



Characterization of the Livestock Production Systems and the Potential of Feed-based Interventions for Improving Livestock Productivity in Cheborgei, Roret and Buret Division in Kericho County (Kenya)

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Introduction

Cherobu Dairy Company Limited a multipurpose company that was formed by three Divisions in (Cheborgei, Roret and Bureti) in Kericho County. Currently, the company has chilling tank in Cheborgei Division, Cheborgei town center located (S; 00° 32'.737. E; 035° 06'.216; elevation; 1842). This Company started in the year 2009 and has 2400 registered members. The company's catchment areas comprises of; Cheborgei, Kasegut, Cheboin, Techoget, Tebessonik, kibugut, Cheplanget and Litein Locations. Currently, the Company collects 1500 Liter of milk per day being bulked from 12 collection centers. During the rainy season, milk collection goes as high as 6700 liters per day and declines to a minimum of 800 litres per day in the dry season.

The Feed Assessment Tool (FEAST) was used to characterize the feed-related aspects of the livestock production system in Cherobu Dairy Company Limited Company's catchment area. This was done to help design feeding system interventions that are specific to Cherobu Dairy Company Limited Company's catchment area that fall under cheborgei, Roret and Bureti divisions in Kericho County. The study was done November 2014. This was carried out by East Africa Dairy Development project (EADD-P) in collaboration with the Ministry of Agriculture, Livestock and Fisheries and the producer organization's extension staff.

The main objectives of this study were;

- i) to get 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

The findings and recommendations will be used by the management of Cherobu Dairy Company Limited to develop an implementation plan that will address the dry season feed gaps and improve livestock production and productivity of its members.

Methodology

Sampling method

Farmer representatives both male and female were selected from each of the eight locations (Cheborgei, Kapsegut, Cheboin, Techoget, Tebessonik, kibugut, Cheplanget and Litein) to participate in the PRA Focused Group Discussions (FDGs). The selection was done based on the size of land holding. Two FDGs were undertaken one in Cheborgei having a participation of 19 (11 male and 8 female) farmers. The second FDG was done in Cheboin with a participation of 21 farmers (14 male and 7 female). The questionnaire administered to the six key informants owning small, medium and large scale farms included topics such as; 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 examined and reported. The quantitative data collected from individual key informant farmers was entered into the FEAST excel template (www.ilri.org/feast) and analyzed

Key Findings

Farming system

The farming system is mixed crop- livestock with maize dominating in all the eight locations; Cheborgei, Kapsegut, Cheboin, Techoget, Tebessonik, kibugut, Cheplanget and Litein. Land holding varies across households with the majority having ranging between 0.7 to 1 hectares; there are no landless households in the area. The average family size is 6 people per household.

