



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

*By Sylvia Wafula (ICRAF), Josephine Kirui (ICRAF), and Ben Lukuyu (ILRI)*

**October 2015**

### **Introduction**

Sirikwa dairy is located in Ziwa location (N; 00°50'0717. E; 035°13289. Elevation; 2135m.), Uasin Gishu County with 4759 registered members. The company was started in 2010 and has membership spread across; Ziwa, Sirikwa, Koisagat, Segero, Barsomebe, Matunda, Moisbridge, Kipsomba, Soy, Kipsombe, Kuinet, Kapsang, and Chebarus locations. Currently, the cooperative collects 7000 liters of milk per day.

The Feed Assessment Tool (FEAST) was used to characterize the feed-related aspects of the livestock production system in Soy Division; Uasin Gishu County. This was done to help design feeding system interventions that are specific to this area. The Participatory Rural Appraisal (PRA) exercise was in November 2014. Feedback of the results to the Producer Organization management was done in March 2015. This was carried out by East Africa Dairy Development project (EADD-P) in collaboration with the Ministry of Agriculture, Livestock and Fisheries and Sirikwa dairy 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.

The Information collected would inform the estimation of the feed gaps in the area to enable the management develop an implementation plan that will address dry season feed gaps and improve livestock production and productivity.

## **Methodology**

### *Sampling method*

Farmer representatives both male and female were selected from each of the 12 locations; (Ziwa, Sirikwa, Koisagat, Segero, Barsomebe, Matunda, Moisbridge, Kipsomba, Soy, Kipsombe, Kuinet, Kapsang and Chebarus locations) to participate in the PRA Focused Group Discussions (FGDs). The selection was done based on the size of land holding. Two FGDs were undertaken, one in Kipsombe 25 (16 male, 10 female) farmers and another one in Ziwa having 25 (17 male, 8 female) farmers. 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, medium and large scale.

### **Data collection**

Qualitative and quantitative methods of data collection were used. They included focused group discussions (FGDs) and interviews using a structured questionnaire. Issues discussed during the FGDs included; 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. 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 FGDs was examined 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**

#### **Farming system**

The area has a mixed crop – livestock farming system with maize being dominant in the cropping system. Land size varies across households. It ranges from 0.08 to 1.2 hectares (Table 1). The majority of farmers fall in the small-scale category. The average family size in the area is 6 people per household.

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

Category of farmer	Range of land (Hectares)	% of household that fall into that category
Landless	0	
Small farmer	0.08-1.2 hectares	60
Medium Farmer	Above 1.2 – 6 hectares	30
Large farmer	Above 6 -80 hectares	40

The area experiences two rainfall seasons favorable for crop production (Table 2). The long rain season occurs from March to July while the short rains begin from August to October. Maize, beans and wheat are planted during the onset of the long rainy season with the beans being intercropped with maize.

Table 2: 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												

The cropping system is dominated by maize averaging 5.5 hectares per household and is followed by wheat (figure 1). Other crops in the area include finger millet and vegetables. Maize, beans, finger millet and vegetables are mainly grown for food while wheat is grown as a cash crop.

Irrigation is not being practiced and the area agriculture highly depends on rainfall. Labor is easily available and is required mostly during the planting, weeding and harvesting seasons. The cost of labor is Khs2500 (USD25) per acre for weeding both maize and vegetables and finger millet. Wheat farming is highly mechanized right from planting, weeding to harvesting. Following is not practiced in the area.

