



Characterization of the Livestock Production Systems and the Potential of Feed-based Interventions for Improving Livestock Productivity in Ainabkoi and Kesses Divisions of Uasin Gishu (Kenya)

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Introduction

Tarakwo Daries Limited is a farmer producer organization established in 2010. It is situated in Uasin Gishu County, (N; 00°041'502. E; 023°25'924. Elevation; 1965m) and has members from Ainabkoi and Kesses divisions. Currently Tarakwo dairies collect 2842 kg of milk per day.

The Feed Assessment Tool (FEAST) was used to characterize the feed-related aspects of the livestock production system in Ainabkoi and Kesses divisions of Uasin Gishu County. This was done to help design feeding system interventions that are specific to Ainabkoi and Kesses divisions. The exercise 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 Tarakwo dairies 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 six locations in both Kesses and Ainabkoi divisions to participate in the PRA focused group discussion. The selection was done based on the size of land holding. Two focused group discussions were undertaken one in Kesses with 19 (10 male, 9 female) farmers and another one in Ainabkoi (21 13 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 scale, medium scale 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 focused group discussions was examined and reported. The quantitative data collected from individual key informant farmers were entered into the FEAST excel template (www.ilri.org/feast) and analyzed

Key Findings

Farming system

The area has a mixed crop – livestock farming system with maize and wheat being dominant in the cropping system. Land size varies across households. It ranges from 5 to more than 10 ha (Figure 1). The majority of farmers fall in the medium and large scale category. The average family size in the area is 7 people per household.

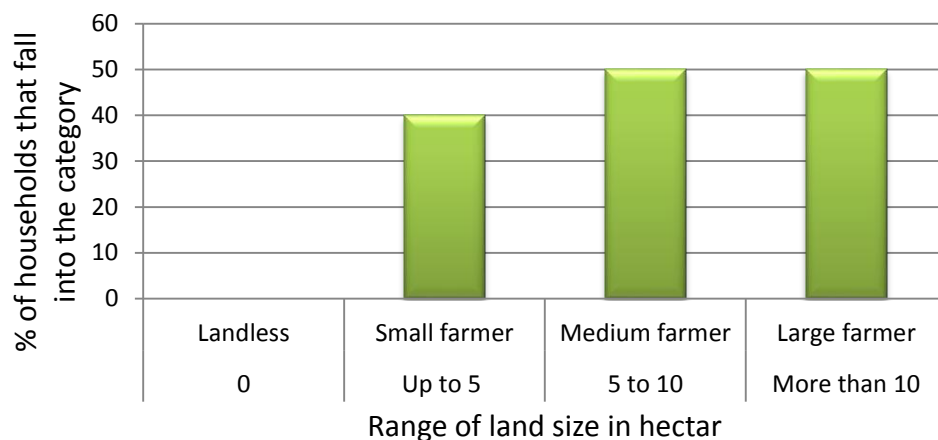


Figure 1: Average land sizes owned by farmers in various categories

The area experiences two rainfall seasons favorable for crop production (Table 1). The long rain season occurs from March to June while the short rains begin from August to October. Maize, beans and tea are planted during the onset of the long rainy season. Land is only utilized for one crop per season. Planting of maize starts in April while planting of wheat begins in May and June. Beans are intercropped with maize.

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												

As indicated in figure 2, maize dominates the cropping system followed by beans with an average of 1.5 hectares per household. Other crops include tomatoes, vegetables and common beans. The area depends on rain fed agriculture and irrigation is not practiced. Labor is easily available and is required mostly during the planting, weeding and harvesting seasons. The cost of labor is Khs2000 per acre for weeding maize, beans and vegetables. However majority of the farmers provide their own labour for planting, weeding and harvesting.