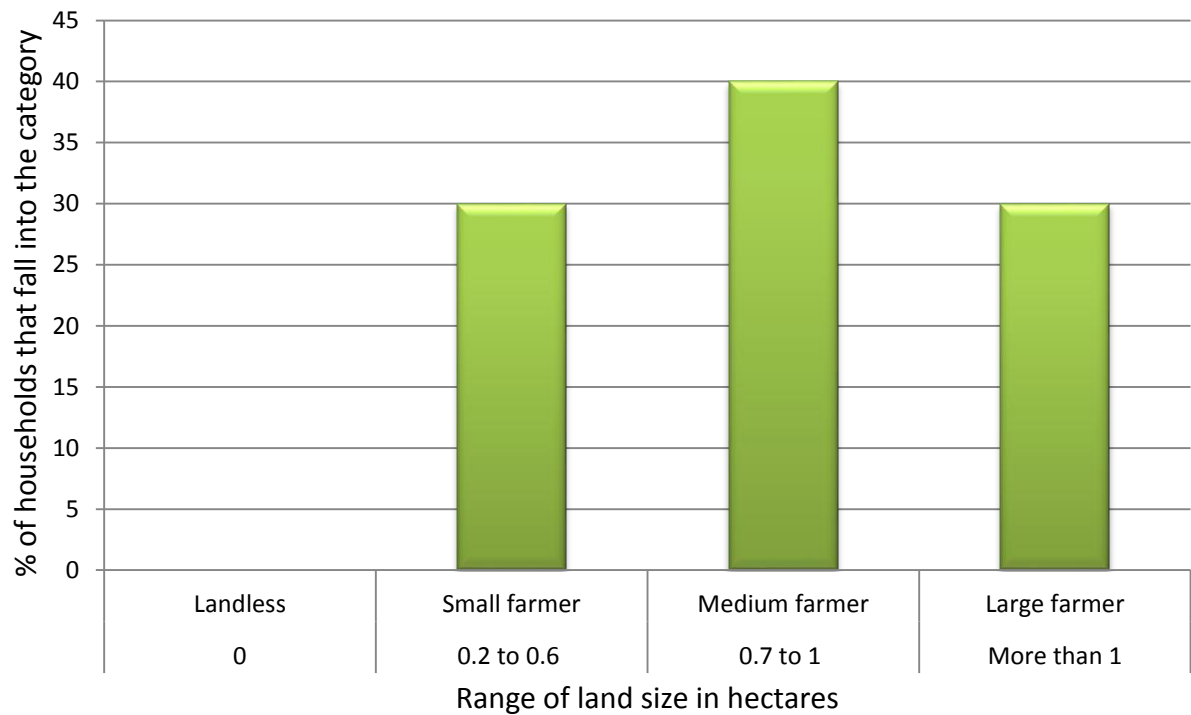


Figure 1: Average land sizes owned by farmers in various categories

The area gets two rainy seasons that are favorable for crop establishment (Table 1). The long rains season starts from February to June while the short rains begin from August to November.

Table 1: Cropping Seasons in the area

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

Tea is the dominant crop followed by maize that is intercropped with beans (Figure 2). Irrigation is not practiced and crop production highly depends on the rains. Labor is easily available and is mostly required during the planting, weeding and harvesting of maize. However labor requirement for tea plucking is all year round. The cost of labor is about Ksh 2000 (22 USD) per acre for both weeding and harvesting of maize. Due high the high demand of farming land, fallowing is not practiced.

