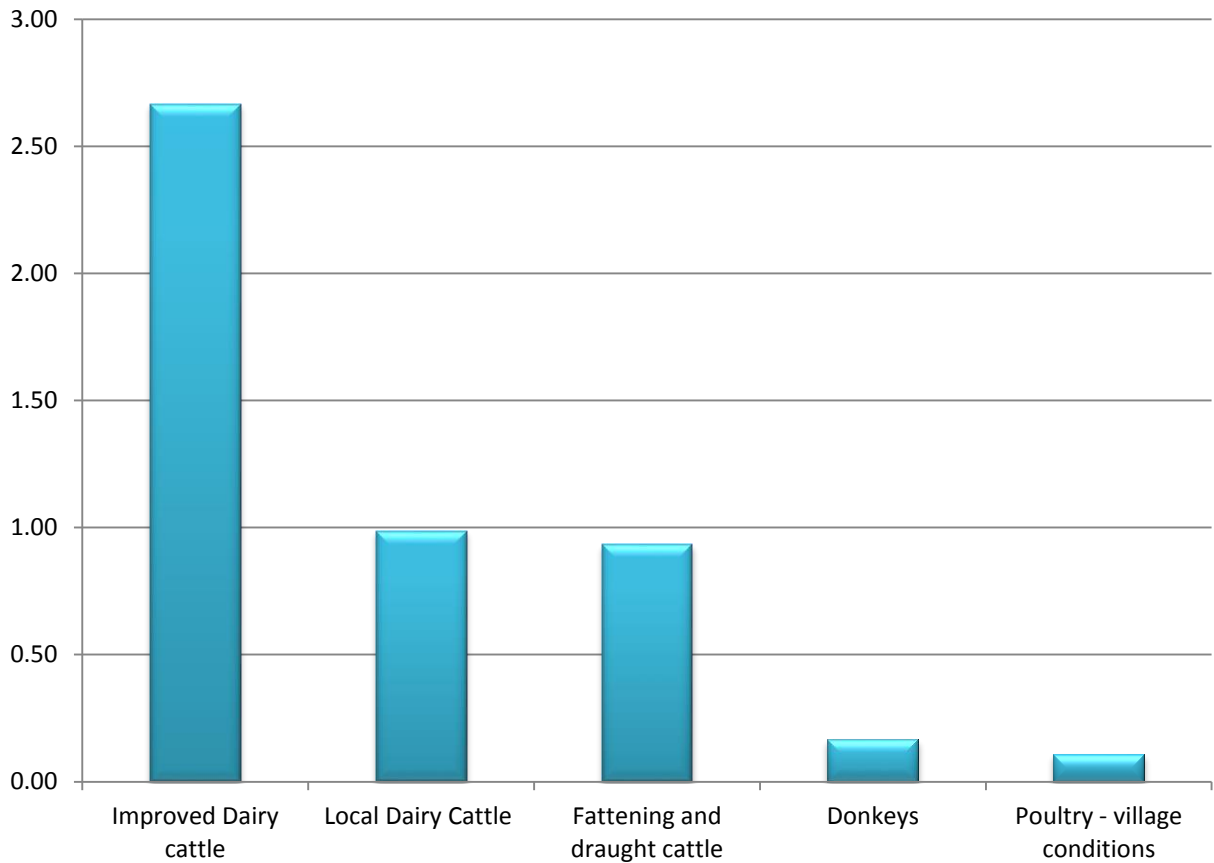


Figure 4: Average livestock species holdings per household in Tropical Livestock Units

### Feed Resources Availability and feeding

Grazing and green forage are the major feed resources. Grazing contributes 36% of dietary dry matter, and 34% of ME (figure 6,7and 8). Crop residue is also a major contributor to Metabolizable Energy (ME) and Crude protein (CP), contributing 21% and 17% respectively. Naturally occurring fodders (weeds) have a contribution of 15% ME and 14% CP. This naturally occurring and collected fodder is available throughout the year round with a slight decline in January, February, and March.