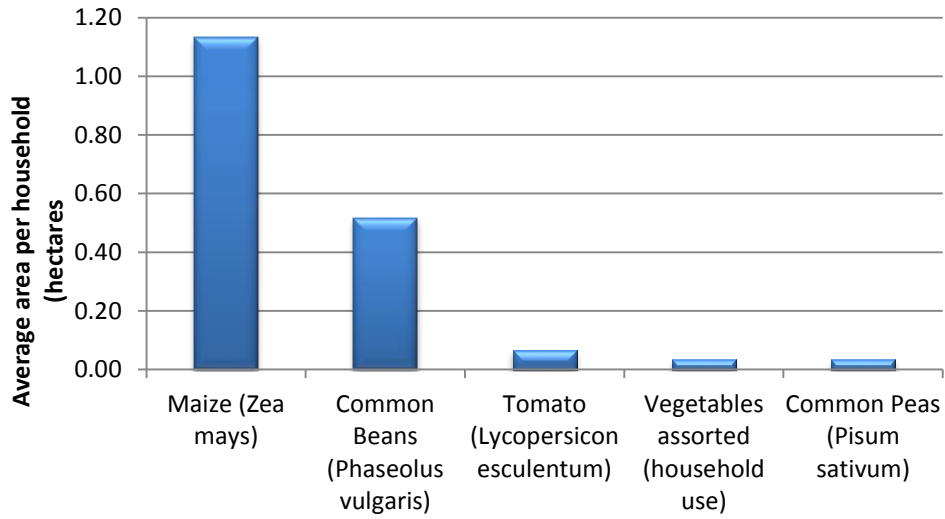


Figure 2: Average area per major crops grown by farmers

Sources of Income

Livestock is the main contributor to household income, contributing 63%. This is closely followed by crops at 17% while off farm business and provision of labour contributes 2% and 5% respectively (Figure 3).

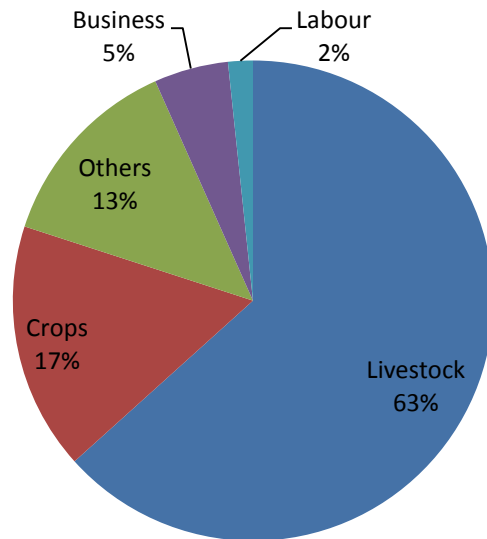


Figure 3: Contribution (%) of livelihood activities to household income

Livestock production systems

Improved dairy cattle are the dominant livestock in the area, followed by fattening cattle, sheep and local poultry (figure 4). All these livestock are used as a source of food and income. They are also used for as sources of; manure and payment of bride price.

Farmers reported that a majority of households leave their livestock in paddocks at night. In addition to this, 99% practice open grazing, 1% practice semi zero grazing and gave supplements. The supplements include; Napier grass, dry maize stover, wheat straw and Rhodes grass. The feed is processed by chopping using machetes, chuff cutter and a few use pulverizers. Those who do not have pulverizers do hire at a cost of Ksh 150 /70kg (1.5USD) material processed. Tractor driven choppers cost Ksh 200/70kg (2USD) material processed. The most common additive is salt that is normally sprinkled on the chopped feed. Fallowing is practices by close to 1% and land for leased is easily available.

Majority of Animal Health Assistants (AHA) are private and only one has been linked to Tarakwo dairy for farmers to access the services on check off. Artificial insemination cost ranges from Ksh 1650 (16.5USD) and Ksh 2500 (25USD). Credit facilities are available from financial institutions that are working closely with Tarakwo dairies. They include; Cooperative bank, Equity bank, Kenya Commercial bank, K- Rep bank and Family bank. Certified maize and wheat seed is easily available. However pasture seeds is not easily available. Framers also reported to access subsidized fertilizer from the Ministry of Agriculture, Livestock and Fisheries.