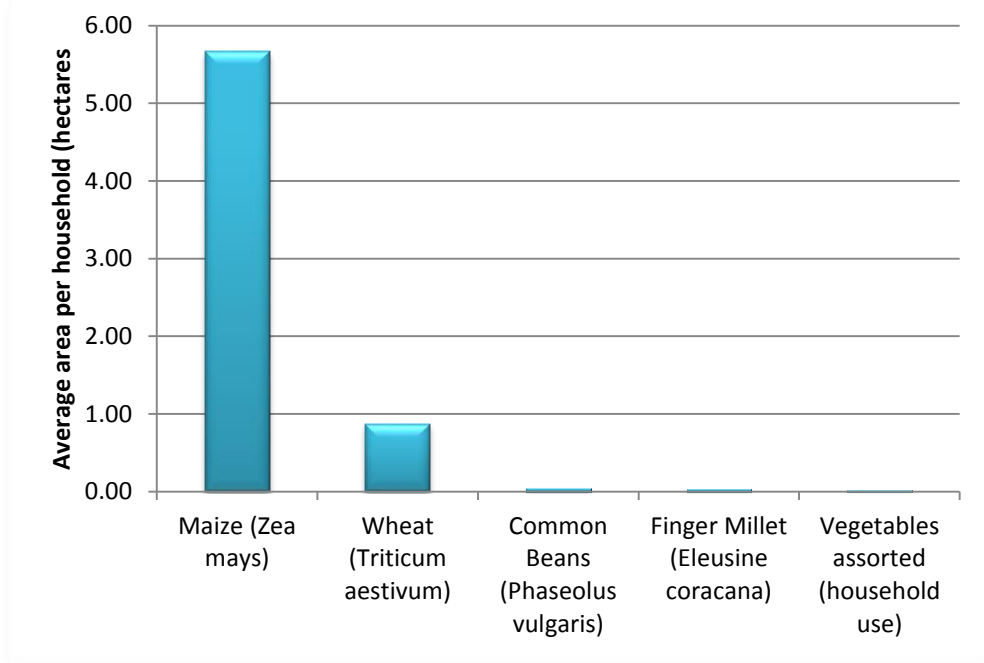


Figure 1: Average area per major crops grown by farmers

### Sources of income

Crop production is the main contributor to household income, contributing 44%. The second contributor to household income is livestock, contributing 33%. Off farm business contributes 16% (Figure 2).

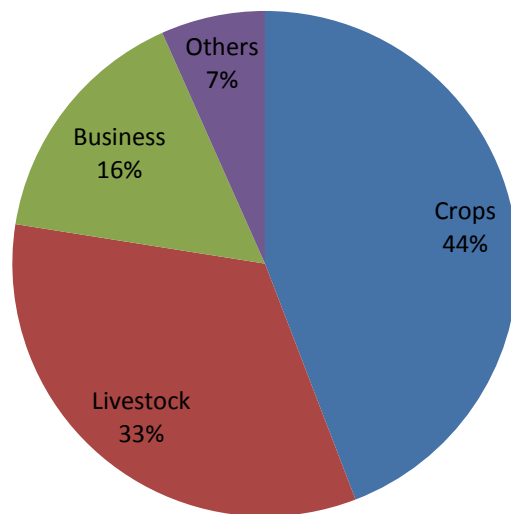


Figure 2: Contribution (%) of livelihood activities to household income

## Livestock Production Systems

Livestock kept in the area include, improved and local dairy cattle, local dairy cattle, local poultry and sheep. Improved dairy cattle are the dominant breed ( Figure 3). All these are primarily used as a source of food and income. Other uses are; manure and payment of bride price.

Farmers reported that a 10% housed their livestock at night while 90% of households do not house their livestock at night. 80% practice open grazing, 20% practice semi zero grazing. Supplementation with Napier grass, dry maize stovers, and Rhodes hay is done for those practicing semi zero grazing. Processing is done by use pulverizers and chuff cutters.

Veterinary services are easily available, with an average cost of deworming of Ksh200 (1.5USD) and average cost of treating East Coast Fever (ECF) treatment cost ranging Ksh 2000 (USD 18) to Ksh4000 (USD 36)depending on the severity of the case. Artificial insemination costs an average of Ksh 2000 (USD18)

