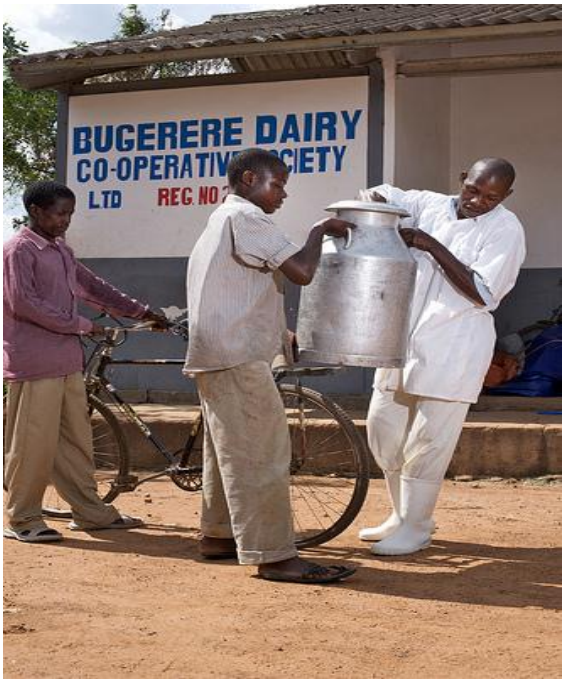




EAST AFRICAN DAIRY DEVELOPMENT PROJECT

REPORT OF PARTICIPATORY RURAL APPRAISAL BASELINE SURVEY OF SMALLHOLDER DAIRY FARMERS IN KAYUNGA, LUWERO, MASAKA, MUKONO AND NAKASONGOLA DISTRICTS OF CENTRAL UGANDA

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EXECUTIVE SUMMARY

In Uganda, livestock production has continued to grow (at a rate of over 4% per annum) in response to increasing demand for milk and meat in the local market. However, per *capita* consumption of milk and its products is still very low. The current annual consumption is 22 liters of milk per person which is well below the FAO recommended 200 liters annual consumption per person. Nonetheless, prospects for increased demand, hence increased production, are good as *per capita* purchasing power continues to increase (Ngigi, 2005). The potential for expansion is high given the natural resources of Uganda. Livestock production in Uganda is an integral part of the agricultural system of many parts of the country. Mixed farming small holders and pastoralists own over 90% of the cattle herd. Cattle are the most important of all the livestock. Milk-producing cows are perhaps the most valued and potentially profitable assets a Ugandan farm family can own.

It has been noted that Uganda like any other country in the East Africa region is weak in market institutions, infrastructure networks and governance. Smallholder households are unable to generate increased income from current dairy business endeavors because they lack access to production technologies, efficient farming practices and links to markets. Past development efforts and projects often employed poorly adapted organizational and institutional approaches borrowed from other settings. These have generally failed to survive beyond the project lifetime. Cooperative development efforts have failed to build on grass-roots interests and resources. For smallholders, there remains a possibility that as formal dairy markets emerge or grow, they will be sidelined by large producers and importers. Despite these constraints and vulnerabilities, smallholder dairying remains a durable strategy to increase household income, as it provides a secure livelihood, promotes women's social and economic status, conserves ecosystems, and respects cultural values. In addition the economic climate is favorable for integrating smallholder dairy farmers into the formal marketplace and supply chain, as milk consumption is shown to increase in Uganda. To help small holder dairy farmers overcome these challenges, the East Africa Dairy Development project has been initiated. It is envisaged to move smallholder, women and men farmers out of poverty by improving their profit participation in the dairy value chain. The project will be implemented through a partnership of three established organizations working in targeted districts in Kenya, Rwanda and Uganda.

The aim of the East Africa Dairy Development project is to ensure that the lives of 179,000 families—*or approximately one million people*—are transformed by doubling household dairy income by the 10th year of the project through integrated interventions in dairy production, market-access and knowledge application. The East Africa Dairy Development project aims to achieve its vision of doubling smallholder dairy income by improving on-farm production and market-access.

The project seeks to improve on-farm productivity by:

- Increasing the volume of milk produced
- Improving milk quality and reducing loss through spoilage
- Providing access to production inputs through business delivery services

Market-access will be improved by:

- Developing local hubs of business delivery services and chilling plants that facilitate market Access
- Linking producers to formal markets through processors
- Increasing producers' benefit from traditional markets

Thus, during the initial stages of the project, a baseline survey was commissioned. The baseline was meant to capture the status of the beneficiary before interventions. The baseline involved *inter-alia* a qualitative (PRA) assessment of the target communities. The broad objective of the qualitative survey was to identify opportunities for, and constraints to dairy that are specific to the site. Other activities carried out during the baseline were: household questionnaire and market agent surveys. However, this report focuses on the qualitative baseline survey.

Data obtained from the field relates to general dairy farming resource in the study sites and farmer involvement, challenges and opportunities in the sector, existing innovations and actors in the sector, feeding and breeding options and challenges. During the wealth ranking exercise, it was noted that farmers have diverse criteria to classify households by wealth. The households in the various wealth categories have varying challenges of engagement in dairying but also have differential opportunities and drive to invest in dairy farming. A number of alternative livelihood activities support farmers in the study villages. In four out of the five districts, dairy farming was ranked as the most important source of livelihood. Although prioritized differently by the participants, the other livelihood activities include banana farming, poultry-keeping, trade in milk and livestock, small-scale businesses, wage employment, boda boda taxi, and farming of other crops such as cassava, sweet potatoes.

Five districts, with two study sites in each, were selected for the PRA survey. The 5 districts are at different stages of preparedness and readiness for the EADD project and will thus require different approaches and pathways to EADD implementation**.** In Masaka, Kayunga and Nakasongola districts there is already an operational chilling plant run through a cooperative society. Dairy farmers in Mukono district are already part of preparations to establish a traditional market hub for milk collection. Farmers are already registering as members to the cooperative and saving society formed in the area. In Luweero district, farmers are yet to organise themselves into a dairy farmer association and to revive the chilling plant that was present in the area but for long time has ceased operation.

The innovations and actors analysis revealed critical policy issues that should be addressed in order for dairy development objectives of EADD to be met. The study also reviewed the criteria used by farmers in selecting dairy breeds. The farmers' preference for dairy breeds in the village is guided by a number of choices: udder size, body size, body shape, posture, and milk yield. The various breeds are preferred for differed reasons. In all the villages Friesian is the most preferred breed for its milk yield.

In all the study sites, livestock feeding systems forage preferences and constraints to livestock feeding as well as forage seasonality were found to be critical to dairy development. The selected PRA tools revealed that natural pastures are most dominant but are complemented by Napier grass, legumes other fodder plants, with limited supplementation of commercial feeds. Feed conservation is hardly done in many areas due to inadequacies of skills in fodder conservation. Most of the times, farmers rely on natural pasture. Napier grass and crop residues are mostly used during the dry season. Forage availability remains a major constraint to dairy development.

The studies have also revealed that dairying remains the single most important livelihood activity albeit with a number of constraints. The main constraints to dairying in the villages include low quality breeds, water shortage, poor markets, low milk prices, poor rural infrastructure, livestock diseases, limited AI services, inadequate feeds, and expensive feeds and dairy production inputs. The constraints need to be addressed by appropriate interventions for the farmers to realize the potential of doubling their income from milk and other dairy products. The requested interventions were as follows:

- Attracting, encouraging and supporting veterinary input and feed suppliers to the areas
- Establish reliable Artificial Inseminations (AI) services in the areas. The semen available should be of good quality with a variability of bull types to enable choice
- Require a qualified veterinarian within easy reach who is able to handle difficult cases.
- In the pastoralist setup, ghee has always been the main source of income for women. With intensification of commercialisation of milk, they are losing out on this source of income. They require an alternative source of income
- Farmers on rangelands requested for intervention in the clearing of pasture weeds.
- Pastoralists who are in semi-arid zones frequently face water shortage. Constant supply of water is one of their biggest needs
- Milk coolers are required to decrease on loss of milk through spoilage
- Farmers training on better Dairy farming practices

- Availability of better quality pastures and pasture seeds
- Subsidies to farmers on veterinary drugs and vaccines
- Road network in the rural areas be improved and existing ones repaired

ACKNOWLEDGEMENT

The Consultant greatly appreciates the ILRI management for giving him and other colleagues at The Faculty of Veterinary Medicine, Makerere University, a chance to participate in this qualitative baseline survey. The logistical support offered by the EADD country office and the administration of the faculty of veterinary medicine is greatly appreciated. I would like to recognize support offered by Dr. Isabelle Baltenweck and Dr. Nelson Mango of the International Livestock Research Institute.

Farmers in the study were enthusiastic and cooperative, this enabled the team to obtain good quality data, thus their contribution is highly appreciated. Many thanks to the team of extension agents and farmer leaders who guided and helped us establish rapport with the members of the communities. Finally, I would like to thank my co-investigator Dr. Sylvia Baluka and other PRA team members, and the Driver for doing a good job.

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ACRONYMS AND ABBREVIATIONS

ACTORS	-	A group of institutions operating in a study area
ADRA	-	Adventist Development and Relief Agency
AHWs	-	Animal Health Workers
AI	-	Artificial Insemination
AMREF	-	African Medical and Research Foundation
CBOs	-	Community Based Organizations
CCF	-	Christian Children's Fund
Cooperative	-	dairy farmer business associations—legal entities
CP	-	Chilling Plants
DDA	-	Dairy Development Authority
EADD	-	East Africa Dairy Development
EADDP	-	East Africa Dairy Development Project
FAO	-	Food and Agriculture Organization of the United Nations
FMD	-	Foot and Mouth Disease
HPI	-	Heifer project International
HQs	-	Head Quarters
Hub	-	a dynamic cluster of services and activities that generate greater income for dairy farmers
ILRI	-	International Livestock Research Institute
IN	-	International Needs
LC 111	-	Local council III
LG	-	Local government
LOL	-	Land 'O' Lakes
MAAIF	-	Ministry of Agriculture, Animal Industry and Fisheries
MADDO	-	Masaka Diocese Development Organisation
NAADS	-	National Agricultural Advisory Services
NARO	-	National Agricultural Research Organization
NDA	-	National Drug Authority
NGO	-	Non Governmental Organization
PI	-	Plan international
PRA	-	Participatory Rural Appraisal
PS	-	Public Service
SACCO	-	Savings and Credit Cooperative
SACU	-	Send a cow Uganda
TC	-	Town Council
TDA	-	Tweyanze development Agency
TNS	-	Techno Serve
U.A.C.E	-	Uganda Advanced Certificate in Education
U.C.E	-	Uganda Certificate in Education
UBOS	-	Uganda Bureau of Statistics
UNFE	-	Uganda National Farmers' Federation
UPE	-	Universal Primary Education programme

INTRODUCTION

The Dairy Cattle Sector in Uganda: An overview

In Uganda, livestock production has continued to grow, whose rate is estimated at 4% per annum. This is in response to increasing demand for milk and meat in the local market. Higher rates of growth are envisaged as Government pursues its policies of modernizing and commercializing agriculture. However, per *capita* consumption of milk and its products is still very low. The current annual consumption is 22 liters of milk per person which is well below the FAO recommended 200 liters annual consumption per person. Nonetheless, prospects for increased demand, hence increased production, are good as *per capita* purchasing power continues to increase. The potential for expansion is high given the natural resources of Uganda. Seventy five percent (75%) of the land (18 million square kilometers) could be used for crops or grazing. Currently, only 5 million hectares is used for pastures and grazing land (Ministry of Agriculture, Animal Industry, and Fisheries). There are over 6 million cattle in Uganda. The Ankole longhorn (Sanga) breed is the most common, comprising 50 % of the population. The Small East African Zebu breed follows with 30% of the total population. The Nganda intermediate breed represents 16% of the total population. The exotic breeds and their crosses make up only 4 % of the total population ((Texas A&M University, 2000).

Livestock production in Uganda is an integral part of the agricultural system of many parts of the country. Mixed farming small holders and pastoralists own over 90% of the cattle herd. Cattle are the most important of all the livestock. Milk-producing cows are perhaps the most valued and potentially profitable assets a Ugandan farm family can own. They provide families with a dependable flow of cash, producing income from milk for substantial periods of the year with immediate- to short-turnaround on payment. Yet most rural households live in poverty in spite of the potential that cattle offer them to earn well-above subsistence income.

According to the ILRI research brief (2007), current policies and some development projects in Uganda have promoted dairy intensification systems, such as zero-grazing, in a variety of settings. However, the results of the research study showed that less intensive production systems can be equally appropriate in most areas. Smallholder dairy production was found to be profitable and competitive in a variety of settings, where level of intensification suits different local circumstances. There is need for targeted interventions of dairy intensification to meet area-specific conditions and the farmers' specific circumstances.

It has been noted that Uganda like any other country in the East Africa region is weak in market institutions, infrastructure networks and governance. Smallholder households are unable to generate increased income from current dairy business endeavors because they lack access to production technologies, efficient farming practices and links to markets. Past development efforts and projects often employed poorly adapted organizational and institutional approaches borrowed from other settings. These have generally failed to survive beyond the project lifetime. Cooperative development efforts have failed to build on grass-roots interests and resources. For smallholders, there remains a possibility that as formal dairy markets emerge or grow, they will be sidelined by large producers and importers. Despite these constraints and vulnerabilities, smallholder dairying remains a durable strategy to increase household income, as it provides a secure livelihood, promotes women's social and economic status, conserves ecosystems, and respects cultural values. In addition the economic climate is favorable for integrating smallholder dairy farmers into the formal marketplace and supply chain, as milk consumption is predicted to double in developing countries by 2020. To help small holder dairy farmers overcome the currently encountered challenges, the East Africa Dairy Development project has been initiated. It is envisaged to move smallholder, women and men farmers out of poverty by improving their profit participation in the dairy value chain. The project will be implemented through a partnership of three established organizations working in targeted districts in Kenya, Rwanda and Uganda.

The Background information about the East Africa Dairy Development (EADD) Project

The EADD Project is an initiative funded by Bill and Melinda Gates Foundation, and is led by Heifer International (Heifer) and implemented in partnership with two experienced organizations, the International Livestock Research Institute (ILRI) and TechnoServe (TNS). The partners have a joint objective to test a package of complementary interventions that address the noted deficit areas. It is believed existing knowledge and technologies can be employed as a business system that helps farmers utilize their livestock assets to produce greater income. The project is working in specific districts of the three East African countries of Uganda, Kenya, and Rwanda.

The vision of success for the East Africa Dairy Development project is that the lives of 179,000 families—*or approximately one million people*—are transformed by doubling household dairy income by the 10th year of the project. This is to be achieved through integrated interventions in dairy production, market-access and knowledge application. Supported by lessons learned during the four-year pilot phase, the long-term vision is to scale out interventions within the participating countries and to replicate the project in three other countries in the region by assisting 350,000 more families or 2.45 million additional people. The East Africa Dairy Development project aims to achieve its vision of doubling smallholder dairy income by improving on-farm production and market-access.

The project seeks to improve on-farm productivity by:

- Increasing the volume of milk produced
- Improving milk quality and reducing loss through spoilage
- Providing access to production inputs through business delivery services

Market-access will be improved by:

- Developing local hubs of business delivery services and chilling plants that facilitate market Access
- Linking producers to formal markets through processors
- Increasing producers' benefit from traditional markets

The project will accomplish these aims through coordinated, farmer-focused interventions that integrate to develop smallholder profit-participation in the dairy value chain. These interventions will generate information and develop innovative solutions, expand dairy markets and market access for farmers, and sustainably increase dairy productivity.

The project was designed to work from the community level to create a system where poor, smallholder dairy farmers optimize their social and productive assets to increase their income. Farmer groups that include women and youth as members and leaders will be engaged, trained and organized as dairy farmer business associations—legal entities that can operate hubs of dairy businesses providing access to formal markets and improved traditional markets. In the project, dairy hubs will serve as community anchors for industry knowledge, business services and market access. Fully functioning, the dairy hub is a dynamic cluster of services and activities that generate greater income for dairy farmers. Through the hubs, the quality of milk passing through the traditional market will be improved and access to formal markets will be facilitated through farmer owned-and-operated chilling plants. Research will be used to target chilling plant locations and traditional market hubs, and to develop insight into the ground-level, cross-country impacts.

It is expected that this project will develop a pool of knowledge, lessons and best practices that inform pro-poor policy supporting smallholder dairy development and future directions of the industry. This knowledge also will give direction to specific interventions (such as breeding, and feed and fodder practices) in this and future project phases. Multiple modeling tools will assess the impact of interventions on women to guide practices throughout the project timeline. An integrated value chain will develop benefiting producers (especially women and youth), providers of business development services, processors, traders and retailers. Smallholder farmers and business service providers will adopt and replicate project practices that improve governance and management of farmer-owned dairy enterprises. The consistent use of these practices is expected to double the dairy income of project households in 10 years.

Thus, during the initial stages of the project, a baseline survey was commissioned. The baseline was meant to capture the status of the beneficiary before interventions. The primary uses of baseline data include:

1. Analyzing the situation before the project starts, identifying dairy constraints (such as feed, availability, breeding or lack of reliable market outlets) and opportunities (such as family labor availability and appropriate agro-climatic conditions). These are identified at the production level and throughout the value chain to detect possible bottlenecks.
2. Assessing impact of project interventions during the course of the project. Data from the baseline will be used in the models developed by ILRI and TNS to assess project-intervention impact through various indicators at the household level—dairy production and livelihood indicators—as well as on other sectors of the economy. Direct and indirect effects will be captured. The results of this exercise and of monitoring activities will generate strategic lessons regarding poverty impact of dairy in general and project interventions in particular.
3. Showing the results from the project. The impact evaluations will measure against the baseline information.

The baseline involved inter-alia a qualitative (PRA) assessment of the target communities. The broad objective of the qualitative survey was to identify opportunities for and constraints to dairy that are specific to the site. Other activities carried out during the baseline were: household questionnaire and market agent surveys. However, this report focuses on the qualitative baseline survey.

METHODOLOGY

Introduction

In the baseline surveys, one or two approaches to data collection could be used, namely, qualitative and quantitative approaches. The quantitative approach uses data collection tools such as questionnaires, whereas qualitative approach uses mainly PRA tools. The qualitative approach is particularly useful in studying the social phenomenon which encourages probing and in depth analysis. In this survey, PRA tools were used guided by a checklist of issues during focus group discussions.

Out of the 13 districts earmarked for project implementation, five were sampled for the qualitative baseline survey. Five sites were selected in total, three chilling plant (CP) sites and two traditional hub sites. The sites selected were Buikwe in Mukono, Bbaale in Kayunga, Luwero municipality in Luwero district, Kakooge in Nakasongola, and Masaka municipality in Masaka district (See Map 1 below).