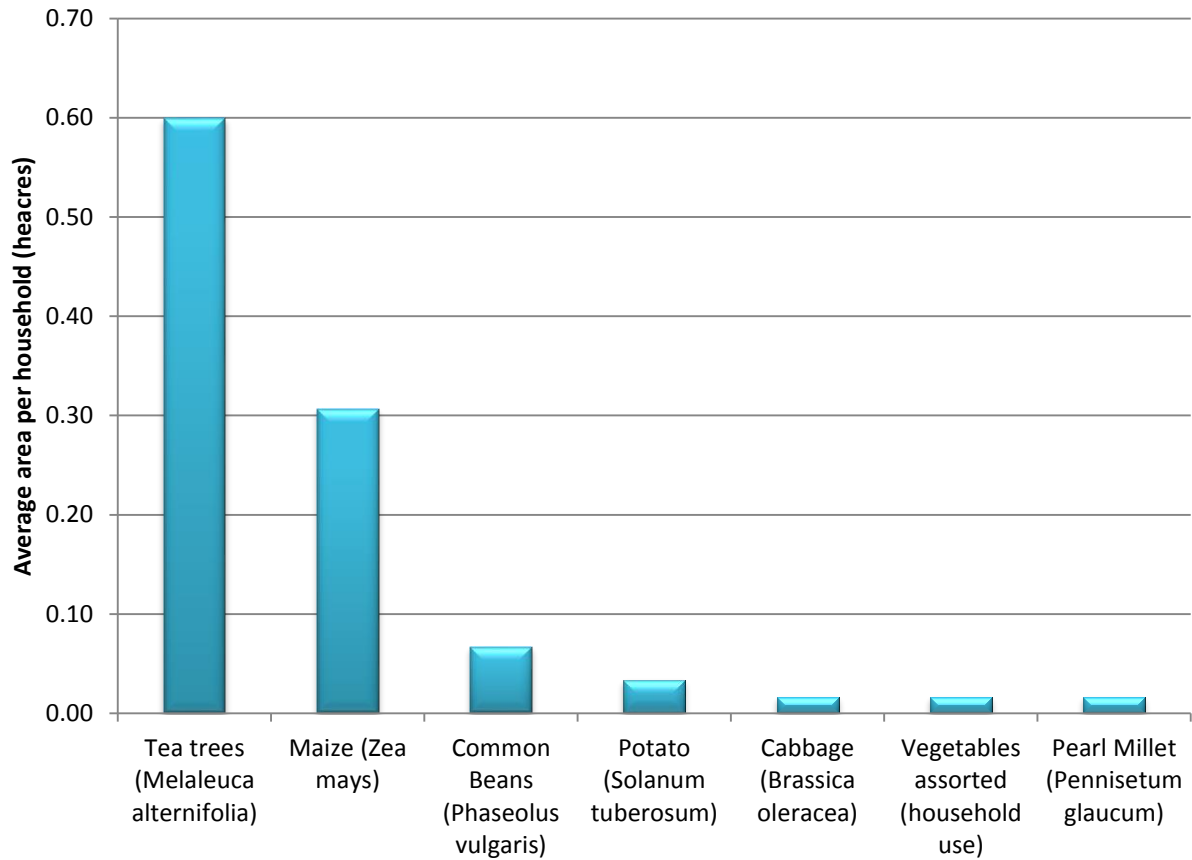


Figure 2: Average area per major crops grown by farmers

Sources of Income

Dairy production is the main source of income making a contribution of 42% of the household income followed by crop production; tea and maize at 41 %, while off farm business contributes 12% to the household income (Figure 3).

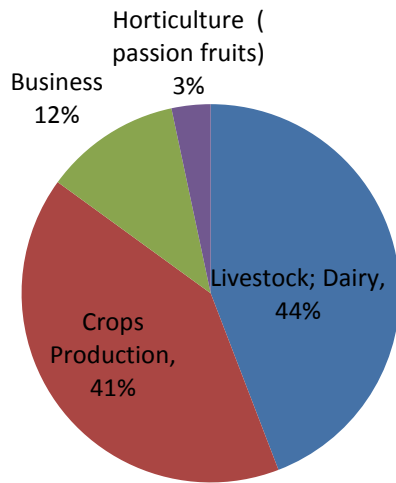


Figure 3: Contribution (%) of livelihood activities to household income

Livestock Production system

Livestock production system is semi intensive with improved dairy cattle being the predominant livestock (Figure 4). Improved dairy cattle are mainly kept for the purpose of milk, income from sale of culls and heifers, manure and dowry. There exist a few draught cattle that are kept for plowing, income and dowry, donkeys kept for mainly transportation. Small ruminants (Sheep) are kept for meat, income, manure and also dowry. Farmers reported an approximate of 90% household having improved dairy cattle. The average milk production is 4.5litres/cow/day (EADD 2 baseline report 2014). Milk is sold to Cherobu dairies.

Credit facilities tailored towards crop farming are accessible to tea farmers and not the rest of the crops. However the loan products do not have a grace period and farmers are expected to start repayments immediately. Fallowing is not practices since demand for land is high and land is used for more than one crop per year, mainly intercropping of maize and beans. Fertilizer is readily available through the government subsidy; however pastures and fodder seeds especially Rhodes grass and Columbus grass is not readily available in the agro vet shops

Farmers reported that 2% of the households have zero grazing units and majorities do not house their livestock. Farmers also reported that 70% of the farmers tethered their livestock and supplemented with forages and maize Stover, 30% grazed in paddocks. Feed processing is practiced mainly through chopping and use of pulverizers. Veterinary and Artificial insemination services are available to households who are registered members of Cherobu

dairies and they do access services both through cash and check off. The cost of veterinary services depends on the type of ailment with ECF costing a range of Ksh 3500 (38USD) to Ksh 4000 (49USD). The price of Artificial Insemination service ranges from 1500 Ksh (16USD) to Ksh 7000K (77USD). Farmers reported a minimal repeat rate of about 30% with about 40% of the farmers using bull services.