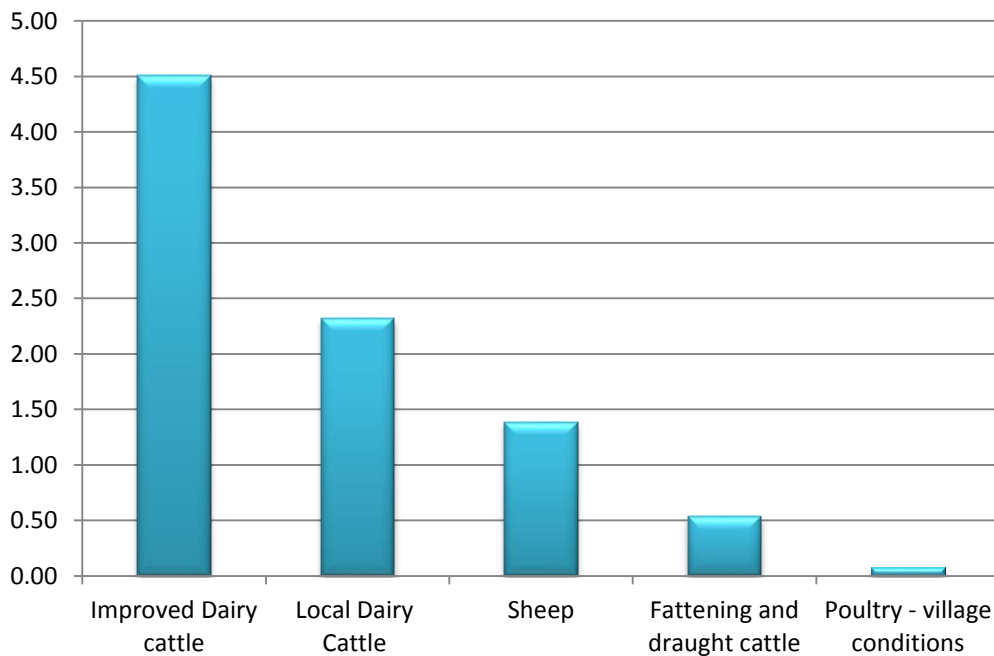


Figure 3: Average livestock species holdings per household in Tropical Livestock Units

## Feed Resource Availability and Feeding

Grazing, crop residues, naturally occurring collected weeds and cultivated fodder are the main feed resources in the area. Grazing accounts for 53%, 52% and 46% Dry Matter (DM), Metabolizable Energy (ME) and Cruder Protein (CP) respectively of the total dietary contribution (Figure 6, 7 and 8). Feed availability is a function of the rainfall pattern in the area and feed shortage is experienced from January to May (Figure 4). Crop residue is mainly from maize stover and wheat straw and account for 21%, 21% and 18% of CP, ME and CP respectively of the diet.

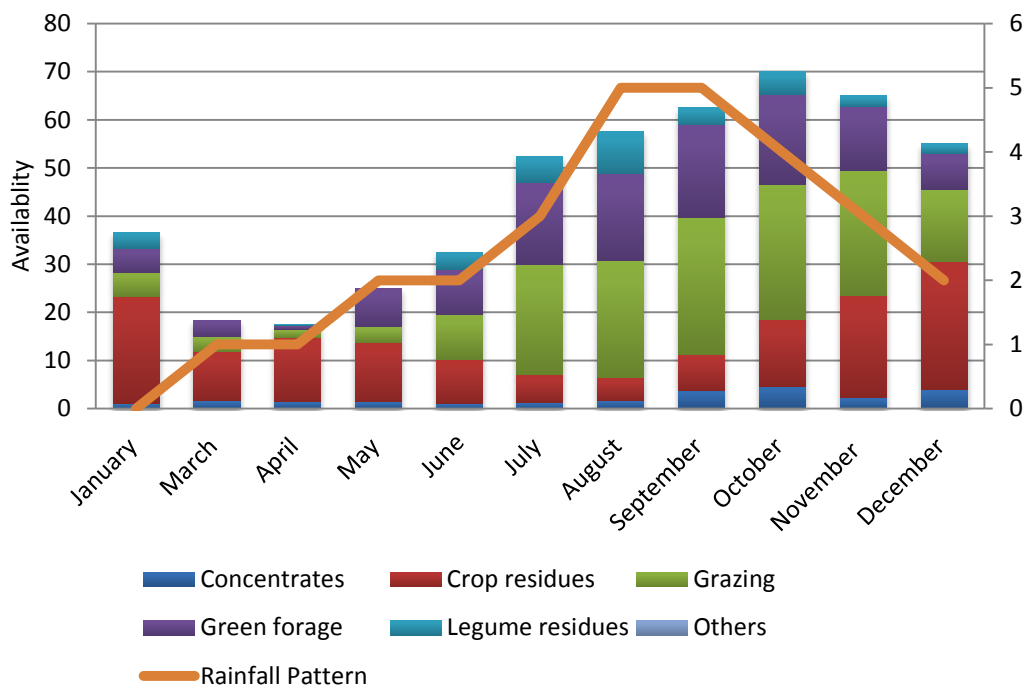


Figure 4: The composition of the livestock diet throughout the year in relation to the rainfall pattern

Rhodes grass is the dominant cultivated fodder followed by Napier grass. However, the average land under fodder per household is 0.52 hectares (figure 5) Cultivated fodder contributes 8%, 7% and 15% of DM, ME and CP respectively to the total diet.