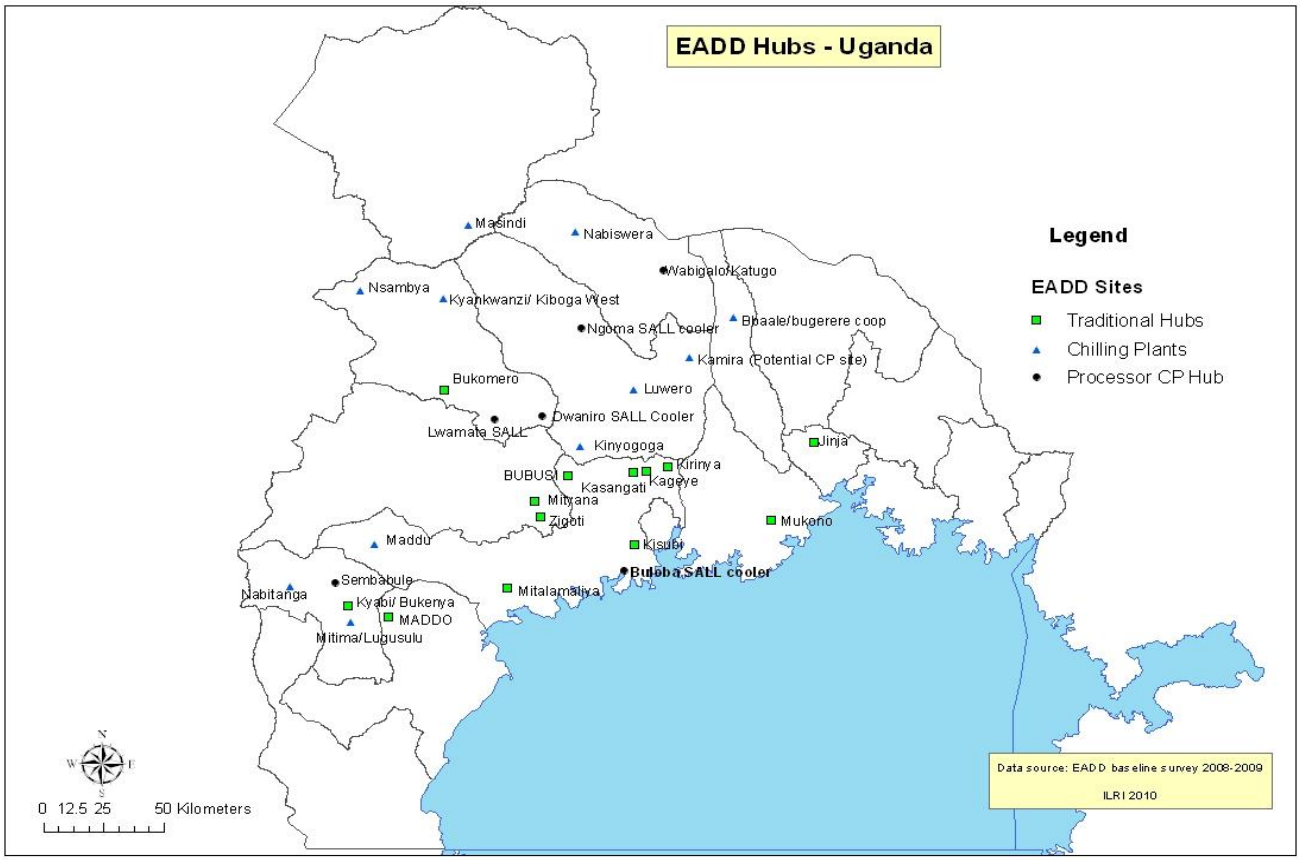


Figure 1: Map showing the districts involved in the baseline survey

Two villages or PRA points were selected in each site for PRA exercise. The criterion for selecting the village was mainly the extent of access to milk market and or the variability in agricultural ecological system.

PRA Team composition and the division of labour

The team consisted of seven members trained in various disciplines, namely, socio-economics, Animal production, rural sociology, communication, management, and veterinary sciences. The team consisted of four males and three females. In the field, the team was divided into two sub-teams at any given moment facilitating two groups. In every PRA focused group discussion session, the teams performed the following roles.

- ***Facilitator***: Explaining and guiding the discussion, cross-checking the analysis templates and key notes on flipchart for all participants to see.
- ***Observer***: Cross-checking the analysis templates, reminding the facilitator about missing issues
- ***Note taker***: Detailed documentation of the discussions; noting observations during the discussions; cross-checking the analysis templates, reminding the facilitator about missing issues
- ***The Consultant***: who introduced the sessions, guided and coordinated the whole field activities.



Plate 1: A photograph showing PRA team members

The team had a technical back stopping from Dr. Nelson Mango (2nd from left) of ILRI for the first week.

PRA Team training

Although some team members had had prior exposure to PRA tools, the team went through training in the use of various PRA tools. They were oriented to the specific tools and checklist that were to be used in the field.



Plate 2: PRA team members undergoing training at the Faculty of Veterinary Medicine

The Consultant with the support from Dr. Mango, took members through all the tools that were contained in the checklist. The tools included:

- Village resource mapping
- Wealth ranking through bean piling and ranking
- Livelihood matrix
- Problem ranking and Problem Analysis Chart
- Actor linkage map
- Actor analysis matrix
- Breed matrix scoring
- Feed matrix scoring
- Seasonal calendars
- Focus group discussions

It was ensured that every member of the team (even those who would not facilitate) was able to use each tool.

Activities prior to the PRA exercise

The day before PRA exercise was used for preparation and mobilization. Village/farmer leaders and veterinary extension agents were contacted and reminded of the PRA activity. They were also encouraged and facilitated to go around the village reminding members about the exercise the following day. Because the PRA exercises were for the whole provision for lunch was planned with their leaders. On the day of the PRA exercise, the project was introduced to the community members by he /team leader (See below).



Plate 3: The team leader introducing the project and baseline objectives

Here the basic objectives of the PRA village workshops were explained. It was explained that the PRA sessions would help all involved including the community to characterize the context, and complement the further studies (e.g. the household survey) and future implementation and evaluation of the project. Also, the members of the team were introduced, explaining their roles (facilitators, note takers, observers). Attending members of the community were also encouraged to introduce themselves, giving their name, and their main activity in the village. This exercise was vital in breaking the barriers between the team members and the members of the communities. Finally, communication rules, and the agenda of the day were set. The introductory sessions lasted an average of 30 minutes and dwelt largely on clarification of the objectives of the PRA and how it fits in the overall EADD project objectives.

The Actual PRA Sessions

After the plenary introductory session, members were encouraged to divide into two groups. Under the guidance of a facilitator, supported by a note taker and an observer, community members discussed various issues concerning dairying in the village using various PRA tools.

Village resource mapping

The main objective of this exercise was to develop area profile by mapping the natural resources, infrastructures, social services and land use system within the village. The exercise lasted for 1 ½ hours, and group members were asked to map out their village/region and its key natural resources, infrastructures, social services and the land use system.



Plate 4: Members of the community sketching the village resource map

The discussion with community members was guided by the following checklist:

- Where are the locations of the most important landmarks surrounding the community (giving example of landmarks – external boundaries)?
- Which resources are available in the village, which are considered to have an impact on people's livelihoods (e. g., crop fields, rangelands, grazing reserves, rivers, degraded areas)?
- Mapping the village infrastructure (e. g., settlement patterns, roads, power supply, network access, different types of water points/sources, community buildings, shops, commodity markets, livestock markets/milk collection points, dip tanks, livestock crush, veterinary posts/clinic, sources of stock feeds)
- What social services (e.g., health clinics, schools, dwelling places of village authorities, community meeting place, or other important facilities) exist in the area?
- What are the main land use and resource management systems in the area (e. g., allocation of cropping, communal rangelands, grazing reserves-browse and fodder plant species, seasonal herd movement, areas that herders associate with diseases)?

During and after the community members had sketched the village resource map, probing questions were asked, which included:

1. Which resources are plentiful? Which are scarce or lacking?
2. Does the community have land that is held in common? Who makes decisions about how common resources are used?
3. Where are different livestock kept? Where do they graze? (Specifically cattle)

4. Which resources are used-particularly in terms of raising and caring for livestock? By whom? Which resources are unused? Which of the resources indicated are the most problematic in relation to raising livestock? (Specifically cattle)
5. Do women and men have different access rights to resources for livestock and related agricultural production? If yes, what are they and how do they affect women and men's capacity to undertake animal husbandry activities? Other agricultural activities?
6. In the household, who makes decisions on the use of land? Water? Livestock/livestock products? Fodder species planted? Species and breeds of livestock raised?
7. What are some of the challenges to raising livestock in the area (e.g. seasonal migration to grazing areas, seasonal migration for labour, and other challenges)?
8. Where are the markets for livestock/livestock products? The input and outlet markets? What are the distances? How are they accessed? By whom?

The output of the village resource mapping was:

- The location, allocation, opportunities and constraints in natural resources, infrastructure and social services in the village
- Identified significant land use and resource management issues in relation to dairy farming

Wealth ranking

As Group One was busy carrying out village resource mapping, group two was carrying out wealth ranking in the community. The objective of this exercise was to determine the distribution of wealth within a given community based on assets owned and income, and the links between livestock ownership and well being (critical herd sizes). The link between wealth standards by social category and farmers' interests and motivations to invest in dairy farming were established. The tools used were group discussion of local criteria for wealth, and bean piling and ranking. A mixed group of men and women from the community actively participated in the wealth ranking in each village. This exercise also lasted for 1 ½ hours, and involved the following activities:

- Explaining clearly the aim of the project and why it is important to understand the different types of wealth categories and the particular types of opportunities and challenges they face. The facilitator stressed the confidentiality of every personal information that is given.
- Identified and ranked local criteria for wealth, checking for aspects such as number of livestock owned, size of land owned, education, type.
- Defined thresholds for wealth categories
- Discussed status of female-headed households, and households headed by other marginalised groups
- Identified farmers' trends to invest in dairy production.

The outputs from this exercise were:

- Local criteria for wealth categories and the critical herd size for the different wealth categories
- Differences by gender, and age between wealth categories
- Differences by farmers' interests/motivation to commercialize livestock production by wealth categories (e.g., distress sales, livestock as business, investment options)

Livelihoods analysis

When Group Two finished with wealth ranking exercise, they embarked on livelihood analysis. The objective of this exercise was to identify important livelihood activities and income sources both on farm and off-farm, and their trends. It was also important in capturing differences in key livelihood sources by gender. The tools used were a Livelihoods matrix, supplemented by focused group discussion by a mixed group. The exercise lasted for 2 hours, and it included the following activities:

- Asking group members to list and rank main sources of livelihoods and cash income both from within and outside the area. Emphasised the role of dairy related activities compared to the other activities.
- Discussed whether the importance of livelihood activities had changed in the past ten years.
- Discussed the situation faced by women headed households and households headed by other marginalised groups identified in the wealth ranking.

The outputs from this exercise was a matrix showing key sources of livelihoods and cash income, as well as the changes in importance, by gender.

Problem/Constraints and opportunities in dairy farming

When group one finished working on the sketching of village resource map, they were assigned another task of profiling constraints and opportunities related encountered in dairying farming in the area. The objective of the exercise was to identify major constraints and problems in dairy farming and to broaden the discussion about their causes and effects. It was also important in highlighting current coping or response strategies and indicating whether efforts to address a particular problem have already been tried and failed or have incompletely addressed the problem. The tools used were Problem Ranking and Problem Analysis Chart, and lasted for two hours. The main activities included the following:

- Organising a mixed group of men and women and asking them to think about their problems. Asked them to list problems that were most important to them in dairy farming. The group then ranked the problems according to importance and used different amount of beans to represent the ranking - the greater number of beans, the greater emphasis they placed on the problem.
- Asked the group to discuss the causes and effects of these problems, drawing a problem analysis chart that lists the priority problems, the causes and effects, the coping or response strategies, and the opportunities or proposed solutions for change.



Plate 5: Problem/Constraint ranking through bean piling

The following probing questions were asked during the exercise:

1. Which problems/constraints are related?
2. Which groups (social categories) share which problems?
3. What are the current coping/response strategies for each problem?
4. Do men and women cope differently? Why these solutions were not already implemented? What solutions can be implemented locally? Which ones require outside assistance?

The end of the two exercises for each group marked the end of the morning session, enabling participants to go for lunch break, which lasted for one hour. Lunch was taken on site to avoid time wastage. During the lunch break, informal interaction and unstructured interview over salient issues continued.

Innovation systems and actor analysis

After the lunch break, group two members embarked on this exercise. The objectives of the session were to:

- Identify and document the status of innovations in dairy industry (as they relate to the EADD),
- Identify major actors in the dairy innovation systems, the roles they play, and activities in which they are involved,
- Assess attitudes and practices of main actors (focusing on the way they work, particularly their history of collaborations, pattern of trust, culture of innovation, etc.)
- Understand patterns and effects of interactions (particularly risk taking behaviours, informal/formal networks, partnerships, actor coordination mechanisms, etc.)
- Assess the enabling environment (policies and infrastructure)

The tools used were focus group discussions, actor linkage maps, and actor analysis matrix. The sessions lasted for 2 hours, and it involved the following tasks:

1. ***Identifying and document status of innovations in dairy industry as these relate to the EADD***. Here, group members were to identify the major innovations in the dairy industry, then the proceeding discussion was structured around the following issues:
   - (new) breeds and feed/fodder selected and adopted
   - (new) animal services received or bought
   - (new) products being implemented; new processes applied (for example, do farmers convert milk into other products and how?)
   - packaging and other innovations
   - (new) organizational innovations at the household level and community levels (for example, cooperatives societies being established).
   - Other relevant innovations

The discussion was summarized around the actors by an actor matrix, characterizing the actors by their activities, achievements, constraints, linkages, status, and satisfaction.

2. ***The other task was to understand patterns and strengths of interactions. The following questions were posed:***
   - How important are these actors to you?
   - With whom are they interacting? How strong/effective are those links?

Then actors were categorized according to their importance. Here important things to note were: the quality of interaction between farmers and the actors; the frequency and speed of interaction, physical distance between actors, their seasonality. The linkage was depicted on the actor linkage map as shown in 6 below

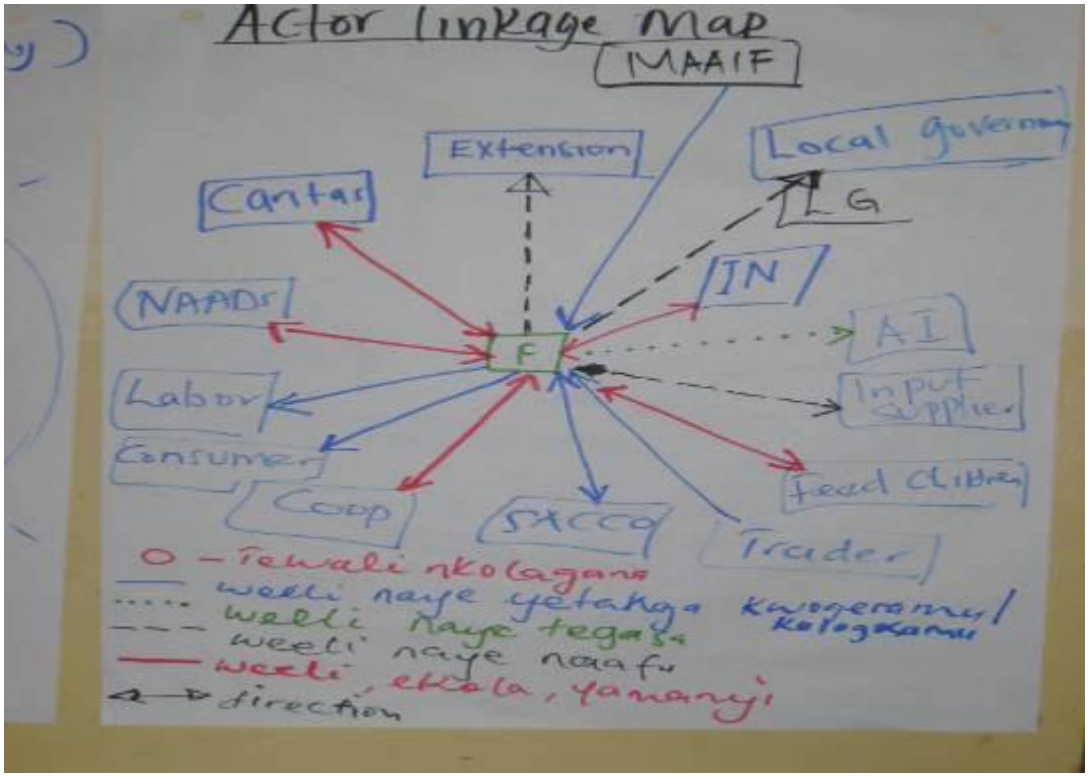


Plate 6: Actor linkage map

The other questions posed were:

- Where and how frequently did farmers interact with these actors
- Are interactions two or one way flows?
- What new actors and/or new links did farmers like to create, or strengthen to help them in their dairy production?
- What actors are missing for improved dairy production and marketing in the area? What activities and achievements would farmers expect from the missing actors? How should they be linked to the existing actors?

3. The third task was to assess attitudes and practices of main actors. The following questions were posed:

- Which actors have histories of collaboration? In which innovation areas were these collaborations?
- Are there some formal/informal networks in the dairy innovation systems?
- Are there mechanisms for coordinating actors in the dairy innovation systems? Identify these mechanisms.
- Do actors trust each other in what they jointly do?

4. The fourth and final task was to assess the enabling environment, i.e. policies and infrastructure, by posing the following questions:

- What are the (current) enabling (or constraining) policies, regulations, guidelines relevant to the dairy industry?
- What resources (personnel, budgetary, etc.) are allocated to the industry?
- What are the relevant and available (or missing) infrastructures to the dairy industry?

The outputs of this exercise were:

- Actor Linkage map showing key actors and their links with farmers, within the village, outside the village, and in relation to main milk markets, as well as innovative farmers and missing actors and their expected linkages.
- Matrix summarizing opinion of the inputs and services provided by the actors.

Breeding preferences, strategies and Livestock feeds and feed sources

During the afternoon session, as Group Two was handling the exercise of innovation systems and actor analysis, Group One was tackling the exercise on breeding preferences, strategies and livestock feeds and feed sources.