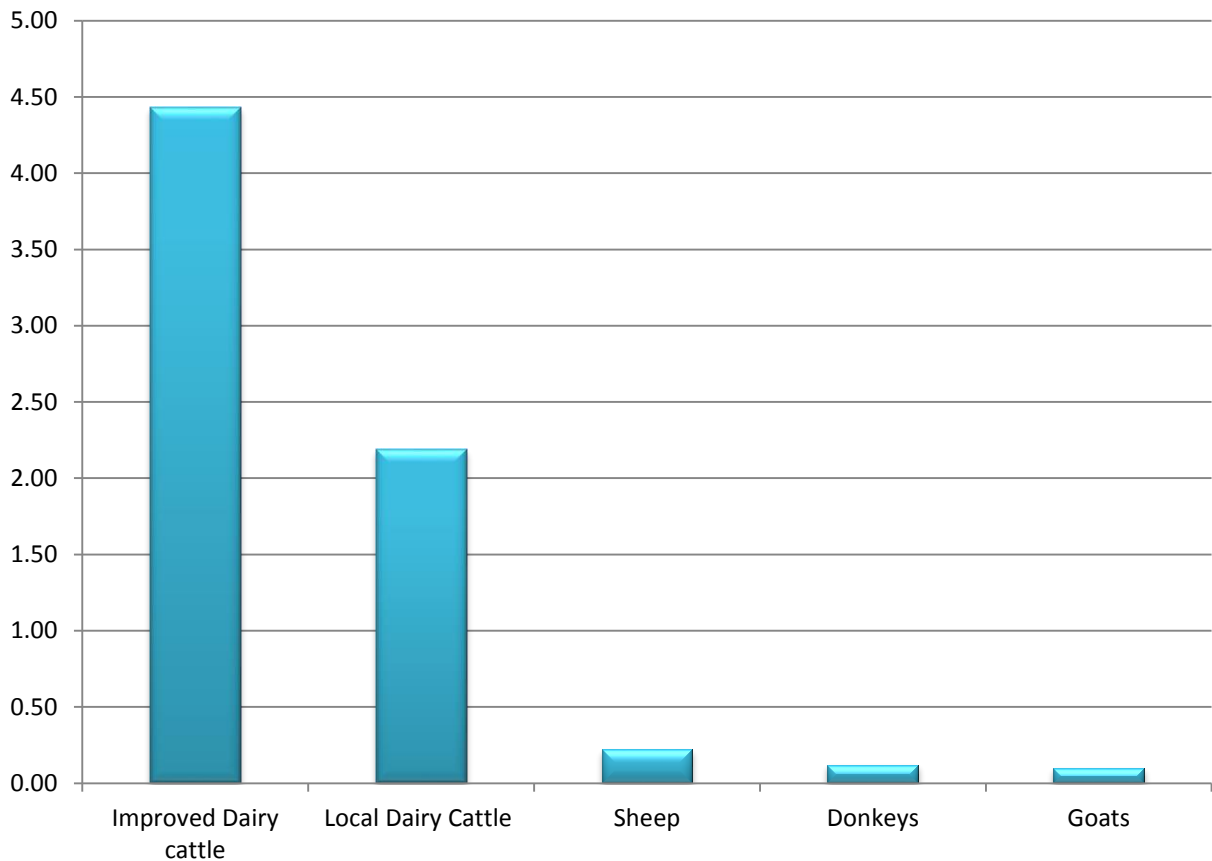


Figure 4: Average livestock species holdings per household in Tropical Livestock Units

Feed Resources and Availability

From figure 5 below, feed availability is highly influenced by the rainfall pattern in the area. Grazing is practiced all year round and contributes 55% of dry matter to the total diet. Cultivated fodder that includes Napier grass, Rhodes grass, fodder shrubs and sweet potato vines contributes Dry matter (DM) of 32%, Crude protein (CP) of 52% of the diet. Crop residue is available from July to October and contributes dry matter (DM) of 10%, Crude protein (CP) of 7% to the total diet. Naturally occurring weeds and collected fodder has a total dry matter dietary contribution of 3%. Grazing contributes 52% Dry matter and 38% crude protein to the total diet.