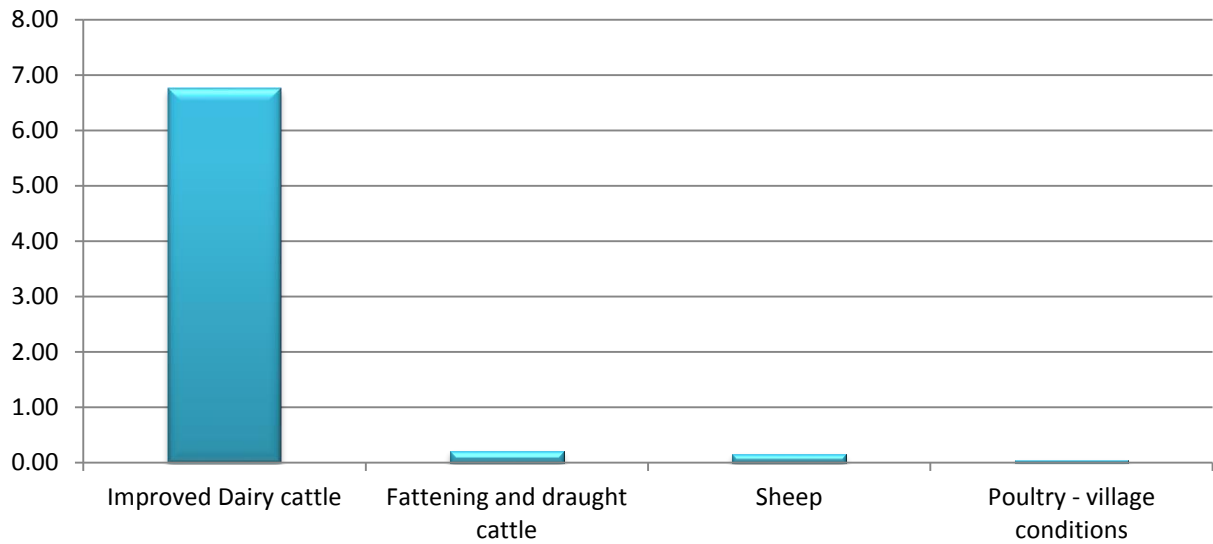


Figure 4: Average livestock species holdings per household in Tropical Livestock Units

Feed Resources Availability and Feeding

Grazing, crop residues, cultivated fodder crop residues, and naturally occurring weeds are the main feed resources in the area. The main contributor is grazing contributing 52% (DM) Dry matter, 51% (ME) Metabolizable Energy 46% (CP) Crude Protein (Figure 7, 8 and 9). This is followed by crop residues making a contribution of 30%, 30% and 26% DM, ME and CP respectively (Figure 7, 8 and 9). Majority of the farmers have paddocks with natural pastures that they do graze all year round. The cattle are also left to graze on farmland after maize and wheat has been harvested. Feed shortage in the area is experienced from March to May (Figure 5).

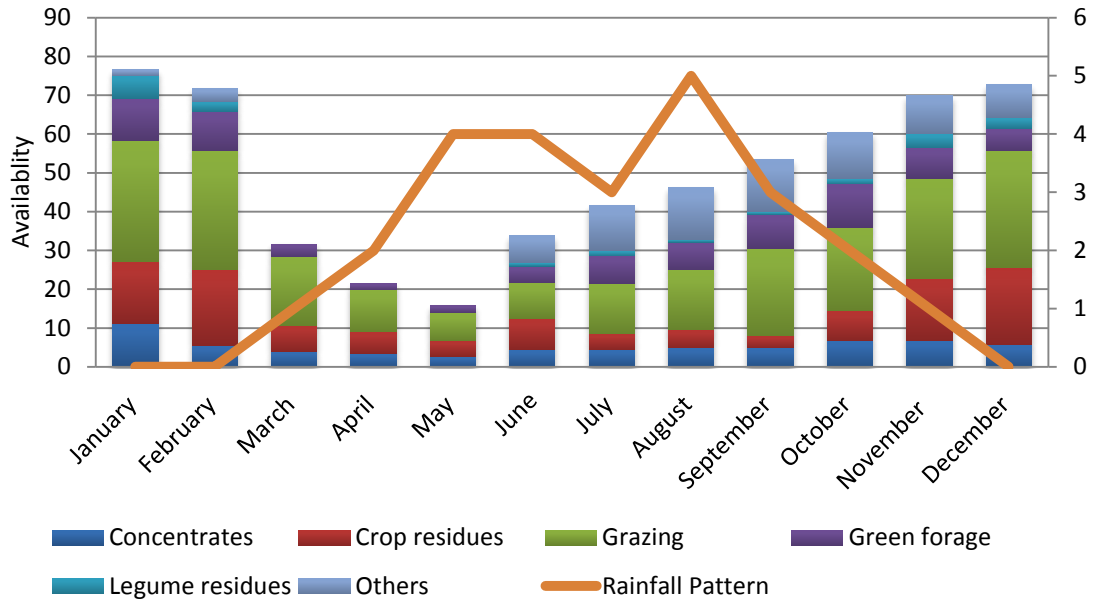


Figure 5: The composition of the livestock diet throughout the year in relation to the rainfall pattern

Cultivated fodder contributes 9%, 9% and 17% DM, ME and CP respectively to the total diet. Rhodes and Napier grass are the main fodder crops with average acreage of 0.061 and 0.031 hectares respectively per household.