Breeding preferences and strategies

The objectives of this exercise was to identify important traits of dairy cattle preferred at the community level and assess breeding services and strategies linked to them. The tools were a checklist of important questions and group matrix scoring exercise supported by focused group discussions analysis. This exercise lasted for one hour. This exercise involved two activities:

Activity 1: MATRIX SCORING EXERCISE: The group was asked to list a) the trait or characteristic they think are important in judging an animal they prefer and b) the reasons for keeping or preferring a certain animal. Participants were then asked to score each trait giving reasons why they think it is important. N.B. Notes of discussions were being taken during the exercise including exactly what is meant by each criterion.

The following check list questions were used for activity 1:

- How did participants learn about and end up with the breeds they currently kept?
- What was the most common breed of cattle kept across the group?
- Were there other breeds that they would choose – if so why did they not keep these breeds?
- What was the main way of acquiring animals in the area (purchase/gift/calf etc)
- If they relied on purchasing, why did they not rear their own?
- If they purchased, how did they decide which animal to buy? That is:
    - What information did they request from the seller
    - What characteristics did they look for
    - Where did they get the animals from?
- If they reared their own – why did they not purchase?

Activity 2: MAPPING EXERCISE: Breeding services were mapped, taking note of (i) availability and (ii) preference of the services in the area. This was done on the flip chart.
The checklist questions that guided activity 2 included:

- Why are certain breeding services preferred and not others?
- Which factors are considered in choosing a breeding service?
- What are major constraints faced in accessing preferred breeding services in the community?
- If there is no choice – how do they improvise and why?

The outputs from this exercise were:

- A general description of existing and desired breeds in the region.
- Information on why certain traits and breeds are important.
- General level of demand for certain breeding services.
- Information on advantages and constraints associated with different breeding services as well as scope for availing more services.

Livestock Feeding systems and seasonality

The objectives of this exercise were to capture the general problems and their impact on forage production, e.g. physical (limited access to water; disease, quality, quantity of feed) and economic (limited access to cash, credit, land etc; Policy).

The tools used were: Focus group discussion, Ranking, Seasonal calendar and Village map. The exercise lasted for one hour.

Forage production constraints

Participants were asked to list general forage production constraints. After listing, they were requested to rank the constraints. They were encouraged to discuss how these constraints affected forage production

Forage resource maps

These were already covered under the mapping exercise during the morning session of group one. The village resource map was interviewed in respect to forage resources. The team was careful to extend the probing beyond browses and fodder trees, and they included all types of forages. Forage resources were linked to seasons/ seasonal movement of herds or herding routines.

Seasonal feed calendars

The objective of this exercise was to establish:

- The importance of different forages at different times of the year
- Seasonal shortages and solutions applied

Seasonal feed calendars showed feed types by month and by source. The purpose of this was to show (a) general types of all feeds (b) sources of feed, and the proportion of each that are used in each month; and estimation of feed sufficiency in each month.

Probes for seasonal calendars included:

i. Asking for list of forages fed to cattle including source of forage.
ii. Asking in which month each forage was being fed.
iii. Explaining the process of proportion scoring. Assuming that all the forages fed in each month have a total score of 10, how much of that would be allocated to each of the forages fed in the month.
iv. Asking for the score and marking them on the calendar. In case where there were disputes amongst the group both scores were recorded, then establishing which scores apply to most people.
v. Recording the months when forages were very scarce and probed out why?
vi. Obtaining information on how sufficient the feed resources were during each month.
vii. Discussing coping strategies in dry periods
viii. Discussing possible intervention/solution from the farmer's point of view

Final plenary session

After the group exercises, the two groups reconvened. The objective of the plenary session was to share the day's experience, allowing the whole group to benefit from the exercises and thereby enhancing ownership of the whole process. The activity of this session involved asking the group to reflect on the day's activities. The session lasted for 15 minutes. The session finished with the team leader thanking participants, giving them information about what would happen next.

Data Analysis

Data was analyzed and synthesized using pre-designed analysis templates. Also, after a day's exercise, every evening, the team met at the base, where the team leader requested each member to highlight their salient findings noted during the PRA exercises of the day, and these were recorded in form of memos. Finally, the qualitative data gathered was analysed using mainly two qualitative analysis tools, namely micro-analysis and memo writing.

In Micro-analysis, this is a detailed analysis where a careful scrutiny (line-by-line) of text is carried out to generate initial categories of data and identify relationships among categories. After data was transferred from notebooks and flip charts into the computer using Word™, a detailed manual scrutiny of data (first word by word, then phrase by phrase, and then line by line, and finally paragraph by paragraph) was carried out. In the process, data was classified according to main categories, namely, Village resources, livelihoods, opportunities and constraints, innovative actors, and breeding and feeding. This process of categorisation was guided by the checklist and the analysis template. Further analysis led into identifying sub-categories in each main category.

BACKGROUND INFORMATION ON THE STUDY DISTRICTS

Kayunga District

Kayunga is located in the Central region of Uganda with a total surface area of 1803.187sq km that is punctuated with wetlands, water and tropical rain forests. It has an annual average temperature of 19c – 25c with 1000mm-1200m per year with two heavy rain seasons coming in March – May and August – November. The topography is generally flat with undulating hills and savannah vegetation cover. It borders with 6 districts: Apac in the North, Mukono in the South, Luwero and Nakasongola in the West and Jinja and Kamuli districts in the East.

Kayunga district has a total population of 297,081 people of which 144,609 are males and 152,472 are females (2002 population census). Currently the sex ratio is 94.9 males to 100 females while the population density is 213 persons per sq km. The urbanization level is 6.7% indicating that the majority of populations live in rural areas. Kayunga became a district in 2000 after being curved from Mukono District, and comprises of two counties; Ntengeru and Bbaale.

The original inhabitants of the district are Baganda, but it has a diversity of ethnic groups with so many new emigrants, who include; Nubians of Sudanese origin, the Japadhola from Tororo, Basoga, Ateso, Banyara, Bakayi, Luo, Bagisu, Banyarwanda, and Asians who have become parmanent residents in the area.

The district has mainly Murram roads with only 48km of Tarmac road from Sezibwa bridge to Nyinze in Kangulumira sub-county on the boundary with Mukono and Jinja district again.

The level of literacy in the district is less than 60% especially in Bbaale County due to the influence of nomadic life and fishing on Lake Kyoga.

Some parts of the District, especially Bbaale and Galiraya su-counties depend on livestock and their products for survival. Milk, meat, ghee, hides and skins among others fetch a lot of money for the members of these communities.

There is a total of over 55,000 head of cattle, comprising of 86.6% locals, 13.2% crosses, and 0.2% pure exotics. Though of low standard, Kayunga District has 32 Dairy farms, 60 Ranches and 10 Dual-purpose farms. There are 45 Dip tanks, one Spray race and 48 Valley Tanks. Of these, only two Dips are in working state. The spray race is under use. Most of the valley tanks, though still under use have silted. Approximately 35,000 Litres of milk is sold in the District, with 25,000 Litres being sold in Bbaale S/C alone per day. About the same quantity is consumed in households.

There are 3 Milk Cooling Plants, one cooling Plant of 15,000 Litre capacity is located in Bbaale Trading Centre, and it belongs to farmers Cooperative Group. The other two belong to Private individuals in Kayunga Town.

Luwero District

Luwero district has always been a cosmopolitan area with many people of different origins and ethnic backgrounds. Among them include the Baganda, the original inhabitants of the district. Other ethnic groups include Banyarwanda, the Banyankole from Western Uganda, the Luo speakers and Nubians of Sudanese origin. Of recent, there are new settlers from Karamoja who follow the cattle corridor in search of green pastures for their animals. This mixture of tribes makes Luwero an interesting multi-lingua place with a diversified culture.

Generally, the topography is flat with undulating hills and with savannah grasslands. This type of vegetation makes the district favourable for pastoralist lifestyle and it defines the economic activities of the people. But there is subsistence agriculture in the southern part and some level of commercial horticulture dictated by the abundant market in Kampala.

Agriculture is the main economic activity of Luwero district and involves both crop and animal husbandry. Agriculture consumes over 85 percent of the labour force in the district.

Livestock is common in the northern areas of Luwero particularly in Ngoma County, while subsistence agriculture and commercial horticultural farming is undertaken in the southern parts of Luwero including Wobulenzi, Nakaseke, Bombo and Bamunanika.

The agriculture products include fruits, bananas, cassava, potatoes, honey, maize and horticulture while livestock products include dairy products and beef. Although commercial farming is still on a small scale, there exists a great opportunity especially in the areas of dairy production, horticulture in banana and vegetable growing. The district being located about 65km from Kampala, it provides a lucrative trade opportunity for traders who ply between the district town and Kampala to buy and resell merchandise. Therefore, Luwero is bustling with trade in Milk, fruits, foodstuffs, live animals on the other hand and various household and construction material on the other hand.

Masaka District

Masaka District is one of the oldest districts of Uganda. Originally, it consisted of Rakai, Kalangala and Sembabule, making it once the largest district in Uganda. Today Masaka has been reduced in size after Kooki, Ssesse islands and Sembabule sub-districts were elevated to the District status. It is situated about 37kms. away from the Equator towards the south and lies between 0^{o} 25^{o} South,and 34^{o} East, having an average altitude of 115m above sea level**.** The district is boardered by Sembabule in the north west, Mpigi district in the North,Rakai district in the west and south and Kalangala District in the East. The District Headquarters is 120 km from Kampala.The landscape and topography is rolling and undulating with valley bottom swamps including stream flows to lakes and rivers. It has got some rocky hills, considerable area under river basin and plains, lakes, swamps and bushes.

The soil texture is varies from place to place, ranging from red-latrine, sandy loam and loam but in general, productive. The rainfall pattern is bimodal having two crop seasons with dry spells in between July and August as well as January and March with the exception of a few months in a year of declining trend in precipitation. The average annual rainfall received is 1100-1200mm with 100-110 rainy days. The maximum temperature recorded is not exceeding 30^{o} C and the minimum not below 10^{o}c having almost equal lengths of day and night throughout the year.

The total geographical area of the district is about 6986 sq.Kms out of which 5865 sq.Kms is arable and 122120 hectares are under cultivationa considerable area is covered by marshlands, lakes, rivers, forestry and swamps. The total gazetted forest estate is about 35302 hectares this constitutes about 6.38% of the total land area of the district.

The district is divided into 3 Counties, and 1 municipality with 23 rural sub-counties and 1 town council with 3 divisions. These are further divided into 127 parishes and 1331 villages.

The district is predominantly agricultural, with 74.3% having their source of livelihood from agriculture. Employment income contributes 8.52 % to the district income, where 7.91% comes from trading . Property income is estimated at 5.52% and 1.12% income from the cottage industry respectively. Nine sub-counties have access to electricity, and a population of 876,474 people, of which 50.2% are males, and 49.8 females. 89% are rural, while 11% are urban, with an annual population growth rate of 2.5 %

Mukono District

Mukono is located in the central region of Uganda. It is endowed with natural resources ranging from green forests and fertile soils to a wealth of water resource. This is topped up with the comparative economic potential accelerating

the development of the district. The districts headquarters are located in Mukono Town Council- TC 21kms along the Kampala – Jinja high way. It is bordered by Jinja to the East, Kayunga to the North, Luwero to the Northwest, Kampala and Wakiso to the Southwest and Tanzania to the South on Lake Victoria. Mukono covers an area of 11,764Km^2 with a population of 807,923 people (404,806 males and 403,117 females). Mukono district comprises of four (4) counties; Nakifuma, Buvuma Islands, Mukono and Buikwe.

Agriculture is the main economic activity in Mukono district. The main food crops grown include; Cassava, Sweet potatoes, Maize, Millet, G-nuts, Peas, Soya beans, Bananas, Simsim, and Yams. The cash crops includes; Cotton, Coffee, Sugar cane and Tae. Fruits and vegetables are also widely grown in Mukono for example; Tomatoes, Onions, Pineapples, vanilla, passion fruits and cabbage.

80% of the agricultural activity in Mukono district is on a subsistence level. Commercial agriculture is carried out on big scale plantations such as SCOUL sugarcane estates, Kasaku tea estate among others. Private small scale farmers are slowly catching up on practicing agriculture for commercial purposes.

High value crops such as vanilla and flowers have boosted farmer's incomes, replacing the declining benefits from coffee farming.

The subsistence agriculture is characterised by the low acreage due to effects of increasing population (causing over fragmentation of available land) and urbanization forces. There is slow productivity from the land due to soil fertility loss, soil erosion, over cultivation and the poor rudimentary farming methods. The farmers rely on family labour, and in these cases women and children. There are approximately 70,000 head of cattle in the district. There have been efforts to improve livestock faming in the district. The National Agricultural Advisory Services – NAADS is implementing the Rural Development Strategy (RDS) in 11 sub counties in the district. This is implemented under the Integrated Support to Farmers Groups (ISFG). It seeks to accomplish the following; increase productivity, increase household output on selected agricultural produce and promote and ensure a stable market for produce.

Mukono has a 759Km of motorable feeder roads network, and 700Kms of community access roads. However, some of the community access roads are in a poor state.

The district has good access to good roads such as the Kampala – Jinja highway. Its proximity to Kampala gives it an advantage of connection to the major towns in Uganda. For the last two years, the roads in the district have greatly been improved from fair to good. The Eastern railway line from Kampala to Tororo and beyond to Northern Uganda and to the Kenyan Harbor at Mombassa passes through Mukono district. The district is served with a good communication network. Uganda telecom, MTN and Celtel Uganda networks are available there.

Banking facilities are also available with Stanbic Bank, Micro Finance Limited, Med Net among others plus, Kampala is just 21Kms away with very many financial institutions.

There has been an increase in the provision and accessibility of clean water in the district. Coverage has increased from 40% in 2000 to 56% in 2005.

Nakasongola District

Nakasongola District is dominated by the indigenous Bantu known as Balulli. They speak Lululi whose dialect is similar to that of Runyoro, Runyala, Lukenyi and Lugweri. Baluli live harmoniously with other tribes including Karamojong, Baganda, Langi, Bakenyi, Bateso, Banyarwanda, and Banyankole. Nakasongola District was created from Luwero by an act of parliament and started operating on 1st July 1997. Nakasongola district boarders Masindi district in the west and North West, Luwero and Nakaseke districts in the south, Kayunga district in the East, Amolatar district in the north east and Apac district in the North. It covers an area of 3424 sq.Kms representing about 1.4% of the country's total surface area.

Nakasongola is generally flat area, topographically undulating between 3800ft above sea level. Much of the low lying areas are drained by seasonal streams into Lake Kyoga in the North, and has tributaries to rivers like Sezibwa in the East, Lugogo on the West, South and Kafu on the North Western.

The district is mainly covered with Bululi soil catena, and the Lwampanga catena in the low lying areas and valleys. The vegetation type is mainly an open deciduous savannah woodland with short grasses, the dominant tree species include cumbersome ssp, Terminala, Acacia. Nakasongola receives rainfall ranging from 500-1000mm per annum. There are two rain seasons. The main seasons occur in march-April-June/July and October to Nov/Dec.

Nakasongola district has a total population of over 140,000 people (50.2 males, and 49.8 females), with a population growth rate of 2.3%. Majority (95.3%) of the population live in rural areas. It is located in central Uganda on Bombo – Gulu Road, 114 Km North of Kampala. The district is made up of; 1 County, 5 Sub counties, and 1 Town Council.

Agriculture is by far the most important activity in the District employing 89.9% of the people. It is, however, subsistence based. Livestock Keeping and Fishing is also being practiced by a number of people. There are no major companies in Nakasongola district but there is small scale trading going on. Small scale trade, mainly retail, constitute an important source of livelihood for the people. The few private companies in Nakasongola include; a cotton Ginnery and Maize Mills. Two sub-counties and one Town Council have access to electricity. The road network is still poor, with most of the areas being served by murram roads where transport may be very difficult during rainy days .However the marrum roads are graded and Passable in dry seasons.

FIELD FINDINGS

BUIKWE, MUKONO DISTRICT

Introduction

The two PRA workshops in Buikwe site were the first in the series of workshops that were carried out as part of the qualitative baseline survey by The East Africa Dairy Development Project. Mukono and Buikwe in particular were selected as a proposed Traditional Hub for milk marketing. Two PRA sites were selected in Buikwe study site, which were selected on the basis of accessibility to milk market. The first PRA exercise was conducted in Buikwe parish which comprised Buikwe township and its environs while the second was conducted in Kitazzi parish. These were particularly selected because they were perceived to have relatively easier access to milk market as compared to other villages in Buikwe sub-county. Deliberate efforts were made to invite both men and women to the PRA workshops. However, the turn up of women was almost a third of that of men for the first site and a quarter in the second site. All the six PRA tools in the checklist were applied. They were all relevant and useful in eliciting discussions of participants who were then able to freely give information. The communication between participants and the PRA team was good. Two things helped in making the communication easy:

1. All facilitators were fluent in the local language, and thus all the discussions and exercises were conducted in Luganda, the local language.
2. The use of visual exercises such as resource mapping, proportional piling, and innovation actor linkage map helped participants internalize the whole process and thus stimulating free discussions.

The only challenge was that there were some few participants who were indifferent, and they would want to leave the whole exercise to some 'experts' in the groups. It took deliberate efforts by the facilitators to encourage them participate in the discussions and exercises.

The main objectives of the qualitative baseline survey were: to obtain information relative to the current situation of the surveyed households and to identify farm-level constraints to increased productivity, to improved milk market access and identify potential interventions were achieved.

Participants consisted of livestock farmers and some local administration leaders but who were themselves cattle farmers. Participants, came from varying production systems, i.e. those practicing open grazing, and others zero-grazing. However the majority of the participants comprised of mainly the moderate poor. They said that the very poor do not attend farmers' meetings even when they are invited. They were mainly older people, about 35 years of age and above. The youth did not attend the meeting, and it was observed that most of them are not interested in farming. Majority are engaged in quick income generating activities such as brick making and motor cycle transport commonly referred to as Boda Boda business.

Table 1: Buikwe: PRA workshop profile

Country:	**Uganda**	**Type of hub**	**Proposed Traditional Hub**
District	Mukono	Site/hub	Buikwe
Village (PRA site)	a) Buikwe parish b) Kitazzi parish	Dates of interview	30th July 2008 and 31st July 2008
Venues for the workshops	a) Buikwe Sub-county Health Centre b) Kasubi Primary School	Duration of the workshops	1 day for each workshop

Language of workshop	Luganda	Number of participants	Site:	1st	2nd
			Female	6	5
			Male	15	17
			Total	21	22
Names of facilitators	Dr. Baluka, Dr. Maureen Mayanja, and Dr. A. Mugisha (Overall Coordinator)				
Names of note takers	Dr. Sylvia Nalubwama, Mr. Olivier Mugisha				
Names of observers	Mr. James Byomuhangi, Mr. Frank Mugume				
Special conditions (weather, local activities, etc)	On the first day, rain in the afternoon, council meeting the whole day however it did not have any adverse effect on attendance of the workshop.				