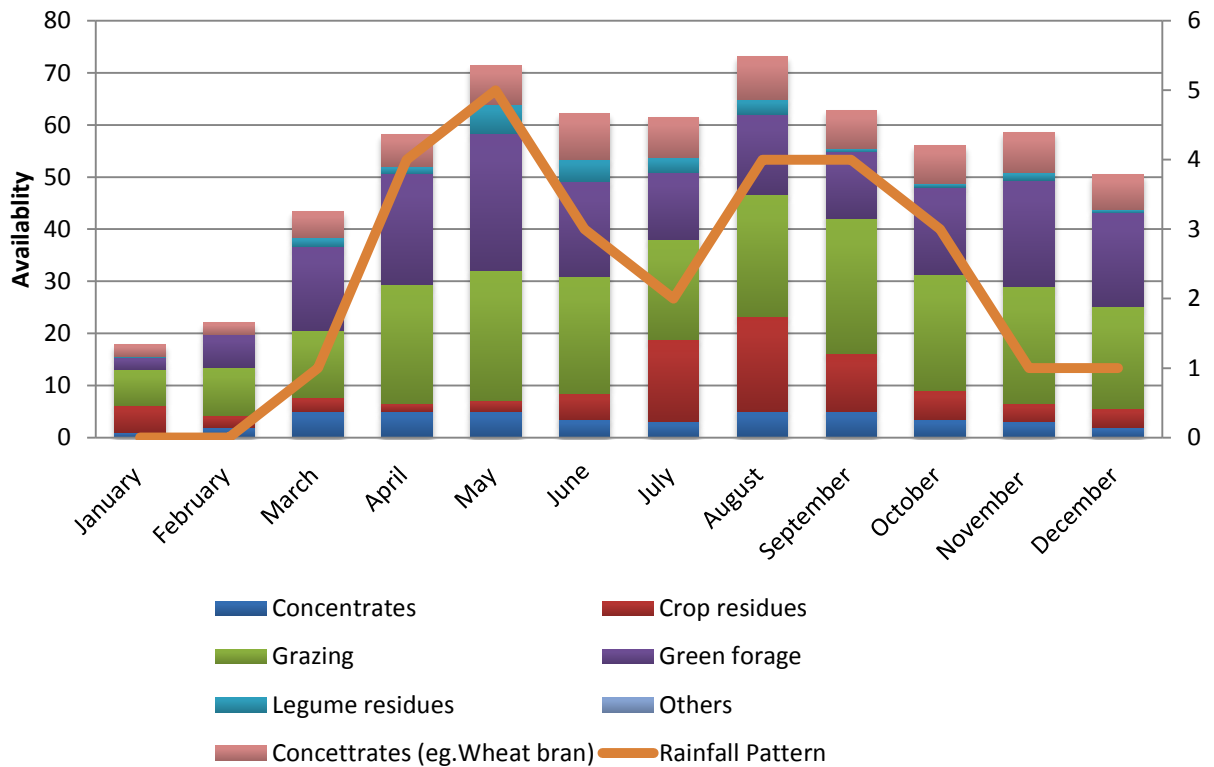


Figure 5: The composition of the livestock diet throughout the year in relation to the rainfall pattern

Farmers reported that they experience feed shortages from January to May. Crop residue from maize (dry maize stover) and bean haulms (from common beans) is collected starting from July to October from the crop land and piled in stacks near the homestead where by it is chopped or pulverized and given to animals in small quantities.