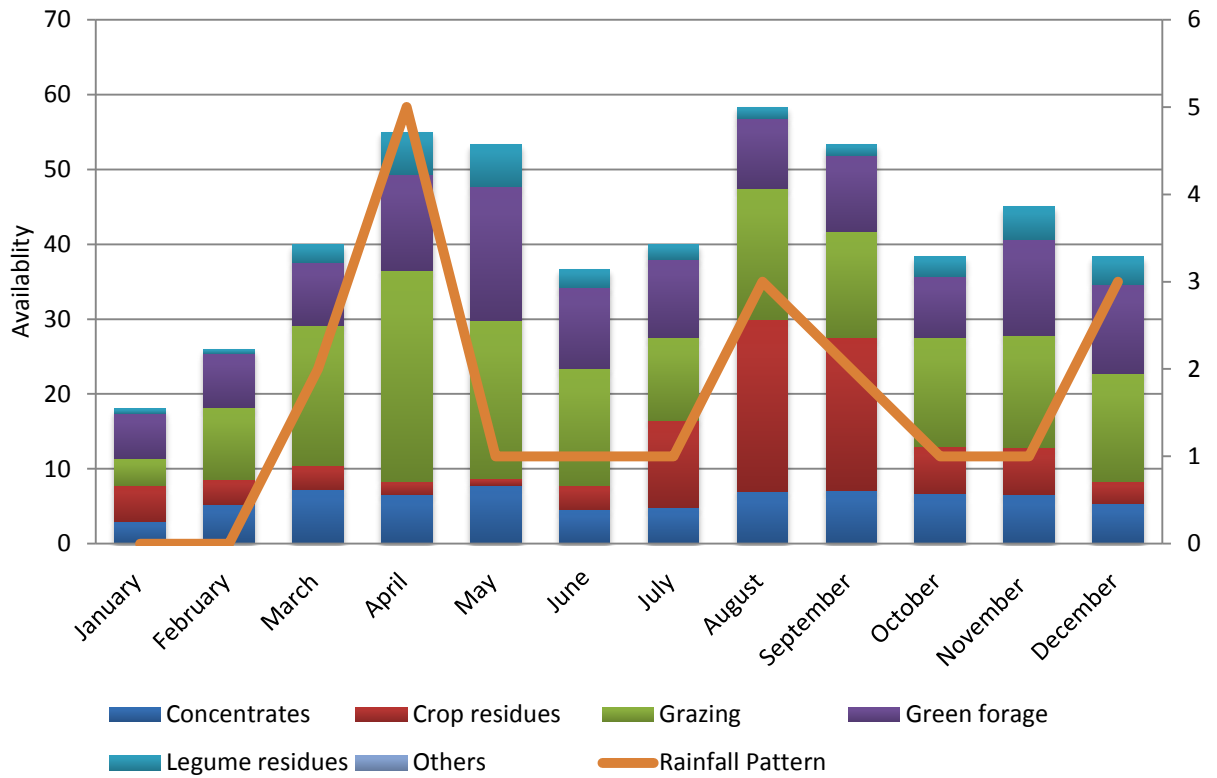


Figure 5: The composition of the livestock diet throughout the year in relation to the rainfall pattern

The dominant fodder crop in the six locations is Napier grass ((*Pennisetum purpureum*)) under an average of 0.35 hectare per house hold followed by Sorghum and Sweet potato vines at 0.025 hectare per household