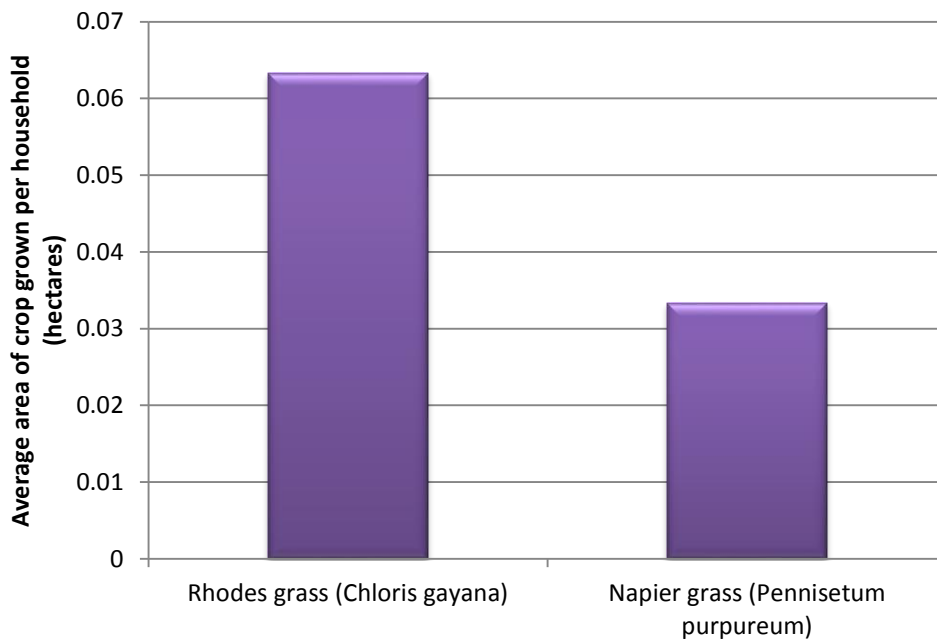


Figure 6: Dominant Fodder crops grown in the area

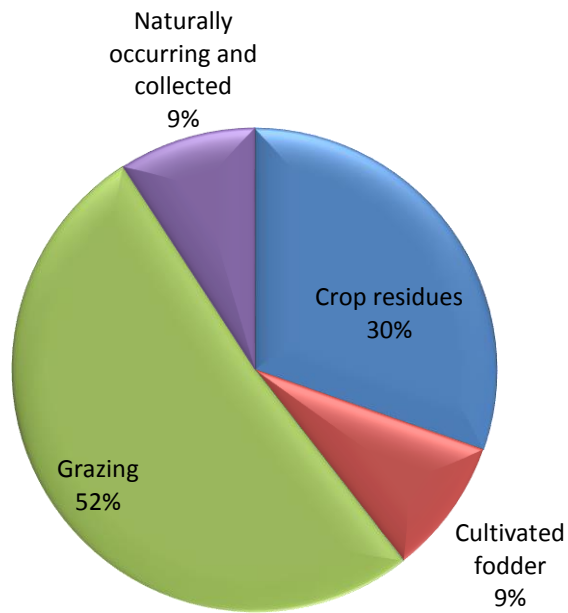


Figure 7: Dry Matter Content of total diet

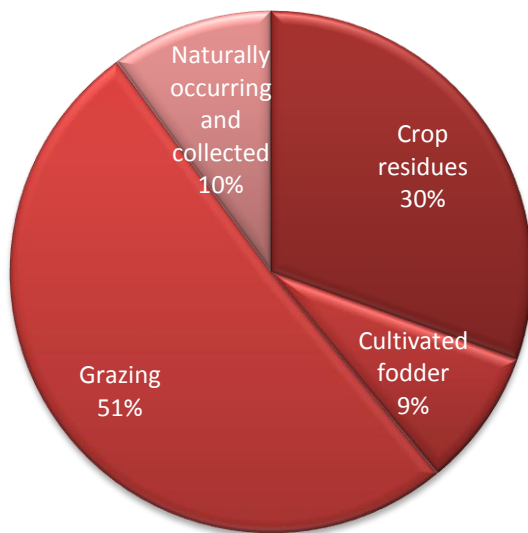


Figure 8: ME content of total diet

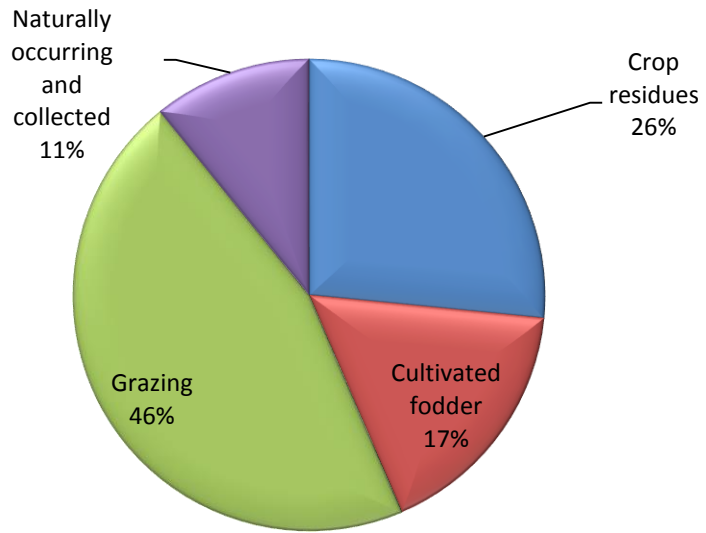


Figure 9: CP content of total die

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	Poor quality and high cost of concentrates	Tarakwo to establish linkage with a reputable manufacturer and source in bulk	Establish functional relationship with reputable manufacturer
2	Unavailability of pasture seeds	Tarakwo to stock pasture seed in the agrovet shops	1. Establish working partnership with seed manufactures (Kenya seed, Leleben, Western seed) and seed distributors to enable stocking of seed in the agrovet shops 2. Identify Volunteer farmer trainers who will bulk seed and pass on to the next group
3	Lack of feed conservation	Train on silage and hay making	1. Train on feed conservation 2. Stock the agrovet shops with silage tubes , silage sheet and mollases
4	High cost of feed processing equipment	Tarakwo to identify Financial institutions that will give credit to farmers	1. Create working relationship with financial institutions and equipment suppliers for farmers to acquire on check off 2. Tarakwo to consider acquiring an equipment that will offer services to the farmers at an affordable price.
5	Inadequate knowledge on feed ration formulation	Training on feed formulation Use of demonstrations to train on feed formulation	Training the extension team and volunteer farmer trainers on feed formulation
6	Accessibility of A.I services	Increase the number of A.I service providers that are linked to Tarakwo	Link more A.I service providers to enable farmers access the services on check off
7	Diseases(mastitis and E.C.F- East Cost Fever)	Training on disease control	1. Training on udder health and proper milking procedure 2. plan to carry out ECF vaccinations in collaboration with KDF

Summary and Existing Opportunities