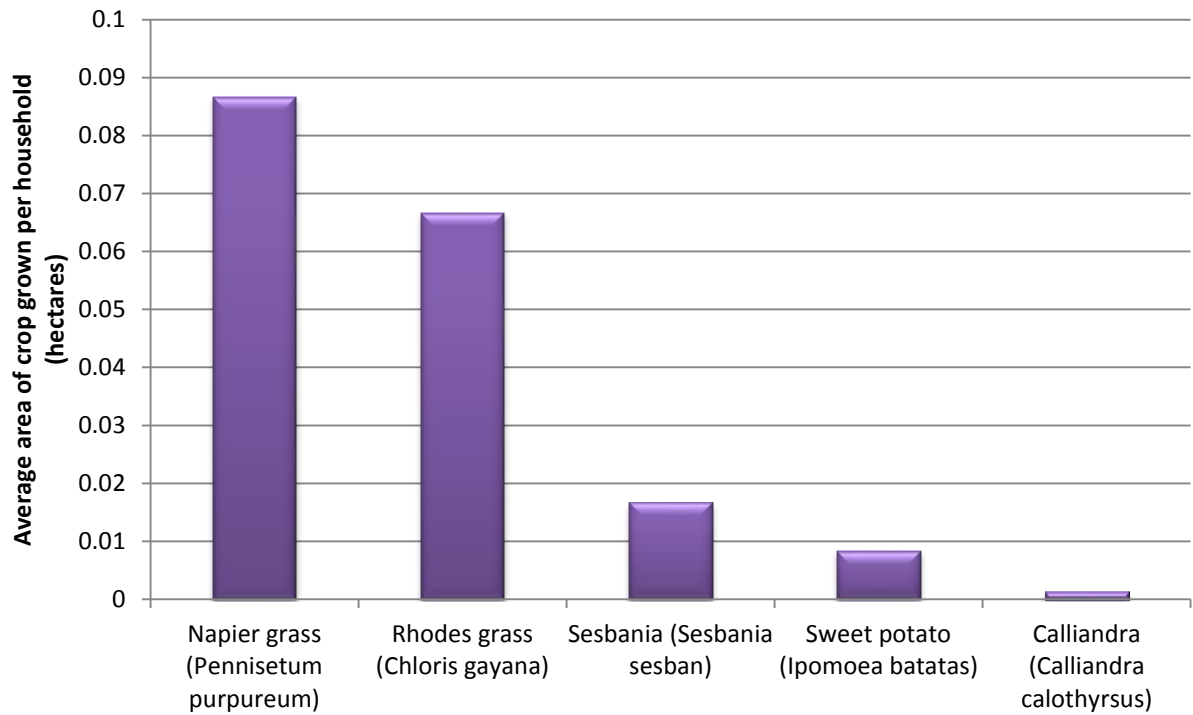


Figure 6: Dominant Fodder crops grown in the area

Napier grass (*Pennisetum purpureum*), is the leading cultivated fodder with an average of 0.08 hectares followed by Rhodes grass (*Chloris gayana*) under an average of 0.065 acres per farmer (figure 6).