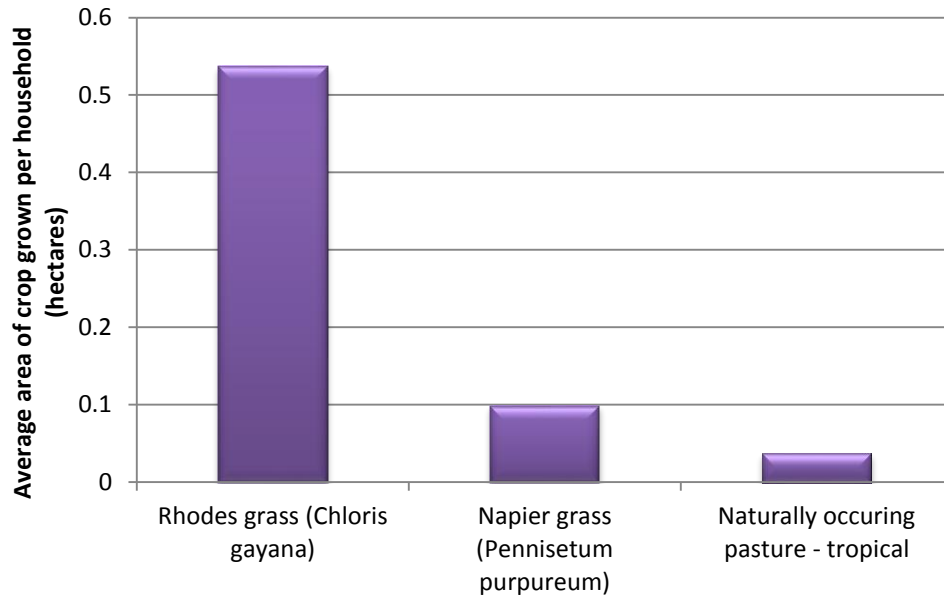


Figure 5: Dominant Fodder crops grown in the area

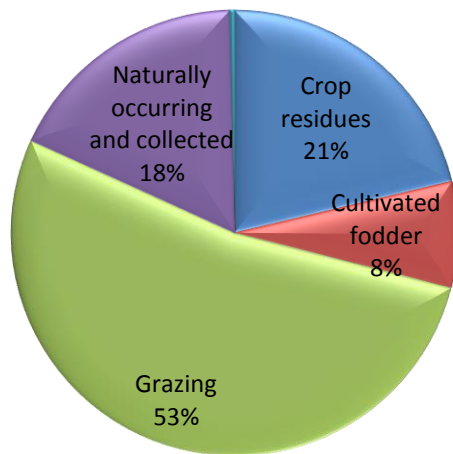


Figure 6: Dry Matter Content of total diet

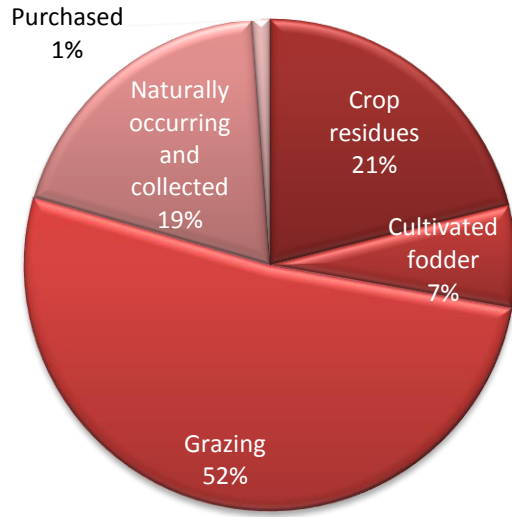


Figure 7: ME content of total diet

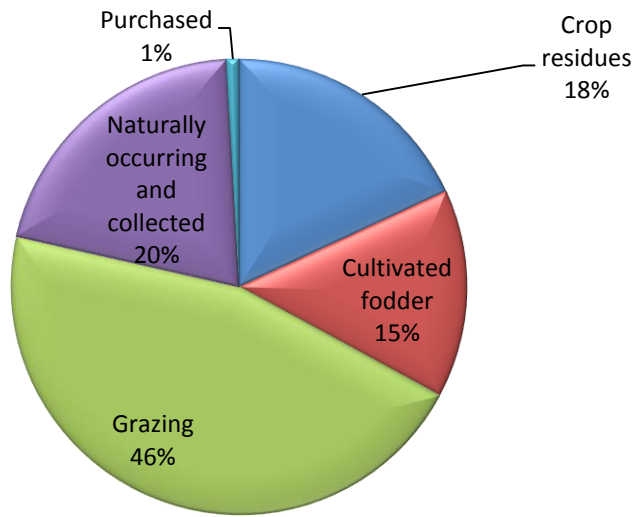


Figure 8: CP content of total diet



## Problems, Issues and opportunities

Table 3: Problems, issues, proposed solutions by farmers and key areas of intervention from the feedback session