From the results, majority of the households in Ainabkoi and Kesses fall under Medium to large scale land holdings with land size ranging between 5 to more than 10 hectares. Grazing is the major feed resource followed by crop residues from maize and wheat. Both the natural pastures and crop residues are of low nutritive value and cannot sufficiently meet the daily dietary requirement of the dairy cow. There is need to broaden the feed resource base and improving the natural pastures. Introduction of other forage varieties like forage sorghum, Columbus grass, forage legumes and fodder trees will complement the Rhodes and Napier grass.

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. Identify Volunteer farmer trainers that will complement the existing extension structures by hosting demonstrations and bulking of pasture seeds.
2. Plan to train on feed conservation (silage and hay making), crop residue handling and utilization.
3. Introduction of other forage varieties; forage sorghum, fodder legumes, fodder shrubs and maize for silage making

Institutional Interventions

1. Establish relationship with reputable feed manufacturers to access good quality concentrates at affordable prices.
2. Establish working partnerships with private A.I service providers and link them to the farmers for farmers to access A.I services on check off

3. Link up with Kenya Dairy Farmers Federation (KDFF) and initiate East Coast Fever(E.C.F) vaccination in the region
4. Work with the county government of Uasin Gishu to access the hay balers
5. Establish working relationships with financial institutions for farmers to acquire credit to purchase equipment.
6. Ensure silage making inputs (molasses, silage tubes and silage sheet) are stocked in the agro vets
7. Establish relationship with seed manufactures and distributors and stock seed in the agro vet shops for ease of accessibility.

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.

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 12850

Total Dry matter deficit from the feed gap estimation = 124131kg 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	11172	60824	60824	304	
Naturally occurring collected	48462				
Grazing	63307				
Purchased	-				
Estimated area under grazing to meet the above (12661) DM requirement	12661				5 % of acres 12661