Buikwe: Village Resource Profile

External boundaries of Buikwe Subcounty

River Sezibwa Ngogwe sub-county to the north, to the west is River Mubeeya, Najja and Kawolo sub-counties, to the east is River Sezibwa and Lugazi sugar plantation, and to the south is Najjembe sub-county.

Parishes in Buikwe Subcounty:

a. Ssugu
b. Kitazzi
c. Malongwe
d. Lweeru
e. Buikwe

Most important economic activity

Agriculture, mixed farming, i.e. crop farming for food, and cattle keeping for milk mainly for income

Overall land use system.

Growth of food crops and settlement covers over half of the land in the area. The rest of the area is then dedicated to forests and grazing land.



Plate 7: Buikwe: Village sketch map

Table 2: Buikwe: Resource Profile

Mapping issues	**Detailed information**
Natural resources	
Water bodies	Rivers and swamps
Crop fields	Scattered throughout the area
Rangelands	No specific areas reserved for rangelands
Gardens	Scattered throughout the area
Irrigation schemes	None existent in the area
Mines	None existent in the area
Others (specify) a) Forests	• Natural forest - Kitazzi parish • planted forests - Sugu parish • Hills
Infrastructure Water	Boreholes, Piped water, spring wells
Transport	All weather roads ▪ Malongwe Lweera Buikwe ▪ Buikwe – Kitazzi ▪ Kitazzi – Malongwe ▪ Lugazi – Jinja Road – Through Buikwe of Kitazzi. Railway line – Buikwe to Kitazzi with station at. Buikwe Trading Centre (TC)
Electricity	Main line through Buikwe – Lweera-Malongwe
Settlements	Scattered throughout
a) Commodity markets	• None • No livestock market either, cattle bought from farms

b) Trading centres	• Buikwe, Lweemi, Malongwe, Sugu, Kitazzi, Kawolo, Ajija, Matale, Kisaasi.
Milk sale point (informal or cooperative/ self-help group)	• Milk sale point – informal collection at Buikwe TC • Mosts milk is sold to milk vendors who move around on bicycles • Public transport – used for longer distances e.g. to Lugazi
Milk cooler/ processor	None – have to go to Lugazi town
Dip tank/cattle crush	• At Buikwe King's land – But unused • One on an individual's farm in Buikwe parish
Vet Clinic	• None • Call veterinarians by telephone
Stock feed sources	Shop in Buikwe TC – but not fully functional
Others (specify) a) Veterinary drugs	Shop in Buikwe TC but not fully functional
Social services	
Health	Buikwe subcounty headquarters - Health centre III
Mapping issues	**Detailed information**
Schools	Secondary schools – Only one government school in Buikwe parish Four private secondary schools in other parishes Primary schools – Several in each parish Technical schools, one in Malongwe parish
Church	Churches and mosques available throught the sub-county
Local administration	Offices at the subcounty headquarters ▪ A community centre is available ▪ Prison ▪ Police
Traditional Authorities	None mentioned
Extension offices	No permanent office - though staff may meet at sub county headquarters once a month.
NGO offices	None ▪ International Needs – has projects in the sub-county but has no office in the sub-county
Others (specify) a) Financial	▪ Farmers' Cooperative ▪ Teachers' SACCO
Land use system	
Croplands and use of crop residues	▪ Crop fields – everywhere ▪ Sugar plantation - Bordering Buikwe and Lweera Parishes
Communal rangelands	▪ Not for government but individual/ Kabaka owned land o Individual land - Kitazzi & Malongwe parish o Kabaka's land – Sugu parish o Near Lugazi Sugar plantations – Kitazzi and Lweera parishes
Grazing reserves	Of total head of cattle ▪ Zero-grazing – 12% ▪ Individual farms – 26% ▪ Communal grazing – 28% ▪ Tethering - 34%
Seasonal herd	▪ Sugu – to Kawolo sub county

movements	▪ Malongwe – to Mubeeya River along Najja sub County border. ▪ Also to Najjembe subcounty – especially along sugarcane plantation
Others (specify) a) Livestock Disease infested areas	• Lweera along river/swamp Muyimira. • Malongwe along river mubeeya.

Relationships between the map items, challenges and opportunities.
The map revealed the following:

- There were no livestock markets, particularly gazetted areas for selling or buying cattle. Cattle were being bought directly from individual farms.
- There was no source of good breeds of milk producing animals. When they had to sell animals farmers sell them within the area or to neighbouring sub-counties.
- No veterinary clinics/offices for veterinarians – this means that veterinarians were not readily available. Farmers buy their own drugs from Lugazi town and have to call in veterinary staff on telephone.
- No milk collection/cooling facilities - the challenge is that milk storage and processing facilities were lacking thus loss of milk. Milk is hawked around on bicycles, and sometimes on foot being carried in Plastic Jerry cans, and it is sometimes transported by public means using taxis to Lugazi
- Small trading centres – challenges that emphasized this were that there were no shops for purchase of veterinary drugs and inputs, and marketing of milk was also a problem without specific outlets.

Buikwe: Wealth ranking

The local wealth criteria identified were land, livestock, water source, labour, means of transport (e.g., bicycle, vehicle), and ability to feed and educate children, TV/Radio and access to main road. Out of the long list, five main items were selected to be analysed further, and the most important wealth criteria selected were: ownership of land, owning a house, having water source on own land, educating children, and owning livestock.

Table 3: Buikwe Wealth ranking categories

Criteria for wealth	**Wealth category**		
	Better-off	Moderately poor	Very poor
Livestock numbers by species. For cattle, differentiate by breed	1-20 & above Exotic cattle	Have no exotics 1-5 local cattle	No cattle Keep local chicken
	5-30 local cattle		
Land size	5-100 acres with title	1-4 acres with title, but may rent additional land	Small plot –without title
External income (off-farm)	Hotel business Clinics, Schools Commercial vehicles	Own Boda Boda motorcycles	Sale of labour
Education for children	Up to senior 6 (UACE), tertiary & vocational institutions & universities	Senior 4 (UCE)	Primary 7 – end of UPE
Housing standard	Use bricks / blocks, cement, sand, tiles, coloured or ordinary iron sheets. About 3 or more bedrooms	Bricks, ordinary iron sheets, single slanting 1-2 rooms	Grass thatched, mud & wattle / poles

Criteria for Wealth in Order of Importance

Livestock was ranked as the most important criterion for wealth in the both PRA sites. The very rich own about 20 or more exotic and 30-50 local cattle respectively. The rich own 1-10 exotic and 5-15 locals. The poor own 2-4 local cattle and they do not own exotic cattle. They may also keep exotic and local poultry, pigs and goats. Those in the very poor category do not own cattle but have a few local chickens.

The second important criterion for wealth was land ownership. Those in the category of very rich owner 50-100 acres of land with title. On the other hand, the rich own 5-45 acres of land with title and the moderately poor own 1-3 acres of land with title but in addition they rent land for agricultural activities such as crop farming. The very poor live on a small plot of land without title.

The farmer's selected five (5) important items which they ranked and scored (using bean proportional piling method) according to order of importance as shown in the table below;

Wealth category	**Score**	**Rank**	**%**
Land	40	**2**	**40%**
Livestock	50	**1**	**50%**
Coffee	5	**3**	**5%**
Business	0	**5**	**0**
House	5	**3**	**5%**

Overall, participants categorized the community into four wealth categories, namely, the very rich, rich, moderately poor and very poor. The participants said that those in the very rich category are very few and this category is not considered to be part of their community because many have houses in towns where they live most of the time and they only come to the village to check on their livestock occasionally. Majority of the community members view the very rich as 'outsiders' although they have property in the community. However, the biggest percentage in the community that educate children fall under the rich and very rich categories.

Farmers' Interest for Commercialization across the Wealth Categories

The moderately poor have the highest motivation to go into commercial dairy farming because sell of milk gives them a daily income and helps them to move out of poverty and improve their status. However, this same category is highly engaged in the off-farm activities because they have the desire to earn additional income and move out of poverty. The moderately poor are the ones reported highly motivated to replace their local cattle with high grade cattle so as to increase milk production. They argued that the yield for the local breeds is low. Exotics or crosses give better returns in terms of milk production although they may be more labour intensive. It was argued that if a local lactating cow loses a calf, it stops producing milk; and yet a farmer can continue milking an exotic cow even if it loses a calf and dries it two months to the next calving. They indicated that they avoid cross-breeding locals with Friesians because they are likely to get calving or delivery related complications due to the big size of the hybrid calf as compared to the small size of the dam. In addition, they argued that crossing the local animal would take long to realize returns as compared to replacing the local with the high grade animal. Generally, livestock keeping is changing focus from the traditional towards commercial dairy farming and sell of milk is now a major source of household income. It was also argued that the rich and very rich go into dairy farming as a hobby and prestige since they have so many other businesses and sources of income.

Gender and Other Crosscutting Issues

Child and elderly headed households are very few because of the socio-cultural set-up of this community; where children and the aged are taken-up by relatives for care. Where they existed, the child and elderly headed households normally did not keep livestock but they owned land. Female headed households are existent in the area, but they are

still few and stigmatized. Women are increasingly getting involved in livestock keeping especially with encouragement from NGOs and government efforts of women empowerment.

Buikwe: Community livelihoods

The Main Livelihoods in Order of Importance

Participants selected six activities (livestock rearing, crop farming, trading, Boda boda[1] riding, brick making and charcoal burning) that are main contributors to their livelihoods. These were then ranked according to order of importance using the par-wise ranking method as shown below;

Activity	Live-stock	Crop	Trade	Boda boda	Brick making	Charcoal burning	score	rank
Livestock rearing		Livestock rearing	Livestock rearing	Livestock rearing	Livestock rearing	Livestock rearing	5	**1**
Crop farming			Crop farming	crop farming	Crop farming	crop farming	4	**2**
Trade/ business				Trade	Trade	Trade	3	**3**
Boda boda					Boda boda	Boda boda	2	**4**
Brick making						Charcoal burning	0	**6**
Charcoal burning							1	**5**

The main sources for cash income

The main sources of cash income are;

- Livestock rearing
- Crop farming
- Trading
- Boda boda (motor cycle transport business)
- Charocal buring
- Brick laying

The above sources of income relate to the above identified livelihoods in such a way that the importance of the first four activities for cash income is ranked in the same way, meaning that Livestock, crop farming, trading and boda boda transport are important for both livelihood and cash income. Livestock and crops are both for home consumption and surplus for sell, some farmers are involved with crops that are purely for cash for example coffee. Farmers are able to earn a daily income from sale of milk, then sell of chicken, pigs and goats in case they are reared.

[1] motor cycle transport business

Table 4: Buikwe: Community livelihoods

Contribution to livelihoods (Rank in order of importance of contribution to livelihoods)	**Contribution to cash income** (1=very important, 2=somehow important, 3=not important)	**Trends** (1=becoming more important 2=less important, 3=new activity)	**Differences in terms of gender, age, ethnic minorities**
1) Livestock rearing	1	1	Men and women
2) Crop farming	1	2	Men and women
3) Business / trading	1	1	Youth
4) Boda boda	2	3	Youth
5) Charcoal burning	2	1,3	Youth
6) brick making	1	2	Men and youth
7) Public service	2	2	Men and women
8) Fishing	1	2	Youth
9) Traditional healers	3	2	Youth/ men
10) welding	3	2	Men
11) Crafts	2	1	Youth and women
12) Sand digging	1	1	Men
13) Butchery	1	1	Men

Note:

- Livestock rearing is becoming more important, adopting improved & increasing livestock numbers, selling milk, use of improved pastures, increased prices of milk
- Crop farming is becoming less important; soils have become infertile, pests & diseases increased., but again more women have gone into commercial crop farming
- Charcoal burning- becoming less important, due to depletion of trees and yet no planting more trees.
- Fishing- becoming less important, because of depletion of fish stock in the lake
- Public service-becoming less important, no jobs, farmers are reluctant to send their children to school, and there is high rate of school drop-out
- Traditional healers- less important, there is option of health centres in the area
- Craft- Less important- no time and less skills for the activity
- Sand digging- becoming important due to increasing demand for improved houses (brick & cemented type)
- Welding- becoming important due to improvement in housing type.
- Butchery- becoming important as the number of livestock and consumption of meat increases

The role by livestock in terms of livelihoods and cash income

Livestock was ranked first in terms of livelihood and cash income. The farmers in this area get milk from their animals on a daily basis, the high yielding crosses are milked twice a day, and this milk is hawked in the nearby trading centers for sale or sold directly to consumers in the neighborhood. The milk earns the farmers a daily income. Besides the milk, farmers derive cow dung which is sold as manure to farmers who are engaged in crop farming but have no livestock, this also earns them an income. The farmers sell culled animals for meat and hides. This is another

income source. In this area one farmer has gone into processing milk into Yoghurt. Thus value addition and therefore an extra income earned. The milk produced is also partly used for home consumption, thus improving on the nutritional status of mainly the children in homes. The farmers, who own livestock, improve the yield of their crop fields using the manure from livestock thus improved production leading to food security.

Trends in the relative importance of Livelihoods and cash income

The farmers reported that new activities have become important sources of livelihoods and cash incomes for example *boda boda* (motor cycle transport business) and brick making. There are changes in relative importance of crops as a source of livelihood and cash income, due to the seasonal changes which affect crop yield. At the same time this has increased acquisition of new knowledge in management and disease control has improved on crop yields in some households. Livestock rearing has gained importance both as a source of livelihood and as a cash income. Farmers are increasingly adopting improved breeds, increasing livestock numbers. New trends have been seen in gender roles; women are increasingly getting more involved in livestock keeping thus doing activities like milking which in the past was men's domain.

Gender and Other Crosscutting Issues

In this area both men and women are involved in livestock rearing, and the role of women is still increasing. Crop farming is carried out by both men and women. The youths are less interested in livestock keeping and crop farming. The youths seem to be more interested in quick cash yielding livelihood activities like riding boda boda, brick making, digging sand and burning charcoal. Sand digging, operating butcheries and welding are mainly done by men. Public servants and all those in monthly paid employment include women, youths and men. Charcoal burning and Business / trading is mainly by the youths.

Buikwe: Constraints and opportunities in dairy farming

Constraints and problems in dairy farming in the study area include

- Labour is expensive, and it is hard to find farm workers
- Scarcity of grazing land
- Feed supplements e.g. dairy meal is unavailable
- Water is scarce
- No cattle market – for farmers to sell and buy
- Transportation of milk is a challenge
- Feeds or forages during dry season - take long to grow and given the small piece of land become very scarce
- Lack of veterinary drug shops - sometimes have to give money to vet doctors to buy for them drugs - which takes long.
- Do not have enough money to buy hand spray pumps – for tick control.

Table 5: Buikwe: Constraints and opportunities in dairy farming

Problems/Constraints	Causes	Effects	Coping strategies	Opportunities/Proposed solutions
Lack of definite sources of milk producing cows	• Lack of information about where to buy milk producing animals	• End up with poor breeds of animal	• No definite strategy other than keeping the breeds they have at the moment.	▪ Need to set up an information centre ▪ Need to have someone in charge of communication *Requires outside assistance*
Veterinary staff are not available	▪ Vet doctors are very few ▪ Most animals not of high value / production	▪ Animals die	• Treat animals ourselves • Call those from neighbouring sub-county Kawolo.	• Train a community based health worker. *Requires outside assistance*
Lack of milk storage and processing facilities	• Lack of unity among farmers • No collection centres	• Loss / spoilage of milk • Low income from milk	• Boil the milk	• Acquisition of Milk Coolers *Local efforts can be made together with outside assistance*
Scarcity of pastures and forages	• Lack of enough land to grow forages • No storage/preservation facilities during plentiful seasons	• Low productivity of cattle especially during scarcity of pasture	• Cattle moved to other places in dry season • Alternative types of feeds used (e.g. (banana stems, maize stovers)	• Acquisition of high quality forage / pasture seeds *Requires outside assistance*
Lack of adequate market for the milk	There is no permanent buyer for the milk produced	• Never certain of getting money	• Keep on looking for new buyers	Need to work together / unite as farmers *Should be by local farmers effort*
Veterinary drugs are not readily available	• No permanent vet drug shops in the area • Farmers buy drugs themselves	• Animal sometimes die and the farm fails too	• Travel to other areas to buy drugs • Use local herbs/ treatments	Acquisition of a veterinary drug/ input shop within the area *Local efforts can be made together with outside assistance*

Gender and other crosscutting issues

a) Division of Labour

All family members are involved in duties to do with the cattle as follows:

- Men - building shelter, grazing/cutting forage, watering contribute 30% of total labor load with respect to cattle keeping
- Youth – fetch water, clean shed / kraal - 10%
- Women – feeding, clean kraal - 60%

Some farmers employ labourers especially to search for, cut and carry forage home for the cattle.

b) Decision Making

When selling/buying cattle or use of milk proceeds

Men – in 60% of homes made decisions unilaterally

In 20% of the homes, decisions were made jointly between husband and wife, and in 20% of the households, female spouses made decisions unilaterally.

Farmers future aspirations related to livestock production and marketing

- Acquisition of better milk producing breeds
- Acquisition of Milk Cooler
- Having a reliable Veterinary drugs / input source close by
- Having easily accessible veterinary personnel
- Collaboration with existing organization's working in livestock related activities.
- Acquisition of affordable loans – for buying feeds and breeding animals.

Buikwe: Innovation systems and actors

Key innovations and the actors involved

Farmers obtained advice and knowledge on improved breeding from National Agricultural Advisory Services (NAADS). They also learnt pasture growing and tick-control using spraying from NAADS workshops. Some farmers now grow pastures such as elephant grass on commercial basis and sell to other farmers.

NAADS also introduced the bull scheme i.e. an exotic bull is given to a community and one model farmer is identified to host the bull station to where other farmers in the area bring their cows to be served so as to improve on the local breeds they already have.

Bucket feeding and women milking is also new and considered an innovation because in the past women were culturally barred from milking. Women were prompted to learn milking because their stake in livestock production and management has increased, they felt cheated by hired milkers and sometimes the milkers would delay to milk and the lactating cows would cry with pain.

Farmers learnt deworming from NAADS and Uganda National Farmers Federation (UNFE) workshops

Milk vending i.e. transporting milk in jerry cans on bicycles from homes to trading center in search for customers is also an innovation. Packaging milk in polyethene bags is also an innovation.

They learnt silage making and using grass cutter from Engineer Kato.

The key innovations in inputs were giving maize bran to milking cows, feeds / fodder to housed cattle, and mineral licks / blocks.