<b>Problem Rank</b>	<b>Identified constraint</b>	<b>Proposed solution by farmers</b>	<b>Proposed Key interventions from the feedback session</b>
1	Inadequate water	Sirikwa dairy to facilitate acquiring on check off	Create linkages with stakeholders dealing with water tanks to enable farmers acquire on check off Train on rain water harvesting
2	Unavailability of pasture seeds	Sirikwa dairy to source for seed and stock in the agro vet shops	<ol style="list-style-type: none"> <li>1. Establish sustainable working relationship with seed manufacturers</li> <li>2. Recruit Volunteer farmer trainers to host demonstrations, train group members and bulk pasture seeds</li> </ol>
3	Inadequate knowledge on feed establishment conservation and utilization.	Trainings and demonstrations on; establishment, conservation and utilization	<ol style="list-style-type: none"> <li>1. identify Volunteer farmer trainers to host demonstrations</li> <li>2. Recruit and more extension staff and strengthen extension structures by linking with stakeholders who can capacity build them on feeds technologies.</li> <li>3. Organize exchange visits</li> <li>4. Train through field days</li> </ol>
4	inadequate of capital to invest in dairy farming	Sirikwa to facilitate farmers acquire credit from financial institutions	<ol style="list-style-type: none"> <li>1. Establish relationship with financial institutions to enable sirikwa dairy member to access credit</li> <li>2. Create partnership with stakeholders who can capacity build farmers on savings</li> </ol>
5	Diseases (ECF – East Coast Fever and Mastitis)	Trainings on disease management	<ol style="list-style-type: none"> <li>1. Establish a working relationship with Kenya Dairy Farmers Federation to carry out ECF vaccinations</li> <li>2. Train on udder health and proper milking procedures.</li> </ol>

## **Summary Existing Opportunities**

Results indicate that majority of the households in Sirikwa dairy fall under small scale holdings with land size ranging between 0.08 to 1.2 hectares. Grazing is the main feed resource followed by crop residues (maize stover and wheat straw). There exists a narrow feed resource base hence need to introduce other forage varieties to complement Rhodes and Napier. Intervention toward proper handling and utilization of crop residue will contribute to improving the nutritive value of the residues. The grazing paddocks mainly comprise of natural pastures that have not been well managed, hence need to improve them.

## **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 and demonstrations on fodder establishment, conservation and utilization.
2. Training farmers on other existing fodder varieties like, forage sorghum, lucerne, desmodium, oats and fodder shrubs will broaden the feed resource base in the area.
3. Training and demonstration on crop residue handling, and utilization.
4. Intervention on Natural pasture improvement.
5. Training on water harvesting.
6. Training on udder health and proper milking procedures.

### *Institutional interventions*

1. Establish sustainable working relationship with pasture seed manufacturers and distributors and ensure pasture seed is stocked in the agro vet shops.
2. Recruit Volunteer farmer trainers to host demonstrations, train group members and bulk pasture seeds.
3. Create linkages with stakeholders dealing with water tanks to enable farmers acquire on check off.

4. Identify Volunteer farmer trainers to host demonstrations.
5. Recruit and more extension staff and strengthen extension structures by linking with stakeholders who can capacity build them on feeds technologies.
6. Establish relationship with financial institutions to enable sirikwa dairy member to access credit.
7. Create partnership with stakeholders who can capacity build farmers on savings
8. Establish a working relationship with Kenya Dairy Farmers Federation to carry out ECF vaccinations.
9. Organize exchange visits.
10. Organize field days

## Annex 1: Feed gap Estimation 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 18500

Total Dry matter deficit from the feed gap estimation =176565 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	10723	83994	13998	420	
Naturally occurring collected	73271				
Grazing	91142				
Purchased	-				
Estimated area under grazing to meet the above (18228) DM requirement					5 % of 18228 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.