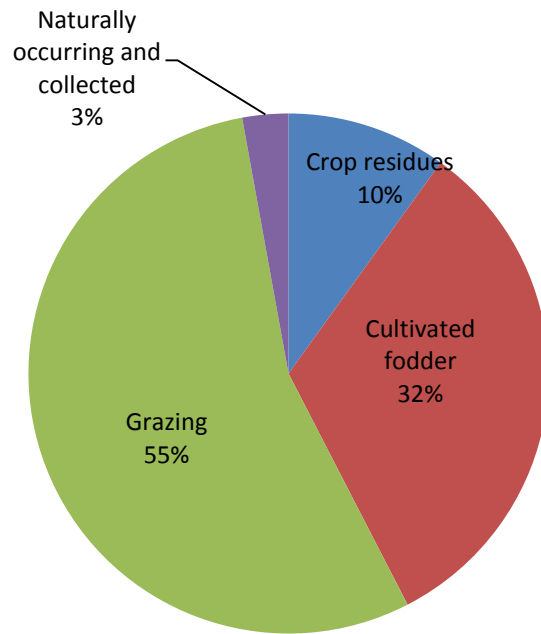


Figure 7: Dry Matter Content of total diet

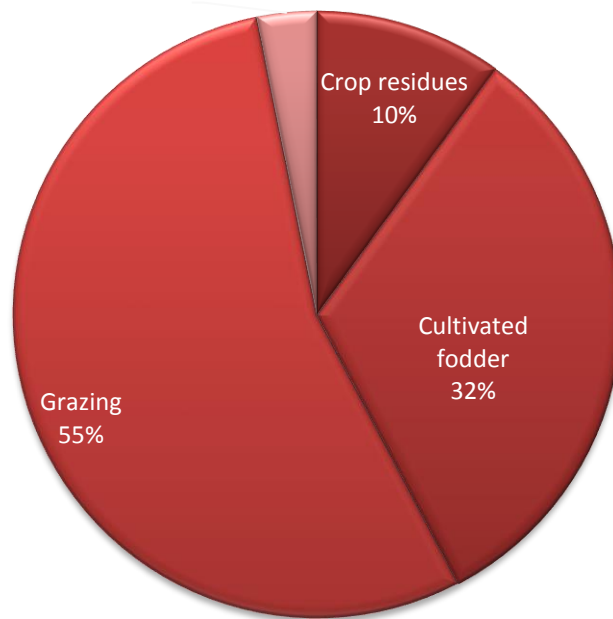


Figure 8: ME content of total diet

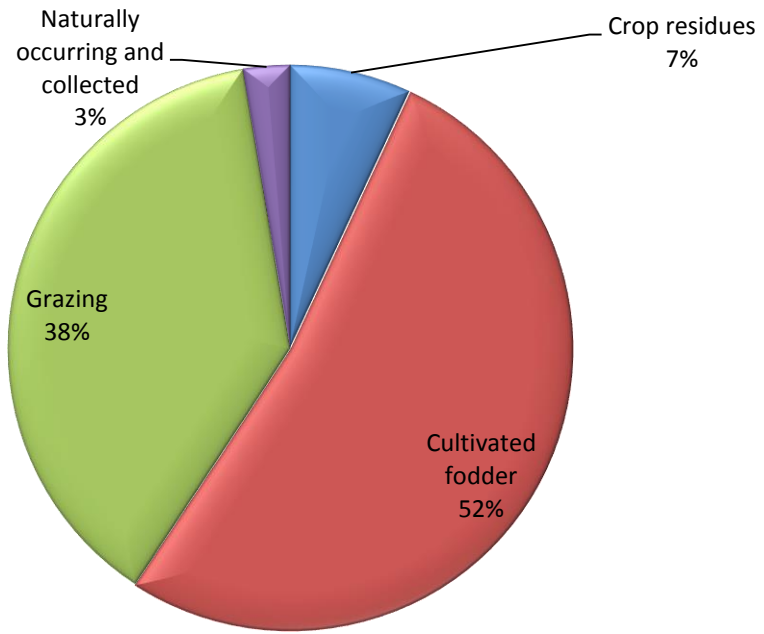


Figure 8: ME content of total die

Problems Issues and opportunities

The major feeds and feeding problems and potential solutions to dairy production as identified by farmers are presented in table 2 below.

Table 2: Problems, issues and proposed solutions by farmers in during the PRA and proposed key interventions from the feedback exercise.

Problem Rank	Identified constraint	Proposed solution by farmers	Proposed Key interventions from the feedback session
1	Inadequate land for pasture establishment		Producer organization to explore contracting farmers who own large parcels of land to produce hay to be sold in the agro vet shops
			Introduction of high yielding forage varieties
2	Inadequate knowledge on fodder establishment and management	Trainings on fodder establishment and management	Practical training through demonstrations and study tours.
3	Inaccessibility of pasture seeds and vegetative planting material	Producer organization to stock seed in the agro vet shops	Establish relationship between Producer organizations and seed producers
			Engage Volunteer farmer trainers to bulk seed and vegetative planting materials
4	Lack of feed conservation hence feed shortage during the dry season	Train on feed conservation	Train on feed budgeting and conservation

Summary and Existing Opportunities

From the results, farmers highly depend on grazing, 52% DM contribution to the total diet. Although household land size is small ranging from 0.7 to 1 hectare, there still exists an opportunity to utilize the area under grazing by either improving the natural pastures and also cultivating the grazing land would yield more high quality forage per unit area of land.

Increasing options for feed resource base in the area will be also an area of intervention since from the results, only 4 forages varieties; Napier grass, Rhodes grass, sweet potato vines and two varieties of fodder shrubs (Sesbania and Calliandra) are found in the area. Feed resource base to be promoted could include; Forage sorghum, Columbus grass, Nandi Setaria, Improved Napier varieties that are resistant to disease, Vetch, Lucerne, and Desmodiums.

Maize being the second predominant arable crop with an average of 0.3 hectares per household, this presents an opportunity for the farmers to utilize Maize Stover as a feed resource. Maize Stover contributes only 10% to the total dry matter diet. Training on crop residue utilization is key to ensure farmers utilize this feed resource base. Apart from this, trainings on maize silage making can also be introduced in the area since farmer are already planting maize.

1 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. Training farmers to reduce area under grazing and convert into cultivated fodder
2. Introduction of other feed resources like Forage Sorghum, Columbus grass, Lucerne, Desmodium, Vetch, Maize silage and fodder trees to increase the feed resource base in the area.
3. Training of Crop residue handling, processing and utilization

Institutional interventions

1. Exploring the option of contracting farmers who have large parcels of land to establish hay that will be bought and sold to farmers in the agrovet shops
2. Recruitment of 10 Volunteer farmer trainers to host demonstration and bulk pasture seed and vegetative planting materials
3. Stocking of pasture seed and forage conservation materials in the agro vet shops to enable farmers' access the seeds.

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

Total Dry matter deficit from the feed gap estimation = 161756 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	51762	72790	12131	61	
Naturally occurring collected	21028				
Grazing	88966				
Estimated area under grazing to meet the above (88966)DM requirement	17793 acres				5 % of 17793 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.