The key innovations in practices were cross-breeding, silage making, growing pastures, packaging milk in polyethylene, feeding molasses

Innovations under breeds were crossing local cattle with Friesians, Guernsey and Jersey using bulls or artificial insemination.

The only product under innovations was yoghurt which is made by only one farmer, called Mrs Makanga.

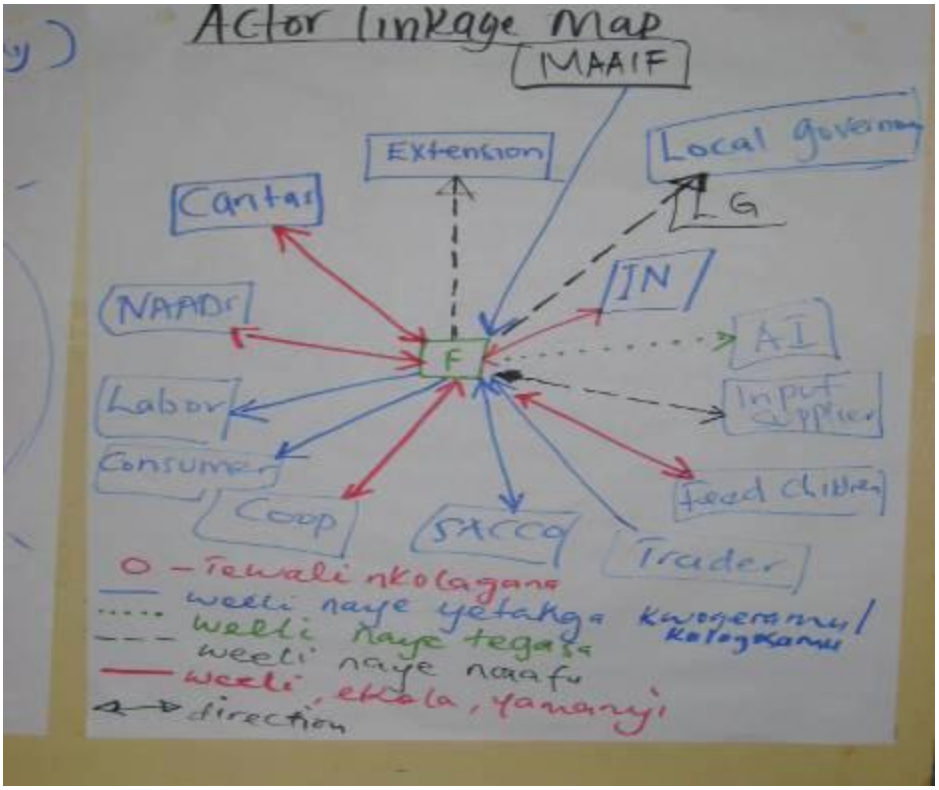


Plate 8. Buikwe: Photograph of the actor linkage map

Table 6: Buikwe: Chart of innovations Status

Conventional activities	Innovations	Innovating farmers
Inputs – acaricides, vet drugs, labor, vaccines, mineral salts, water, hoes, spades, pangas, crushes, spraying pump, pastures / fodder, housing for calves, fencing wire, bicycle, ropes, wheel barrow	*Inputs* – feeds / fodder, maize bran, mineral blocks/licks, good long-lasting Pour-on acaricides	Site1- Engineer Kato, Mr Katwele Jowali Mr Mbidde Sam
Practices- dehorning, branding, tail docking, castration, bull breeding, feeding twice a day on elephant grass, spraying, giving water twice for zero-grazing & once for locals, cleaning shelter daily, giving maize bran for milking cows only & and milking, use of paid labor, milk vending	*Practices* – cross-breeding using improved bulls / AI, silage/hay making, milk vending, deworming, packaging milk in polyethylene bags, using grass cutter, growing pasture for sell, forming dairy farmers' cooperative, bull scheme, women milking, feeding cattle on molasses / brewer's waste, maize brand, zero-grazing, ear-tagging, feeding on legumes	Site2- Mr Kalanzi John Mrs Makanga Mrs Galabuzi Agnes Mr Namagoye Samuel
Breeds – mainly locals	*Breeds* – crossing Freisians, Guernsey, & Jersey with locals/ Nganda,	
Products – milk, meat, manure / cow dung, urine, skins & hides	*Products* – yoghurt	Mrs Makanga, processing yoghurt

The Actors, their activities (including technologies), achievements and challenges.

Farmers face challenges of high costs of drugs, feeds, good breeds and rearing poor breeds that produce little milk. One of the major actors is a farmer i.e. Engineer Kato who makes silage and is willing to teach other farmers. He also has exotic bulls which he is willing to lend to other farmers on condition that they must be spraying their cattle regularly to avoid introducing ticks on his farm.

The cooperative organized the farmers together, advises them and gives them a platform to address their common challenges. The SACCO gives them money to buy cows, keeps their deposits and, thus helps them to save.

The veterinary officer and other animal health workers are key actors. They treat sick animals and also give extension advice to farmers. They also carry out routine disease control through mass vaccinations whenever there is disease outbreak e.g. of FMD, provide routine treatment of sick animals and majority of vets also double as the artificial inseminators. However, government extension vets are constrained by non-payment by farmers, poor facilitation (e.g. lack of fuel or transport allowance), false information given by farmers and high costs of veterinary drugs.

Sub-county local government is perceived to be a major actor because it brought the NAADS programme in the area and ensures security and a favorable environment for NGOs to come and operate in the community.

NGOs such as CARITAS, Feed the children etc although perceived to be actors in the community, they are faced with challenges of poor attendance of training meetings by farmers. Some of these NGOs are involved in sponsoring children for education, but there is high school rate for girls due to high incidences of defilement and early pregnancies.

The dairy cooperative is relatively new i.e. less than 3months and has not done much but based on their objectives and interventions so far it has high potential and has achieved relatively much in light of its life span.

Consumers are able to buy milk from farmers; the challenge is that most consumers are in Lugazi town, quite distant from Buikwe Sub-county hence necessitating middle men i.e. milk vendors.

Milk traders/vendors are viewed to be actors because they help to transport milk on bicycles from Buikwe to the ultimate consumers. Though farmers have concerns that the traders' adulterate milk by adding water and other undesirable additives. And sometimes traders claim that milk has gone bad and is not bought thus avoiding payment to farmers. There is no trust between farmers and middle men; farmers feel that traders lie to them that milk has gone bad because they deliberately want to cheat and default on payments.

- The input suppliers i.e. drug and feed suppliers are not reliable, they opened shops within the area but many times the shops are empty. Drugs are currently supplied by the extension staff when they are called to treat sick animals. Hence farmers cannot access drugs as often as they need them.

- NAADS is one of the major actors in livestock and crop sectors. They organize workshops, establish demonstration sites and provide inputs such as cows, cocks, machine for planting rice, spraying pumps, tents, wheel barrows and banana tissue cultures. They mainly offer advisory services but farmers don't appreciate advice they instead prefer inputs. The NAADS programme has been affected by the numerous parallel meetings and workshops organized by different NGOs operating in the area.

- International Needs (IN), an NGO gives in-calf heifers, goats, pigs, poultry and supports many households by sponsoring children in school. They also train farmers i.e. parents to the sponsored children.

- FEED the Children gave farmers cows, goats, poultry, pigs, sponsored children in school, built schools and health centers, bought school furniture and established a microfinance in the community.

- CARITAS trained farmers in growing vegetables, gave out cattle, built Buikwe hospital and also sponsors children in school.

- MAAIF deploys extension staff in the sub-county, prevents and controls FMD by organizing mass vaccinations and also carried out livestock census and plans for the livestock sector.

Farmers' assessment of services/inputs provided by the different actors / farmers' levels of satisfaction

All the actors are still active in the community apart from FEED the Children that has phased out.

Majority of farmers were not happy with the government extension workers; only one Animal husbandry officer is resident within the sub-county covering a wide area and is not available most of the time when farmers need him. However, on probing, some farmers indicated that whenever they call him he responds because for them they pay their bills promptly but may only not respond to farmers who default on payments. Nonetheless, majority of animal health workers that treat their animals come from outside the sub-county.

Milk buyers or traders / middlemen are within the sub-county but major consumers are outside the sub-county.

Drug and feed suppliers are outside the sub-county.
Consumers provide adequate market for the current milk production though majority are found outside the sub-county. Farmers suffer the middleman effect i.e. the traders adulterate milk and sell to the ultimate consumer poor quality milk. This affects the consumers' demand for milk negatively and hence to buy milk from alternative sources or buy processed milk.

They are satisfied with CARITAS' services i.e. they conducted workshops to train farmers in modern farming methods, gave out dairy heifers and goats and pigs, built for them fuel saving cooking stoves, built a hospital. CARITAS went from home to home helping households and they uplifted their standards of living.

Strong and effective links for services / flows of information in the innovation system

NAADS, Dairy Cooperative, CARITAS, International Needs, and FEED the Children have strong and effective links with the community and information flow is bi-directional.

Actors and linkages considered important but are weak or missing in the dairy sector and the reasons

The artificial inseminator is considered important but has a very weak link and is considered non-functional. Majority of participants said that the AI personnel would come late when called and many times the cow repeats heat hence costing the farmer more to pay twice or thrice before a cow conceives. They generally consider AI to be very expensive and problematic; the inseminator sometimes promises to come and fails to turn-up. The problems experienced with the inseminator are partly explained by the fact that he lives outside the sub-county, rides a long distance to come; sometimes the motorcycle breaks down and also covers too wide an area for one person. Artificial inseminators come from outside the district, lack transport and obtain semen and liquid nitrogen from Entebbe and have to incur the cost of maintaining the cold chain. Furthermore, their work is hindered by poor heat detection and timing on the side of farmers.

Extension workers such as the government sub-county based vets and other animal health workers are considered important actors but have weak linkages with the community. They are often ill-facilitated; lack motorcycles or have motorcycles without fuel budget at the sub-county. They also experience problems such as non-payment by farmers, being given false information about onset of heat by farmers. Farmers are not willing to pay them transport refund whenever they come to attend to their animals. Extension workers are few and have to work in a very wide area which makes them ineffective. Vet drugs are very expensive e.g. drugs for East Coast Fever and yet farmers are unwilling to pay highly for the vet services.

Input suppliers for feeds and drugs are outside the district

Farmers need a direct link with the consumers so that they eliminate the middlemen.

Farmer innovators, their special activities, linkages, challenges and limitations
Mrs Mukanga makes yoghurt. Engineer Kato makes silage, has a grass cutter, has exotic bulls and is willing to teach other farmers using his own facilities.

The missing actors for improved dairy production and marketing

Collection and cooling facility for bulking milk and marketing collectively.

Communal dip tanks and spray crushes would help to spray for farmers that cannot afford to spray one or a few cattle regularly. This would help to minimize conflicts between farmers that spray regularly and their neighbors who don't spray hence affecting them negatively.
Artificial insemination services should be brought near.
Drugs and feeds suppliers should be brought near within the sub-county.

Extension workers are thin on ground, ineffective, have poor collaboration with the framing community and yet they are important actors in improving dairy production and marketing.

Institutional and policy changes observed by farmers
DDA banned transportation of milk in jerry cans and their milk is poured if found being transported in jerry cans.

Differences in linkages between actors
NAADS and CARITAS share project beneficiaries. CARITAS keeps saving accounts for NAADS farmers' groups. On the other hand, almost all the various actors enter the community through the sub-county local government. Sub-county local government and Ministry of Agriculture Animal Industry and Fisheries work very well whenever there is a disease outbreak because they are both government organs. They always liaise and work together to reach the farming community.

The Dairy Cooperative commonly referred to as the Cooperative is so far working well with all the various actors in the community.

NAADS and sub-county local government collaborate very well in helping farmers; they sometimes organize joint workshops. In addition, the sub-county/ local government is mandated carry out joint monitoring of NAADs projects with NAADs.

Livestock breeding and feeds

BREEDING

Important traits of dairy cattle preferred

a) Long teats
b) Protruding pelvic bones
c) Big stomach
d) Has small head (indigenous cattle)
e) Big udder
f) Big navel
g) Good appetite
h) No dewlap

There are no breeding strategies linked to the above traits.

Common breeds of cattle kept

The composition of the total head of cattle kept in the area:

a) Exotic
   - Friesian 10%
   - Guernsey 3%
   - Jersey 2%
b) Indigenous 65%
c) Crossbreeds 20%

Main ways of acquiring animals

a) Own breeding
b) Purchase from fellow farmers

Breeding preference

Participants indicated that they had no much choice on breeding service because mainly bull/ natural service is available. Even for those farmers who would have preferred using Artificial Insemination (AI) a major constraint is that the service is not readily available - it has to be sought from sub-county which is far away.

However several farmers still felt that the bull was the most preferred way of breeding citing the following reasons:

a) When you use AI you get more bull calves than female ones.
b) Sometimes when the animal is on heat there is no cash to pay for AI
c) AI services are quite far from farmers
d) Not well sensitized about values of AI
e) Poor quality AI off springs – not as high producing as expected.

f) AI calves cause difficult birth and there are no readily available veterinary surgeons.
g) With a bull repeat services are free – but AI has to be paid for each repeated service.
h) The only AI personnel available is expensive and hard to get.

However also bulls have some problems:

- Some too heavy and break the cows when they mount them
- Spread diseases – especially sexually transmitted.
- Good quality milk producing breeds are not available. National Agricultural Advisory Services (NAADS) project gave out some bulls but these are still too few.

FEEDS AND FEED SOURCES

Forages in the community

- Elephant grass
- Lab lab
- Mukonzikonzi (kyukyu)
- Mukuna
- Grazing pasture

Forages preferred

- Elephant grass preferred because more readily available

Other feeds available

Crop residues from Maize, banana stems, Cassava, and ground nut stalks.

Feed supplements used

i. Maize bran
ii. Dairy meal
iii. Mineral lick

However, supplementation is done by very few individuals because these inputs are very expensive

Forage production constraints in their order of importance

Constraint	Rank	AFFECTING	
		Numbers (production)	Productivity
Lack of good quality pasture/ legume seeds and Forage e.g. Napier Stools	1	x	
Small pieces of land - not enough	2	x	
Poor quality of pastures	3		x
Weather can be very harsh/ extremely dry	4	x	x
Failure to store / preserve forage	5	x	x
Scarcity of pastures and forage	6	x	
Transportation of forage is very difficult	7	x	

Coping strategies during times of forage scarcity

- Travel longer distances searching for forages – particularly to sugarcane plantation and forested areas.
- Use "none traditional" feed items e.g. jackfruit, tree seeds and leaves.
- Feed more of the crops residues from Maize, Matooke, Cassava and Groundnuts.

Feed / Forage calendar and estimation of feed sufficiency

MONTH	***D***	***J***	***F***	***M***	***A***	***M***	***J***	***J***	***A***	***S***	***O***	**N**
Season	**DRY LONG**			**WET SHORT**		**DRY SHORT**			**WET LONG**			
FEED TYPE												
Napier Grass	√			√		√			√			
Pastures (grazing)				√		√			√			
Lab lab				√					√			
Caliandra				√		√			√			
Mucuna				√					√			
Mukonzikonzi	√			√		√			√			
Maize Stover		√				√						
Sweet Potato Vines		√				√						
Cassava/potato/ matooke peels		√				√						

Requirements for input supply and service delivery to livestock keepers

- There is need to attract veterinary input suppliers to the area
- Need a reliable well stocked veterinary drug shop
- Need to have AI services / technician that is readily available
- Require a qualified veterinarian within easy reach especially to handle difficult cases.

Therefore, from this study, it can be concluded that the majority of households in this site are small holder farmers whose main livelihood is agriculture, and livestock was one of the main sources of income.

However, raising livestock, particularly cattle was encountering some constraints which will need some concerted efforts to overcome. There is a dire need for inputs and services, mainly feeds, AI and animal health services.

There are some innovation efforts such as making yoghurt, silage/hay, packaging milk in polythene bags. These efforts need to be encouraged, supported and up scaled to benefit other producers.

BBAALE SITE, KAYUNGA

Introduction

Like in Buikwe Mukono, two PRA workshops were conducted in Bbaale site, Kayunga District. Bbaale was selected as a proposed chilling plant area. The two workshops were conducted in two sub-sites selected on the basis of accessibility to milk market. Bbaale parish which is close to Bbaale township is relatively more accessible to the market while Misanga parish is far away from town and thus considered to have difficulties in accessing market. Deliberate efforts were made to invite both men and women to the PRA workshops. However, the turn up of women was not good. All the six tools in the checklist were applied. They were all relevant and useful in eliciting discussions of participants who were then able to freely give information.

Table 7: Bbaale: PRA village workshop profile

<table>
<tr><td>Country</td><td>Uganda</td><td>Type of site</td><td colspan="3">Proposed chilling plant</td></tr>
<tr><td>District</td><td>Kayunga</td><td>Site</td><td colspan="3">Bbaale Sub-county</td></tr>
<tr><td>1st PRA site
2nd PRA site</td><td>Bbaale parish
Misanga parish</td><td>Date of interview</td><td colspan="3">11th August 2008 and 12th of August 2008</td></tr>
<tr><td>1st Venue
2nd Venue</td><td>Baale sub-county offices
Misanga parish</td><td>Duration of workshop</td><td colspan="3">1 day for each workshop</td></tr>
<tr><td rowspan="4">Language of workshop</td><td rowspan="4">Luganda</td><td rowspan="4">Number of participants</td><td>Workshops:</td><td>1st</td><td>2nd</td></tr>
<tr><td>Females</td><td>2</td><td>1</td></tr>
<tr><td>Males</td><td>18</td><td>16</td></tr>
<tr><td>Total</td><td>20</td><td>17</td></tr>
<tr><td>Names of facilitators</td><td colspan="5">Dr. Maureen Mayanja, Dr. Sylvia Baluka, and Dr. Anthony Mugisha (Overall Coordinator)</td></tr>
<tr><td>Names of note takers</td><td colspan="5">Dr. Sylvia Nalubwama and Mr. Olivier Mugisha</td></tr>
<tr><td>Names of observers</td><td colspan="5">Mr. Mugume and Mr. Byomuhangi James</td></tr>
<tr><td>Special conditions</td><td colspan="5">There was a meeting for sensitisation on the land bill on the day of the first workshop, some of the farmers who would have wanted to attend the PRA meeting did not, because they were attending the meeting on the land issues</td></tr>
</table>

Participants consisted of mainly livestock farmers and few local council leaders who owned cattle. Participants were mainly those practicing free grazing system with very few practicing zero-grazing.

The special challenges were that there was no gender balance; there were only 3 women out of the 37 participants who attended the village workshops. Attendance to the meetings was somehow disrupted by another meeting on a very contentious land issues, however, the main objective of the PRA exercise of obtaining the baseline information was achieved.