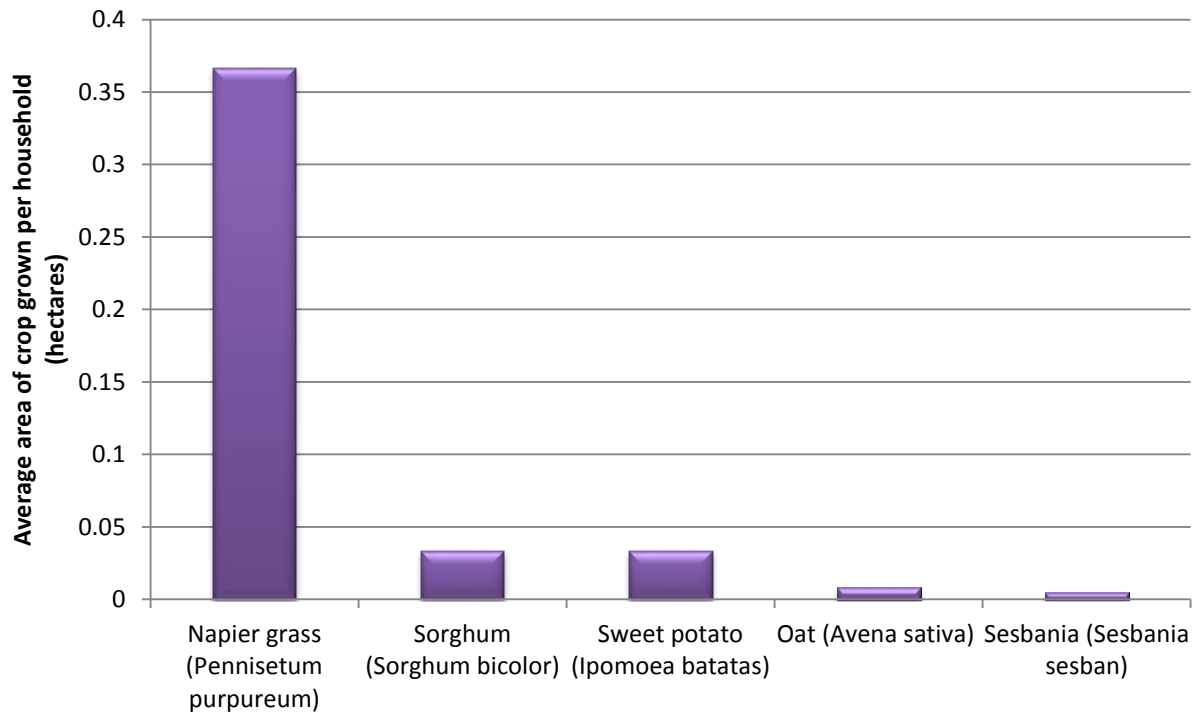


Figure 6: Dominant Fodder crops grown in the area

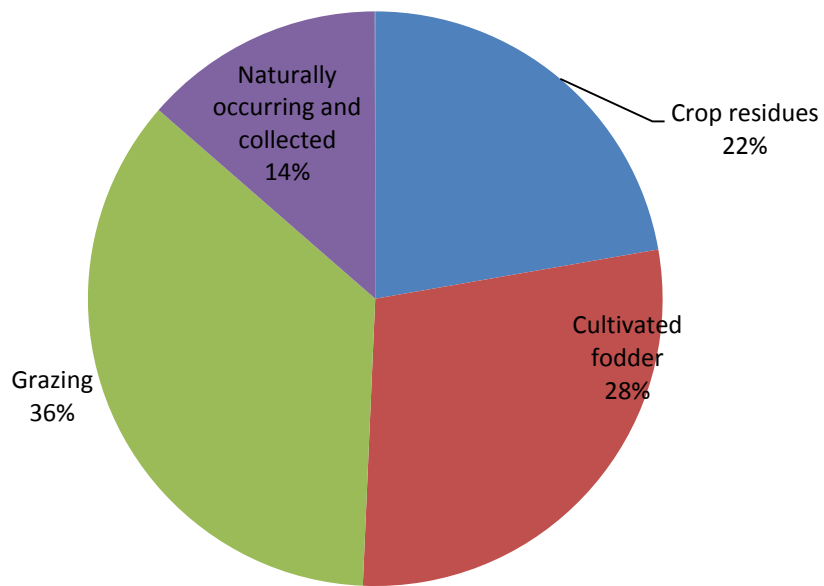


Figure 7: Dry Matter Content of total diet



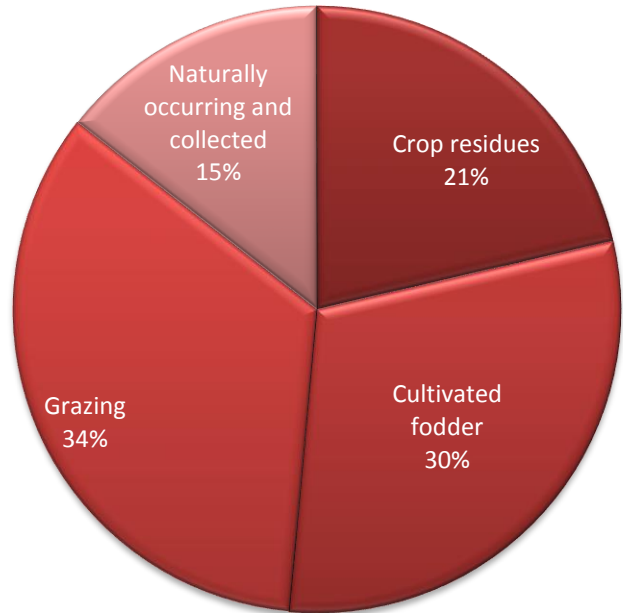


Figure 8: ME content of total diet

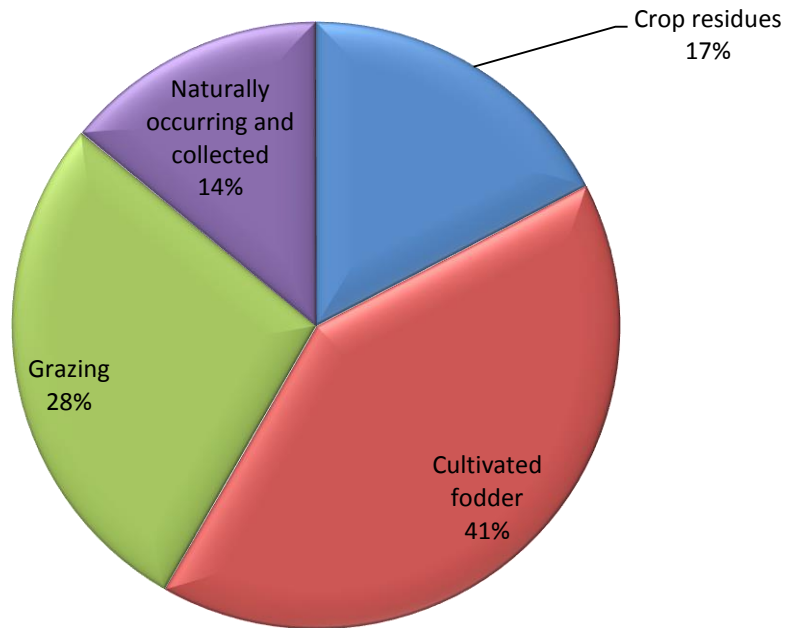


Figure 9: CP content of total diet

### Problems Issues and opportunities

Table 2: Problems, issues, proposed solutions by farmers and key areas of intervention from the feedback session

Problem Rank	Identified constraint	Proposed solution by farmers	Proposed Key Interventions from the feedback session.
1	Long Distances to watering points	The Producer Organizations to facilitate access to water tanks on check off	Facilitate linkage with stakeholders undertaking water harvesting and conservation activities
2	Unavailability of pasture seeds and vegetative planting materials	The Producer organization to stock seed in their agro vet shops	Through stakeholder meetings, the Producer Organizations to be linked with seed manufacturers The Producer Organizations to initiate seed multiplication and bulking through its members
3	Inadequate feed during the dry season	Capacity building on feed conservation techniques	Train on establishment of a variety of fodders Train on simple feed storage Train on feed conservation Producer organization to contract farmers to plant hay for that they will purchase and stock in the agrovet shops
4	Inaccessibility of silage making inputs	Producer Organization to stock Silage making inputs in their Agro vet shops	EADD to facilitate linkages with this input suppliers
5	In accessibility of pasture harvesting equipment's	Partner with county government to facilitate acquiring of bailers	Train on simple box baling Link PO to input suppliers like simple brush cutters.