Bbaale: Village Resource Profile

From the village sketch map, the main boundaries of the study site are R. Nile and Galilaya sub-county which surround Bbaale sub-county. There are six parishes in the sub-county, which include; Bbaale, Nakitokolo, Misanga, Mugongo, Kavule, and Kokotero

Agriculture is the most important economic activity, and this includes both crop and livestock farming, and the overall land use system in the area is livestock, growth of food crops and home settlements.

Relationships between the map items, challenges and opportunities

From village sketch map, it was noted that:

- Government forest reserves are used as communal grazing areas, especially during drought but it is done illegally
- There's a good network of roads
- The only one milk cooling / processing facility for the whole sub-county is in this area at Bbaale Trading centre – capacity of cooler is too small to handle all milk that can be availed. This is far away from other remote parishes like Misanga.
- Hardly any communal dams / watering points for cattle – the government ones are none functional.
- No source of good breeds of milk producing bulls (semen) – no AI services, bulls are very scarce.

Table 8: Bbaale Village Resource Profile

Mapping issues	**Detailed information**
Natural resources	
Water	• River banks / Landing sites - R. Nile and R. Sezibwa • Wells are available
Crop fields	Scattered all over the area: maize, beans, cassava, sweet potatoes
Rangelands	Land for grazing cattle normally: • Individually owned but let / hired out • Parts of the government forest reserves in Nakitokolo
Gardens	Scattered all over
Irrigation schemes	None
Mines	None
Infrastructure	
Roads	Well networked All weather/murrum roads • Kavule – Bbaale –Galilaaya subcounty • Bbaale – Migongo • Nakitokolo - Bbaale – Kokotero - Kavule • Bbaale – R. Nile shore
Mapping issues	**Detailed information**
Settlements	scattered though out
Water	Boreholes for domestic use
Electricity	Lines along Kavule-Kayunga road- Bbaale- Nakitokolo
Commodity markets	• Fish market at Budaali landing site in Bbaale • A small commodity market at Nakitokolo

Trading centres	Main trading centre at Bbaale, and another small one at the fish landing site
Milk sale point (informal or cooperative/ self-help group)	Only 1 in the whole sub-county at Bbaale Trading Centre • Farmers' cooperative – Bugerere-Balunzi Farmers
Milk cooler/ processor	• 1 cooling tank at the milk sale point in Bbaale trading centre • 1 milk processing point for Ghee and cheese at same place
Dip tank/cattle crush	• 1 government dip in Bbaale – non-functional • Some privately owned dips on individual farms
Vet Clinic Traditional Health worker	• No veterinary clinic • 1 veterinary service provider (government staff) based at Bbaale but serves two sub-counties, Bbaale and Galilaya • No traditional health workers reported
Stock feed sources Veterinary drug shop	• None • 1 veterinary drug shop at Bbaale Trading centre
Others (specify) • Cattle dams	• Dams – for livestock; o Government: 1 in Nakitokolo and 1 in Bbaale parish o On private farms: 1 Nakitokolo & 5 in Bbaale
Social services	
Health	only 1 (one) health centre IV in whole sub-county
Schools	Primary and secondary available
Church	Churches and one (1) mosque available
Local administration	L.C.III offices at Bbaale
Traditional Authorities	None
Extension offices	Extension service & offices at Bbaale
NGO offices	None
Others (specify) • Financial ▪ Police	 1 Savings and Credit Society (SACCO) at Bbaale Trading centre Police post- (one) 1 at Bbaale trading centre
Mapping issues	**Detailed information**
Land use system	
Croplands and use of crop residues	Crop lands are scattered all over the sub-county, and rarely feed their animals on crop residues.
Communal rangelands	
Grazing reserves	Of all the management systems (through proportional piling) - Individual farms accounted for (11/36) - Communal: (18/36) ▪ Hired from private owner ▪ Use of government forest land - Tethering: (07/36) ▪ On own land ▪ On other peoples farms

Seasonal herd movements	Not permanent but only to river banks to drink water and back during dry season - Bbaale through Kakotero to R.Sezibwa - Bbaale to river Nile - Nakitokolo through Misanga to River Nile
Others Disease prone areas	Disease (tick) infected areas at forest reserves where communal grazing occurs

Bbaale: Wealth Ranking

Table 9: Bbaale: Criteria for Wealth ranking

Criteria for wealth	**Wealth category**		
	Better-off	**Moderately poor**	**Very poor**
Livestock numbers, by species. For cattle, differentiate by breed	50 and above Exotic/cross bred cattle	At least 2 exotics / crosses Or 50 local cattle	1-2 local cattle and Keep a few local chicken
	500 and above local cattle		
Land size	15-640 acres with title	1-15 acres with no title, but may rent additional land	No land ownership but stay on a small plot as sitting tenants without title
External income (off-farm)	Hotel business Clinics, Schools Commercial vehicles	Own Boda Boda motorcycles	Sale of labour
Education for children	Up to senior 6 (UACE), tertiary & vocational institutions & universities	Senior 4 (UCE)	Primary 7 – end of UPE
Housing standard	Use bricks / blocks, cement, sand, tiles, coloured or ordinary iron sheets. Three or more bedrooms, fenced compound	Bricks, ordinary iron sheets, single slanting roof and 1-2 rooms	Grass thatched, mud & wattle / poles
Water source	1-3 Dams on farm, Dam water on farm never dries up	Get water from natural sources e.g. swamps, wells or from boreholes	Use rain water or water from well or borehole
% of households in each category	16%	75%	9%
Differences by milk marketing orientation	Commercial –improve their breeds for milk production		

Criteria for Wealth according to the Order of importance

Four wealth categories namely the very rich, moderately rich, moderately poor and the very poor were identified. The criteria for wealth in order of importance are; land, livestock, house, educating children, access to water source and access to main road. A person who owns 640 acres (1mile) and above of land with a title is considered to be very rich. While one with 15-640 acres with title is considered to be moderately rich. The moderately poor own about 1-15 acres of land without title. The very poor do not own land, they keep people's farms and are only allowed to build temporary shelters for housing as part of their reward. The very rich own 300 and more exotic cattle or their crosses, or 500 local cattle. The rich own 50-300 cross-breeds/exotic cattle, or 100-500 heads of local cattle. The moderately poor own 1-2 cross breeds/exotics, and own 50 head of local cattle. The very poor do not own exotics or cross breeds but may own 1-2 locals and a few local chickens.

Those who are categorized as very rich build houses using bricks, cement, sand, tiles, and use coloured iron sheets for roofing. They also fence off their homes. Two among the very rich have storied houses. The rich build using cement, sand, use ordinary iron sheets for roofing, and they may also fence their homes. The houses are big with 3 or more rooms. The moderately poor build houses using bricks, roof using ordinary iron sheets but the houses are small with 1 or 2 rooms and the roof is single slanting. The very poor build houses using poles and mud and roof using grass. The very rich can educate their children up to universities within Uganda or abroad. The moderately rich can educate their children up to Senior 6 / advanced level, tertiary institutions or vocational courses and universities within Uganda. The moderately poor educate their children up to senior 4 i.e. ordinary level and vocational courses while the very poor educate their children up to primary 7 under the government Universal Primary Education programme.

The very rich have at least two Dams on their farms for watering their livestock. These Dams never dry even during drought. The rich have one small Dam on their farms that may dry up during drought and force them to hire water Dams from the very rich or use water from natural water sources such as rivers, wells etc. The moderately poor tend to settle near natural water sources or next to the rich with water at their homes to which they give them access. They also get water from swamps, wells or boreholes. The very poor use rain water or obtain water from swamps, wells or boreholes.

The importance of livestock regarding the other wealth criteria

A farmer can sell livestock and pay school fees in a lump sum or can collect daily sales from milk and pay fees in installments. A cattle owner can also sell 2 or 3 head of cattle and build a permanent house.

Cattle provide cow dung and slurry that are used as organic manure for the crops especially *matooke* which is an important staple food in the community. Cattle urine is also used as a pesticide to destroy banana weevils.

Farmers interest for commercialization across the wealth categories

The rich and very rich have taken the lead in adopting crosses and exotic breeds for improved milk production. The moderate poor are interested in improving by crossing their local cows but cannot be given access to the Rich's exotic bulls and yet there are no AI services in the area. The very poor seem to prefer hand-outs given to them for a meal or working for the rich.

The main livelihoods in order of importance are livestock rearing, crop farming, business/trading, public service, fishing, brewing and milk processing. On the other hand, the main sources of cash income in order of importance are trading / business, livestock rearing, crop farming, charcoal burning, fishing, public

service (employment), brewing alcohol, and milk processing into ghee. Trading here means not only dealing in merchandise but also includes buying and selling milk, crops and alcohol.

Women who are engaged in milk processing are given the milk as their share that they can use to earn money for their personal needs, clothing children and buying some household requirements such as salt.

Participants noted that many people go into merchandise business after growing crops or rearing cattle which they sell and obtain capital for such business ventures.

Table 10: Bbaale: Community livelihoods and their trends

Current sources of livelihoods (Rank in order of importance of contribution to livelihood)	**Contribution to cash income** (1=very important, 2=somehow important, 3=not important)	**Trends** (1=becoming more important 2=less important, 3=new activity)	**Differences in terms of gender & age**
Livestock rearing	1	1	Livestock rearing - is done by both men & women
Crop farming	1	1	Crop farming - is done by both men & women. Though men mainly grow cash crops like coffee & women grow food crops but may sell surplus
Business / trading	1	1	
Public service	2	2	Public service –employs men, women & youth.
Fishing	2	2	Fishing - is done by both men & women
Brewing alcohol	2	3	
Charcoal burning	2	2	Charcoal burning - is done by both men & women
Fishing	2	1	Fishing is done by both men and women
Boda boda riding	2	2	Done mainly by men and youths
Milk processing into ghee	3		Milk processing – done mainly by women.

Note:

- Livestock rearing becoming more important, adopting improved & increasing livestock numbers, selling milk, use of improved pastures, increased prices of milk.
- Trading – becoming more important, increased trade in milk, cross-border market for milk via Busia
- Crop farming becoming more important; adoption of improved seeds, farmers trained in better farming methods, availability of market for food stuffs
- Charcoal burning becoming less important, trees are depleted & government policy against deforestation

- Fishing becoming more important –more people have bought boats & acquired fishing licenses
- 2 Public service becoming less important, lack of jobs, high school drop-out rates & parents are reluctant to educate children
- Milk processing-becoming less important, most of the milk is sold fresh & milk from newly adopted dairy breeds has less fat content

The Role played by livestock in terms of livelihoods and cash Income
Livestock rearing was ranked first as a source of livelihood but rated second as a source of cash income. Probably this can be explained by the fact that Kayunga is very remote, making it expensive to transport milk to the final consumers or selling through middlemen who buy cheaply so as to obtain a high profit margin.

Trends in the relative importance of livelihoods and cash income
Livestock rearing is becoming more important both as a source of livelihood and as a source of cash income. Farmers are increasingly adopting improved breeds, increasing livestock numbers; more people are trading in milk, are growing and feeding cattle on improved pasture. Few farmers are processing milk locally into ghee, yoghurt and cheese. Trading is increasingly becoming important, partly because everything can now be sold. In the past people used not to sell food crops but now majority of farmers grow food crops for sell or sell surplus.

Crop farming is becoming more important; farmers are adopting use of improved seeds, they are attending training in better farming methods and there is availability of market for food stuffs in urban centers. Charcoal burning is becoming less important because trees are depleted & government policy against deforestation

Gender and other crosscutting issues
In this area both men and women are involved in livestock rearing though the role of women is growing. Crop farming is carried out by both men and women. The youth are less interested in livestock keeping and crop farming. The youth seem to be more interested in quick cash yielding activities like riding boda boda (motor cycle transport business), brick making, sand digging, and burning charcoal. Sand digging, operating butcheries and welding are mainly by males

Public servants and all those in monthly paid employment include men, women and the youths, and the number of women is increasing. Carpentry is by youths and men, charcoal burning is mainly by youths, business/trading is mainly by youth; fishing is mainly done by men and youths. It was noted that women are the ones who process milk into ghee, and the income accrued thereof belongs to them. It was also observed that the trend for processing milk into ghee is becoming less important because milk can easily be sold while fresh. Therefore, the reduced milk processing into ghee is a worrying gender issue, since women are losing out on a very important source of income unless women are assisted to get an alternative source of income, they are likely to suffer because of this lost source of income.

Bbaale: Findings on constraints and opportunities in dairy farming

Scoring by proportional piling indicated that water scarcity was the major constraint followed by lack of good bulls (see Table 11 below). Lack of milk collection centres, machinery to sink dams, and high cost of veterinary drugs were reported to major constraints to cattle keepers.

Table 11: Bbaale: Constraints scoring and ranking

Problem/constraint	**Score by proportional piling**	**Rank**
Water scarcity	43	1
Lack of good breeds of bulls	24	2
Lack of milk collection centres	19	3
Lack of tractors/machinery for sinking dams	19	3
High cost of veterinary drugs	18	5
Pasture weeds (Lantana camara)	3	6
Total	126	

Table 12: Bbaale: constraints and opportunities in dairy farming

PROBLEMS AND CONSTRAINTS	CAUSES	EFFECTS	COPING STRATEGIES	OPPORTUNITIES/ PROPOSED SOLUTIONS
Few Water sources/ scarce water resources	Lack of machinery for digging dams	Cattle die especially during dry season	Have tried to dig dams manually – using hoes	Need to acquire more permanent water sources *Requires outside assistance*
Lack of good milk producing bulls	Most farmers around rear indigenous, low milk yielding breeds of cattle	Available cattle have very low milk (and meat) production levels	Have tried to select good/high milk producing breeds of bulls from indigenous ones	Need Artificial Insemination services in the area *Requires outside assistance*
Only one milk collection point and far from many farmers	There is no electricity supply, the cooler is at the point where the electricity line ends	Milk from far off places goes to waste – especially from the evening milking	Try to vend the milk to nearby consumers / individuals	The more rural areas should also be electrified *Requires outside assistance*
Lack of tractors/ machinery for digging dam	Too expensive for an individual to buy these tractors	• Existing dams too shallow to keep water for long • Lack of water during dry season	Walk the cattle to river banks	Need to acquire machinery for digging more permanent dams *Requires outside assistance*
Vet drugs too expensive	There is only one small shop in the area – leaving no choice	Cant afford to buy all that is needed	Some go to other towns / Kampala when possible and buy from there	Need the necessary category of personnel to come within the area and set up the veterinary drug shops *Needs cooperation between farmers and other service providers*
Grazing land destroyed by Lantana camara	The natural vegetation (including forests) has been destroyed	There are not enough pastures for the cattle	Make effort to uproot the Lantana from pasture land	Need training / experts on how to best fight spread of Lantana Camara *Needs cooperation*

				between farmers and other service providers

Gender and other crosscutting issues

a) *Division of Labour*

Livestock labour division

- Children – fetch water, cattle spraying, milking in holidays and weekends.
- Women – take cows to water, Look after calves, Clean kraal, Fetch water
- Men- Grazing; milking, medication, spraying, taking to watering points.

b) Decision Making

Men make the decisions on land use as well as issues to do with selling / buying cattle or use of milk proceeds

There were no gender specific constraints cited.

Farmers' future aspirations related to livestock production and marketing

1. Have better/ higher prices for their milk.
2. Have better breeds of cattle
3. Have improved breeding services
4. Have more dams and / or closer water sources
5. That spraying / tick control be enforced as compulsory for all farmers
6. That adulteration of drugs will be fought by relevant authorities
7. Clean all grazing lands of Lantana camara / and all other pasture weeds
8. Plant better quality pastures

9. Farmers be allowed to plant their own trees and utilize government gazzetted land

10. Farmers be given access to more training sessions by government extension personnel – particularly on better animal husbandry.

11. More processing of milk because

- Products e.g. ghee earn higher price than milk
- By products from processing can be used to feed animals
- Milk processing gives high quality products for human consumption
- It saves spoilage of milk in high production seasons

12. Gain the ability (be trained) to grow, preserve and store forage/grasses during rainy season in preparation for dry season

Innovation systems and actors

The Key Innovations and the Actors Involved

Mr Byaruhanga from the President's office vaccinated cattle on his farm and also helped to vaccinate for neighboring farmers free of charge. He also uses improved bull breeds and promised to donate 7 breeding bulls to the cooperative and the leaders to distribute them to the members who are capable of taking good care of them. He also buys drugs such as dewormers and acaricides in large quantities from Cooper Uganda limited, and deworms his cattle regularly.

In the past, few farmers had exotics or crosses but now many farmers have gone into dairy farming and are opting for Friesian crosses

Ssebyala Baker and sons make yogurt and cheese though they have not trained other farmers.
Karangwa rears high producing cows that produce 12litres and more.

Kazungu buys bulls expensively at about 2million Uganda shillings and sell the crosses at high prices.

The innovative farmers are mainly the rich and educated; they don't relate well with the poor farmers in the community except Mr. Byaruhanga who is a politician, and cares much about public opinion, which is likely to be drawn upon during elections. Otherwise, other rich farmers deny them access to their improved bulls.

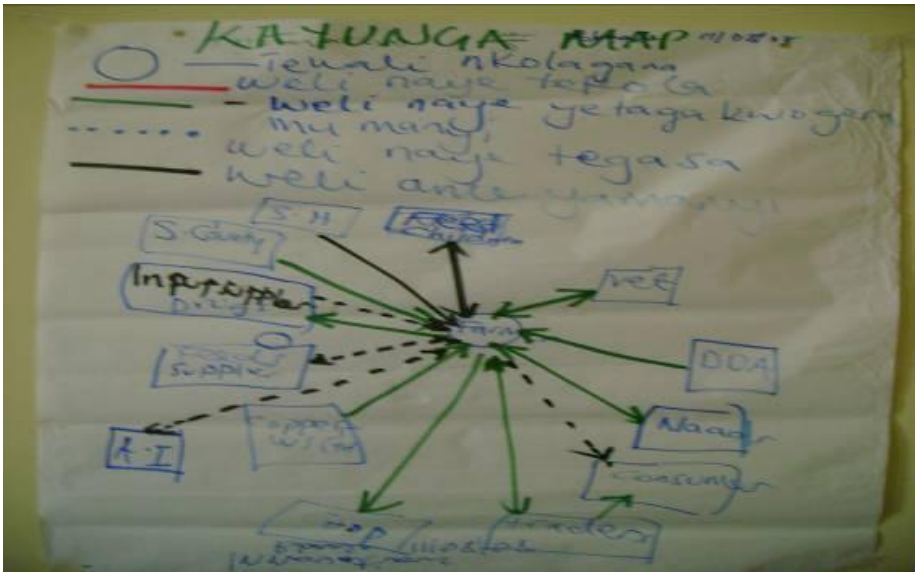


Plate 9: Bbaale: Photograph of the sketch of the actor linkage map

Table 13: Bbaale: Status of Innovations

Conventional activities	**Innovations**	**Innovating farmers**
Inputs – acaricides, vet drugs, labour, vaccines, mineral salts, water, hoes, spades, pangas, crushes, spraying pump, pastures / fodder, housing for calves, fencing wire	*Inputs* – feeds / fodder, maize bran, mineral blocks / licks, good long-lasting Pour-on acaricides	Mr Byaruhanga
Practices – dehorning, branding, tail docking, castration, fattening castrates, breeding with	*Practices* – slashing farms, planting pastures & legumes, branding,	Mr Karangwa

improved bulls, milk vending	identification, milk vending, fattening castrates, breeding with improved bulls	
Breeds – Nganda / locals Ankole long horn (Nsagara)	*Breeds* – crossing Freisians & Ankole long horn Ankole long horn & Boran	3. Mr Kazungu
Products – milk, meat, manure/cow dung, urine, skins & hides, ghee	*Products* – yoghurt , cheese	4. Mr Kabuye

The actors, their activities (including technologies), achievements and challenges.
NAADS gave out goats, pigs, Friesian bulls for cross breeding with local cows and conducting training workshops for farmers. In addition, it gave farmers chicken and trained them in better animal production practices.

Self-help, an NGO, gives training in crop farming and gave pigs, goats or cattle to farmers who were able to build pig houses and pit-latrines according to the specifications given by Self-help. Self-help also supports farmers infected with HIV / AIDS. Some potential beneficiaries quite often are not cooperative or are rather reluctant to build pit latrines. Self-help has done well but they only help farmers or households that have complied with their requirement of digging a pit latrine first before they become their beneficiaries. This has hindered many people from benefiting because they have failed to dig pit latrines.

FEED the Children, another NGO, sponsors education for needy children and orphans from selected households.

Dairy Development Authority (DDA) trained them in good milk handling and marketing practices

NARO – sent some researchers to examine their cattle and took some blood samples
Cattle market was built with help from the district local government but the turnover was very low i.e. would receive only about 20 head of cattle per market day, hence the market was abandoned and the infrastructure has since collapsed.

Cooper Uganda limited organizes workshops and brings drugs near to the farmers. The central government through the district helped to rehabilitate an old cattle dip from the 1960s but many rich farmers have fenced off big pieces of land under their farms hence closing off access routes to the dip and denying the poor farmers access. They have abandoned the rehabilitated dip and resorted to pump spraying, and the dip has collapsed again.

Bugerere Dairy Cooperative operates a collection and cooling center and hired a milk tanker to transport milk according to DDA specifications to prime markets in Kenya via Busia and to Kampala. They also obtained a cooler of about 5000litres from DDA on loan.

Farmers' assessment of the services/inputs provided by the actors and their level of satisfaction
Majority of farmers are dissatisfied with Bugerere dairy cooperative; they have not voted office bearers nor called members for meetings for the past 10years.

Farmers are also not satisfied with NAADS claiming that it often gives out poor breeds of goats that have failed to adapt to their environment. The goats they received from NAADS are even inferior to their local goats.

They are satisfied with FEED the children, in the way they have sponsored children to school.

Strong and effective links for services or flows of information in the innovation system
There are strong links with FEED the children and other Self-help NGOs, although they are not directly working towards improving dairy production and marketing.

Actors and linkages considered important but weak or missing in the dairy sector? What are the reasons?
Cooperative would have been a very important actor, but its link to the farmers is very weak. Farmers would prefer forming another cooperative if they got external and internal support to organize them rather than strengthening the current cooperative. The past performance has been poor and the community does not trust the current officials who operate the cooperative though they still sell their milk through the cooperative for lack of an alternative. The other reason for lack of trust in the cooperative is that they sold the old cooler and never disclosed to members what they received. The cooperative officials don't give feed back to farmers; the leaders run it like a family business without being accountable to the members. The cooperative seem to be facing a lot of challenges because they are using a hired tank; it is only one and serves Busia-Kenya as well as the Kampala markets on the same day. Sometimes the tank breaks down for days hence the milk goes bad but because the farmers don't trust them they think they are lying so as to cheat them. If the cooperative had a second tank it would enable them to sell all the milk before it goes bad and this would improve their performance. Farmers are not happy because sometimes they are not paid and are only informed that the milk got spoilt when they go to collect the anticipated payments.

The government vets / animal health workers – when they are called by farmers sometimes they come without the required drugs and hence cannot treat their animals. However, their performance is good in terms of organizing them for farmer meetings or trainings.

NAADS - gets service providers from outside the sub-county/district who bring them poor breeds of goats. They should buy goats from within the sub-county that are already well adapted to the area. Some NAADS' contact farmers or leaders don't mobilize farmers for trainings because they want to gain alone and they end up failing the NAADS programme. NAADS has promised to give goats to some farmers. NAADS implementers tell farmers to construct houses worth 200,000 Uganda shillings for goats before they receive the goats and yet the goats they are giving are only worth 40,000 Uganda shillings.

The missing actors for improved dairy production and marketing

- Artificial inseminator within the sub-county
- Feed suppliers should come closer within the sub-county.
- Direct link with the consumers / market
- Drug suppliers should be brought closer within the sub-county

Institutional and policy changes
DDA's policy of banning transportation of milk in jerry cans and pouring their milk has affected them negatively.

Differences in linkages between actors

The cooperative has no good relations with the farming community. The farmers wish for an alternative cooperative so that they abandon the current cooperative to collapse when they stop selling their milk through it.

Bbaale: Livestock breeding and feeds

BREEDING

Important traits of dairy cattle preferred

a) Wide back
b) Back is not straight – has an arch
c) Long teats
d) Small / short neck
e) The milk vein is big
f) Big udder
g) For bulls, large testicles

Common breeds of cattle kept

The commonest breed of kept in the area is Nganda, followed by Ankole long horn (see Table 14 below)

Table 14: Bbaale: The commonest breeds of cattle kept in the area

Breed/type	Percentage		Rank
	Bbaale Parish	Misanga parish	
Nganda	39	65	1
Ankole long horn	22	7	2
Karamojong	13	8	4
Cross-breeds (local with Freisian, and local with Boran	18	10	3
Short horn (Exotic)	8	0	5
Friesian		5	6
Boran		5	6
Total	**100**	100	

However, the most preferred breeds are the cross breeds (Local with Friesian) because they give more milk than local thereby increasing cash income. Nonetheless, the indigenous (Nganda) are the most easily manageable because they are disease resistant and require less input in production, and this explains why the majority are keeping Nganda, although they prefer crosses.

Modes of acquiring animals

There were various ways of acquiring animals, namely;

a) Acquired from immigrants from other regions.
b) Purchase from business men who bring them from other regions / from fellow farmers
c) Own breeding

- From training / seminars learn on best animals to select for milk production
- Mainly keep cross breeds because the pure/exotic die due to poor conditions.

Methods of breeding available in the community
The majority indicated that they use bulls for breeding rather than AI Services citing the following reasons:
a) There is no choice because there are no AI services at all - thus a constraint to acquiring good breeds easily.
b) Many farmers are still afraid of AI for indigenous cows because calves are large – risk of difficult birth which requires attention of Veterinary doctors, and these are unavailable.

Even with use of bulls:
- There are no special breeding strategies linked to milk producing animals
- It's almost impossible to find a source of high milk producing bulls.

FEEDS AND FEED SOURCES

Forages in the community
Grazing pastures

Forages preferred
There is no choice; particularly in some parishes such as Bbaale, where elephant grass purportedly cannot grow because of lack of conducive weather conditions and poor soils.

Table 15: Bbaale: Forage production constraints in order of importance

Constraint	Rank	AFFECTING	
		Numbers (production)	Productivity
Bush burning, un cleared pastures/ farms	1	√	
scarce during dry season	1	√	√
pastures weeds	3		√
pastureland for hire is far	4	√	
some people graze without paying	5	√	
problem of wild animals and snakes	6	√	

Other feed sources for the community
Dry grass, mangoes, tree leaves and jack fruit are fed during the dry season. Others are banana/ cassava/ potato, peelings
In dry season:
- Tree seeds: Mivule, Emigaali
- Sisal like plants (Ebigoogwa)
- Potato vine are also fed

Feed supplements used
a) Salt b) Dairy meal, c) Maize bran

Coping strategies during times of forage scarcity

- Make efforts to prevent bush burning
- Take animals out to graze as early as possible while the dry pastures are still wet and soft
- Destocking is being attempted
- Sell off calves so that the older animals which remain have enough pastures
- Use of non traditional feeds such as jackfruit and mangoes
- Take the animals to far off watering places and back everyday

FEED / FORAGE SEASONAL CALENDAR

MONTH	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
Season	**DRY LONG**				**WET SHORT**		**DRY SHORT**		**WET LONG**			
FEED TYPE												
Napier Grass					√		√		√			
Pastures (grazing)				√	√		√		√			
Sweet Potato Vines				√			√					
Cassava/potato/ matooke peels				√			√					
Tree seeds				√								
Sisal like plants (ebigoogwa)				√								
Tree leaves				√								

Key:
√- Feed available

It can therefore be concluded that the majority of the people in the study are highly dependent on livestock for their livelihood and source of income. Dairying especially is increasingly becoming important because farmers are resorting to keeping dairy breeds and selling milk. This is exemplified by the current trend of reduced processing of milk into ghee using traditional means. This is said to be due to the fact that the milk produced has low butter fat content, and farmers find it easier to sell milk directly. However, in this case, women are losing their main source of income, since ghee has always been their main domain.

Livestock farmers in this community have a great potential for dairying. They have high motivation and good attitude towards cattle keeping. They have a vast area for grazing. However, the challenges are that they will need a lot of capital input to clear pasture weeds from their grazing land. Also, like any other cattle corridor area in Uganda, there is a big problem of water scarcity particularly during drought.

On requirements for input supply and service delivery to dairy farmers, there is need for Artificial insemination services that are affordable and readily available. There is also need to attract veterinary input suppliers to the area – especially feed supplements and pasture seeds, and reliable and well stocked veterinary drug shop

LUWERO TOWN COUNCIL, LUWERO DISTRICT

Introduction

Luwero Town council is located about 60Km from Kampala, on the Kampala-Gulu highway. The PRA exercise lasted 2 days in Luwero Town council and was carried out in two locations; first in Luweero town, this site was selected because it was perceived to have relatively easier access to milk markets as compared to more rural areas in this town council. The second exercise was conducted in Tweyanze; this second site was selected because of its relatively long distance from the milk markets. The PRA exercises begun with the introduction of the team and the participating dairy farmers and by the area Extension officer. The team leader then briefed the participants on the EADD project highlighting its history, mission, objectives and partners.

Table 16: Luwero: PRA workshop profile

<table>
<tr><td>Country</td><td>Uganda</td><td>Type of Hub</td><td colspan="3">Proposed Traditional Hub</td></tr>
<tr><td>District</td><td>Luweero</td><td>Site/hub</td><td colspan="3">Luweero Town council</td></tr>
<tr><td>Village (PRA site)</td><td>a) Luweero town
b) Twenyaze</td><td>Date of interview</td><td colspan="3">18th August 2008 and 19th August 2008</td></tr>
<tr><td>Venue for the workshop</td><td>a) Luwero Churc of Uganda
b) Tweyanze CoU primary school</td><td>Duration of workshop</td><td colspan="3">1 day for each workshop</td></tr>
<tr><td rowspan="4">Language of workshop</td><td rowspan="4">Luganda</td><td rowspan="4">Number of participants</td><td>Site:</td><td>1st</td><td>2nd</td></tr>
<tr><td>Female</td><td>11</td><td>10</td></tr>
<tr><td>Male</td><td>09</td><td>10</td></tr>
<tr><td>Total</td><td>20</td><td>20</td></tr>
<tr><td>Overall Coordinator</td><td>Dr. Mugish, A</td><td></td><td colspan="3"></td></tr>
<tr><td>Names of facilitators</td><td colspan="5">Group 1: Dr. Maureen Mayanja
Group 2: Dr. Baluka</td></tr>
<tr><td>Names of note takers</td><td colspan="5">Group 1: Mr. Olivier Mugisha
Group 2: Dr. Sylvia Nalubwama</td></tr>
<tr><td>Names of observers</td><td colspan="5">Group 1: Mr. Frank Mugume
Group 2: Mr. James Byomuhangi</td></tr>
<tr><td>Special conditions (weather, local activities, etc)</td><td colspan="5">Very heavy rainfall for about 3 hours on the first day.</td></tr>
</table>

Participants consisted of livestock farmers under the heifer project in the area. These farmers came from mainly zero grazing and semi- intensive production systems. These farmers all had cows that were given to them by Heifer project. Majority of the participants comprised of mainly moderate poor. They were mainly older persons, over 35 years of age. The meetings did not have youth participants, and the main reason given was that, the youth are not interested in farming but rather get engaged in activities that generate income quickly like motorcycle transport referred to as Boda, boda.

Luwero: Village resources profile

The community generated their resource map. Upon interviewing of the map the PRA session noted the main challenges to dairying in Luwero town council were; Livestock diseases, water scarcity, inadequacy of livestock feeds, high prices of feeds and other inputs and poor infrastructure. The key issues from the map are presented in the analysis template in Table 17 below.

Table 17: Luwero: Resources Mapping

Mapping issues	**Detailed information**
Natural resources	
Water bodies	• Rivers, temporary wells and Kagoye stream through the town council • Temporary wetlands/ trenches in Migadde and Buyuki
Crop fields	Scattered everywhere
Rangelands • Hills	 2 in Buyuki parish, 1 in Migadde parish
Gardens	Scattered all over
Irrigation schemes	None existent in the area
Mines	None existent in the area
Others (specify) • Forests	 *Government* : 1 planted in Luwero sub-county, 2 in *Butuntumula* Private: 1 planted in Luwero & Butuntumula sub-county; latter also has 1 natural one.
Infrastructure	
Roads Settlements	Good network including: • Kampala- Gulu high way via Luwero trading centre and Butuntumula • Luwero trading centre- Luwero sub-county- Kigombe • Luwero trading centre- Kiwoko • Wobulenzi- Tweyanze- Bamunanika • Miggadde- Butaza trading centre – Buyuki-Wabuya • Buyuki-Tweyanze- Kikoma Scattered everywhere.
Water • Domestic use • Cattle dams	 • piped water in Luwero town council • Boreholes – in sub- counties • Government dams – 1 in Butuntumula (non functional) • Private dams - 2 in Butuntumula; 1 in Luwero sub-county
Electricity	• Along main road then spreads through Luwero town council only • line through Migadde to Buyuki Parish
Commodity markets Trading centres	• in Luwero town council • no animal markets • One centre in each parish
Milk sale point (informal or cooperative/ self-help group)	• sell at farm gate to consumers • sell to hawkers/vendors (on bicycles) • sunday milking given free to hawkers

	• farmers take to Luwero trading centre, sell to: - traders who take to Kampala - several informal selling shops
Milk cooler/ processor, Dip tank/cattle crush	1 private cooler in Luwero town None
Vet Clinic Traditional Health worker	One government veterinarians –Butuntumula and Luwero sub-county, Wombulezi Town council offices Traditional health worker – 1 woman in Luwero sub-county assists particularly in dystocia.
Stock feed sources Veterinary drug shop	4 shops in Luwero trading centre and 2 shops in Wombulezi trading centres 8 shops in Luwero trading centre and several in Wombulezi T/C
Others • Breeding Services	a) AI :- All in Luwero trading centre, - 2 private and 1 Heifer Project technicians b.) Bulls- 2- in Luwero Trading centre- Friesians used at a fee per service
Social services	
Health	• 2 health centres in Luwero town • 1 Health centre in Luwero sub-county • 2 health centers in Buyuki parish
Schools	Primary- private 16; Government 4 Secondary.- private 10, Government 1
Church	Several churches and a mosque available
Local administration	• Offices within Town council • Offices at each sub-county headquarters
Traditional Authorities	None
Extension offices	Offices within town council and subcounty headquarters;
NGO offices	• VEDCO has office in Kikoma parish • Heifer project & Save the Children have offices in Luweero TC • ADRA has offices in Katikamu. • Others which have projects are: CCF, Adra, Send a cow and Plan international,
Others (specify) • Financial • Police	 Stanbic Bank; Uganda Micro Finance; a Teachers' SACCO One in Luwero town
Land use system	
Croplands and use of crop residues	Scattered everywhere. Mainly matooke, sweet potatoes, cassava, beans, groundnuts, maize, yams (balungu)
Communal rangelands	None mentioned
Grazing reserves	Ways of rearing, of total heads of cattle: • Individual farms 50%

	• Communal 25% (In forested areas and mainly along Kagoye stream in town council) • Zero grazing 10% • Tethering 15% Also rear goats and keep bees
Seasonal herd movements	• Mainly along Kagoye stream in Luwero town • From Butuntumula subcounty to River Lubenge • To hill tops of Buyuki and Migadde parish
Others • Livestock Disease infested areas	• Disease (tsetse fly) infected area along Kagoye stream • Tick fever around communally grazed hills

Luwero: Wealth ranking

The Three wealth categories of wealth ranking identified by participants were;
Rich (Better off), moderately Poor, and very poor. The main criteria (in ranked order) used by the community to rank households according to the wealth categories include;

1. size of Landholding
2. Type of Housing
3. Livestock
4. Size of Coffee plantation
5. Type of Vehicle
6. Education of children

Table 18: Luwero: Wealth ranking analysis results

Criteria for wealth	**Wealth category**		
	Better-off	**Moderately poor**	**Very poor**
Livestock numbers, by species. For cattle, differentiate by breed	5-10 & above cross bred cattle	1 exotics / crosses	No cattle
	100-500 local	5 and above local cattle	Keep a few local chicken and pigs
Land size	Town: 2 plots - 1 acres with title Village- 10 acres – 1 mile with title.	Town: Rents Village: land with no title " Kibanja"(1-5 acres)	No land ownership but stay on a small plot as sitting tenants without title or are caretakers of this land.
Education for children	Up to senior 6 (UACE), tertiary & vocational institutions & universities	Senior 4 (UCE)	Primary 7 – end of UPE
Housing standard	Use bricks, cement, sand, tiles Colored or ordinary iron sheets. Bungalow or flat with about 3 or more bedrooms.	Bricks, ordinary iron sheets, with or without cement, single slanting. A few rooms.	Grass thatched, mud & wattle / poles
Vehicle	4 wheel drives, commercial	Motorcycle, bicycle	none

	trucks Salon car, motorcycle, bicycle		
Coffee	1- 10 acres +	Less than 1 acre	none

In the more urban part of the town council, the largest number of households fall under the category of rich (40%) and moderately poor (35%) whereas in the rural part, the largest number of households fall under the category of moderately poor (52%) and very poor (25%) according to the wealth criteria used. The livestock and land ownership largely determine the category in which the households were placed by the participants.