## **Summary and Existing Opportunities**

Results indicated that farmers highly depend on grazing 36% DM as a feed resource followed by cultivated fodders 28%. Availability of natural pastures highly depends on rainfall and is in short supply during the dry season in January, February and March. The acreage under cultivated fodder per household is low with the highest occupying a 0.35 hectares per household. Increasing acreage under cultivated fodders can be one way of in addressing dry season feed gaps. Farmers reported that they collect a proportion of maize stover from farm land, heap it around home stead and feed it to the livestock in small quantities. There exists an opportunity to train on maize treatment for optimal utilization. Framers in the area can also be trained on utilization of green maize Stover for silage aside from whole green maize silage.

It came out clearly that feeds resource base in the area for cultivated fodder comprises of; Napier grass, sweet potato vines, Sorghum, oats and fodder trees. Diversification of feed resource based will ensure feed availability during the dry season.

## **Way Forward and key areas of intervention**

A feedback session of the PRA results and the Feed gap estimation with the Producer Organization management, Bod and extension team was undertaken and the following key areas of intervention were identified.

### *Technological interventions*

1. Introduction of other forage varieties for the drier parts; Bracheria ( Mulato), improved Napier varieties, Columbus grass, forage sorghum, Desmoduim . In the wetter locations, up scaling acreage under oats, Rhodes grass, sweet potato vines, lucerne, vetch ; and fodder trees
2. Training on both dry and green maize stover handling and utilization.
3. Stocking of the agro vet shops with inputs to facilitate silage making,
4. Training on fodder conservation

### *Institutional Interventions*

1. Engaging stakeholders undertaking activities in water harvesting and conservation
2. PO to be linked to Suppliers of feed harvesting equipment's , one for demonstration and later stocking it in the agro vet shop for farmers to purchase on check off.
3. Recruitment of more Volunteer farmer trainers who will host demonstrations on improved feeds and feeding systems , and also act as bulking centers for vegetative planting materials and other pasture seeds
4. Contracting farmer groups to produce hay or the PO establishing Rhodes to be conserved as hay for sale to members during the dry season
5. Stocking of pasture seed in the agro vet shops to enable farmers to aces on check off

## Annex 1: Feed Gap Estimation for Dry Season Feeding Results

Current situation; average milk production= 4.5liters/cow/day (EADD baseline report 2014)

Target production = 11.4 liters/cow/day

Estimated number of cows in the area 32390

Total Dry matter deficit from the feed gap estimation = 313887 kg DM

### Assumptions:

1. Assumed 6kg DM/ bale of hay,
2. Total yield of 200 bales/ care /year
3. For Grazing, a cow is able to picks only 5kg DM/day

Feed Resource	Dry Season Gap ( DM kg)	Rhodes DM (Rhodes+ Naturally occurring)	Estimate bales	Estimate Acres under Rhodes	Estimate acres under other forages ( takes a percentage of the area under grazing)
Rhodes	93866	206506	34317	172 Acres	
Naturally occurring collected	112639				
Grazing	106382				
Estimated area under grazing to meet the above DM requirement	21276 acres				5 % of 21276 acres

### List of References.

Duncan, A., York, L., Lukuyu, B., Samaddar, A. and Stür, W. (2012). Feed Assessment Tool (FEAST) Questionnaire for Facilitators (Version 5.3); A systematic method for assessing local feed resource availability and use with a view to designing intervention strategies aimed at optimizing feed utilization.

EADD2 Baseline Report 2014