Luwero: constraints and opportunities

The farmers listed and discussed the main problems afflicting dairying and also proposed solutions to these problems as shown in Table 19 below.

The Main problems facing the dairy industry in Luwero are:

- Veterinary inputs (drugs, dairy meal) are too expensive
- Semen is scarce and sometimes not available
- Many artificially inseminated cows do not conceive
- Milk prices too low
- Cattle claimed to be good quality/breed produce low milk quantities
- Farm/veterinary input sources too far away from rural farmers
- Lack of centre / facilities for milk collection
- Feeding very difficult in dry season
- No proper / permanent watering points for cattle

Other constraints in dairy farming in the study area mentioned were;

- Improved pasture seeds are not available
- cows take long to conceive when AI is used (many repeats)
- At communal watering points water is made dirty by cattle which walk in.
- Only limited types of semen / same bulls used for a long time – possible in- breeding
- Poor quality of feed supplement / concentrates
- Not enough market / outlets for milk
- Farmer sensitization/ training sessions are held for away from villages
- Milk cans are expensive, bulky and few can be carried on bicycles than plastic jerricans

Table 19: Luwero: Problems and opportunities matrix

Problems	Causes	Effects	Coping	Proposed solutions
Veterinary inputs - drugs, dairy meal - too expensive	- Taxes are high especially on drugs which are all imported - No subsidies on farm inputs	Farmers face difficulty in treatment of cows	Nothing possible - just buy, but in hardship	-Farmers should unite and cooperate in order to buy or purchase in bulk -Farmers can get own trader / sales representatives *Local efforts can be made together with outside*

				assistance
Semen is scarce and sometimes not available	Storage facilities especially liquid Nitrogen are not readily available	Cows miss service at the right heat period – we incur loses	Farmers resort to taking them to bulls for natural service	AI technicians should be assisted to get or obtain the required storage facilities / equipments *Requires outside assistance*
Many artificially inseminated cows do not conceive (30/180)	▪ AI Technicians delay to come when called for insemination ▪ Farmers not detecting heat well	Repeat services thus farmers spend more money	Resort to use of Bulls	Farmer training and vigilance in detecting heat signs in the cows. Need AI technicians closer to the rural areas *Local efforts can be made together with outside assistance*
Milk prices too low	Farmers are few with no say in setting prices	Income is so low compared to expenditure – thus farmers so poor	Farmers resort to milk vending/ hawking directly to consumers so as to get higher price / more money	Unity and cooperation so that farmers can have a common voice *Local efforts can be made together with outside assistance*
Cattle claimed to be good quality / breed produce low milk quantities	- Poor selection by the buyers / NGO personnel who supply them - poor husbandry and management practices by farmers	Very low milk yields	Keep those given to them – then try to breed them with better bulls / semen for better offspring	- To get semen of high quality - acquire heifers of better quality / milk production levels. *Requires outside assistance*
Farm / veterinary input sources too far away from rural farmers	Farmers are few, so traders are not attracted to bring such business closer	Death / low productivity of cattle when inputs not acquired in time	Travel long distances when possible and buy several inputs at one time to reduce on transport costs	Farmers should unite and find means of convincing someone to bring inputs closer to them.\ *Local efforts can be made together with outside assistance*
Lack of centre / facilities for milk collection	Lack of cooperation and unity	Milk is sold at a give-away price thus less income	-try to sell until it is finished -Farmers consume milk themselves / give more to the calves	Farmers need to be united and attract the required facilities like milk storage facilities / Cooler *Local efforts can be made together with outside assistance*
Feeding very difficult in dry season	- Lack of proper feed storage methods - Failure to plant forages – depend mainly on pastures	- Farmers don't get enough milk from cows - Animals get starved and	Some farmers try to plant Napier grass during rainy season	Farmers need to be educated on the planting and preservation of pastures *Requires outside assistance*

		died		
No proper / permanent watering points for cattle	- Lack of catchments areas (swamps or wetlands)	Animals get diseases when searching for water	Farmers walk cattle to places / trenches that contain water - Farmers fetch water from boreholes and carry home to cattle	Need training and facilitation in harvesting and storage of water *Requires outside assistance*

Luwero: Community livelihoods profile

The PRA participants were guided through a livelihoods analysis session by listing the main livelihood sources. The main livelihood activities in Luweero town council include:

- Livestock rearing
- Crop farming- matooke, coffee, maize, sweet potatoes, beans etc
- Business/ trading
- Formal employment (Public service)
- Boda boda (motor cycle transport business) taxi
- Construction/ building works
- Brick making
- Sand digging
- Carpentry and Welding
- Quarrying
- Timber cutting
- Mechanics

Out of the many activities listed, participants selected six activities which were scored according to their importance. Livestock rearing, crop farming, trading, Boda boda, and public service were selected in both PRA sites as the main contributors to their livelihoods. These were then ranked according to order of importance using the score and ranking method as shown below;

Table 20: Luwero: The highly ranked sources of livelihoods

Wealth category	**PRA site 1**		**PRA site 2**	
	Score	**Rank**	**Score**	**Rank**
Crop farming	19	1	15	1
Livestock farming	18	2	14	2
Trading/ Business	5	3	3	5
Boda boda	3	6	0	6
Building/ construction	4	5	5	3
Public service	5	3	5	3

In both PRA sites, crop farming was scored as the first source of livelihood, followed by livestock. Trade was mentioned as another important livelihood in PRA site 1, because the area is a town, therefore lots of different kinds of trade were transacted. Being employed as a government worker or providing causal labor was also regarded highly as a source of livelihoods in this area.

The livelihood activities that are mentioned as main sources of cash income in order of importance;

1. Trading
2. Livestock rearing
3. Crop farming
4. Boda boda
5. Public service
6. construction/ building

The group then discussed the importance of each livelihood activity and its relationship with dairy farming. The activities were then ranked using a matrix scoring approach. The output is summarised in Table 21

Table 21: Luwero: Livelihood activities and trends matrix

With regard to the trends in relative importance of livelihoods and cash incomes, the farmers reported that new activities have become important sources of livelihoods and cash incomes, for example boda boda taxi, brick making, Apiary[2] and mushroom cultivation. Crop farming is still a main source of livelihood with most of the crops grown for home consumption, very little remains for sale. However in this area, some crops like pineapple and mushrooms have become important agricultural activities for cash incomes. Dairy farming has gained importance as a source of livelihood and as a cash income; farmers are increasingly adopting improved breeds, seeking knowledge for better management. New trends have been seen in roles: women are increasingly getting more involved in livestock keeping thus doing activities like milking. There are more female headed households in the area; these are mainly involved in trading and livestock keeping.

Gender Issues in Dairying

Women are mostly involved in trading and livestock keeping. They are also involved in crop farming for cash incomes. These women headed households have a fairly good livelihood, however the aged are not so well off, except those that have land and commercial buildings. The child headed households are rare since orphaned children are always taken up by relatives or a relative comes to stay with them in case they have property. Men have control ownership and livestock. There is less openness when it comes to income that is derived from sale of livestock or products by men, yet if the woman sell, the men want to participate in deciding on what to use the income for. Access to use of land by women is no problem, however when it comes to sharing the proceeds that's where the problem comes from. The general picture at present is that the households have learnt to make decisions together, this has come about as a result of sensitization through the church and organizations working on gender issues in the area.

Luwero: Innovation systems and actors

The farmers discussed key innovations under selected aspects of livestock production including breeding, feeds and fodder, animal health, milk value addition. Innovations were considered to mean new ideas, technologies or ways of doing things, in a place where or by people whom they have not been used before. It includes not only new knowledge and technologies but also new practices, organisational and institutional arrangements introduced into and used in an new economic and social process or context. The results of innovations and innovative farmers are shown in Tables 3.7 and 3.8 while Photo 3.1 illustrates the linkages between the actors as perceived by the dairy farmers in the PRA meeting.

[2] Bee-keeping

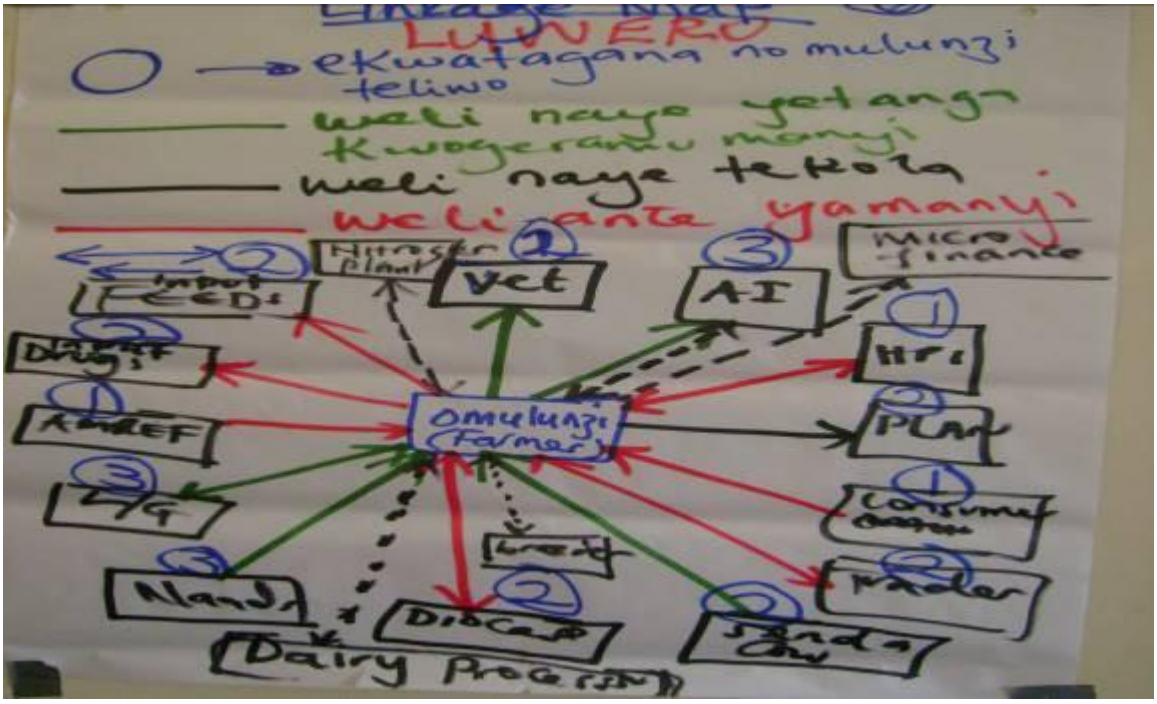


Plate 10: Luwero Mapping of dairy actor linkages

Table 22: Luwero: Dairy Innovations

Conventional activities	**Innovations**	**Innovating farmers**
Inputs- Mineral salts, Land, Vet drugs, water, acaricides, Labor, pasture+ fodder, shelter/sheds/housing, mineral salts/blocks, feeding+watering troughs.	***Inputs-*** Dairy meal, legumes/fodder, sheds, calf pen : Dairy meal, using milking blocks, new acarides and drugs	Site 1- Haji Mubiru, Bp Evans Kisekka, Jane Francis Kasozi - -planting of pasture of different types eg lab lab, elephant grass, etc for feeding milking cows - paddocking of his farm
Practices – Planting pasture (legumes and elephant grass), spraying, shelter cleaning, deworming, ear tagging, castration, dehorning, Vaccination, fencing, crossbreeding with AI/Bull, castration, zerograzing, dig small dams.	***Practices –*** straw beds for calves, weaning of calves, planting fodder, preparing manure, cross breeding wit AI, building sheds for calves Building shelters, milking 3 times a day, using milking salve, planting pastures, women milking	Site 2- Nsereko, Mrs. Namuddu - practices good care, feeding and management and gets about 40 liters from 3 cows, also uses biogas - good zero grazing practices, has 4 cows under this system
Breeds – Nganda (locals), Ankole longhorn, Karamajong	***Breeds –*** Crosses local & Friesians, local & Jersey, Local & Guernsey Friesians- Pure (German and Canadian breeds), Crosses (Friesian, Jersey Guernsey and locals), Ayrshire	
Products – Milk, Meat, Ghee, Manure/fertilizer, skin and hides	***Products –*** Biogas, ghee.	
ACTORS Farmers, Vets/AHW, Milk vendors, Send a Cow, Diocese, Local government, Dairy, NAADS, Plan international, AMREF, AI, Drug supplier, Feed supplier, Radio/Media., HPI, Tweyanze development Agency, NAADS, CARITAS, ADRA, Restocking project, MAAIF.		

Table 23: Luwero: Dairy Innovations Actor Analysis

Key actors	Activities and services	Achievements	Challenges	[a]-Status	[b]-Linkages	[c]-Satisfaction
Government Vets	- treat animals, control diseases, give advisory services		-ill facilitation from the local government - farmers failure to pay for services - Limited budget for municipality to facilitate livestock keeping	0	3	3
Artificial Insemination	- advices on breeding - carries out Artificial insemination	- increased number of cross breeds - increased milk production	- farmers fail to afford the cost - repeated heat - late reporting of heat by farmers.	0	3	3
AMREF	Sponsors orphans Lends money to improve their livestock keeping Gives out heifers	Improved livelihoods and incomes for orphans	-failure to meet the demand, large no of orphans Failure to look after livestock given	2	4	2
Input suppliers	- avail inputs in form of drugs, acaricides and feeds	- availed all different inputs in the area.	- high costs of the inputs leading to high pricing, thus failure for rural farmers to purchase these inputs	- 2	4	1
Send a Cow	Provided heifers trainings	Dairy cows in the area	Farmers failure to pass on cows	1	3	1
Heifer Project International (HPI)	- trainings - facilitates the vet -facilitated building of dairy - gives out cows	- increased number of farmers involved in dairy production - increased number of cross-breeds -more knowledgeable local farmers in dairy animal management.	- slow adoption	2	4	2
Dairy-collection	-provides training for members	- bulking farmers milk -	- low quantity of milk - some time poor quality milk	1	3	1

center	- buys milk from farmers - processes milk to milk products		which is rejected			
Tweyanze Development Agency (TDA)	Sponsors orphans In schools	Improved livelihoods and incomes for orphans	-failure to meet the demand, large no of orphans Failure to look after livestock given	2	4	2

[a] 0 = Not active in the village; 1 = Present in the village but less active; 2 = Present in the village and fully active

[b] 1 = Link not functioning; 2 = Link is weak; 3 = Link needs strengthening, 4= Link is strong, [c] 1 = Good, 2 = Satisfactory, 3 = Poor

Emerging issues on Actors

Extension workers such as the government sub-county based Vet and other animal health workers are considered important actors but have weak linkages with the community. They are often ill-facilitated; lack motorcycles or have motorcycles without fuel budget at the sub-county. They also experience problems such as non-payment by farmers, being given false information about onset of heat by farmers. Farmers are not willing to give them transport refund when they come to attend to their animals. Extension workers are few and have to work in a very wide area which makes them ineffective. Vet drugs are very expensive e.g. drugs for East Coast Fever and yet farmers are unwilling to pay highly for the vet services.

Artificial Insemination is a problem, there is one technician who comes from outside the site and charges highly. The farmers need improved breeds but are unable to access bulls. Therefore, the easiest option is using AI, which is not also readily available. The linkage between AI and farmers is weak and needs strengthening, so that breeding is made easy.

The following actors were missing and the farmers perceived that if present there would be improvement in dairy production and marketing. These are:

- Dairy processors
- AI- inseminator
- Veterinary officer at sub county level
- SACCO or microfinance institution for credit facilities at low interest rates
- Nitrogen plant/ supplier
- Breeder(improved breeds)/ good quality semen

Policy Issues

The innovations and actors analysis revealed critical policy issues that should be addressed in order for dairy development objectives to be met with ease. However, the farmers were able to highlight institutional and policy changes they have observed in the dairy sector;

- Dairy Development Authority banned transportation of milk in Jericcans and their milk is poured if found being transported in Jericcans.
- Every farmer must vaccinate their animals in case of disease outbreak like FMD
- Movement of livestock from one area to the other needs a permit
- Institution of quarantine in disease outbreak in an area e.g. FMD

Luwero: livestock breeding and feeds

Breeding

The group reviewed the criteria used by farmers in selecting dairy breeds. The farmers' preference for dairy breeds in the village is guided by the following choices:

a) Udder size: well placed and big udder, well placed and not sagging
b) Prominent milk vein
c) Milk yield: gives a lot of milk, more than 15 litres per day
d) Big naval

e) Posture: strong and straight legs
f) Body shape: An arch in the back and loose flesh at the thighs.

The farmers mentioned the following ways through which they acquire animals.

1) By inheritance
2) Purchase
3) Through donations- NGO's / Government
4) As gifts

They have following breeds of cattle

a) Indigenous (Nyankole 40 %, Nkaramoja 20 %),
b) Cross breeds 10% (Indigenous x Friesians),
c) Exotic breeds (Boran 5%, Friesians 25%).

Farmers use various breeding methods and the reasons given for Preference of a particular breeding service were:

- Some farmers preferred AI because then they did not have to face the expenses of keeping a bull, however a statement was made that "A big problem with AI is that cattle don't conceive easily, there are many repeated inseminations".
- Though the bulls are not of high quality milk production traits some farmers preferred them because they are more readily available and less expensive than AI services. Furthermore, in case of repeated heat the farmers are not charged extra money for repeated service like in case of AI.
- Farmers who use bulls have to breed their own indigenous bulls; however these sometimes face difficulty in mounting large cows and are not of very good quality.

Livestock Feeding

The group also discussed existing livestock feeding systems, forage preferences and constraints to livestock feeding as well forage seasonality. Table 24 presents the summary of key feed types in Luweero town council revealed from the PRA discussions.

Table 24: Luwero: Livestock feed types

Forages in community	Prefered Forage	Other feed sources	Feed supplements
Grazing pasture: bracharia, panicum maximum, kyukyu, lumbugu, kalandalugo	- Grazing pastures - Napier grass	Matooke peels, potato vines, potato/ cassava peels, maize stover, beans/groundnut stems & leaves, yam leaves, jack fruity, banana stems, *mululuza* tree leaves, pawpaws	- Salt - Dairy Meal - Mineral lick
Forages: Napier grass, Guatemala, "*Kakirakambwa"*, Gassia, kikuyu grass, mucuna, coliandra, lablab, centrosema, silatro, *"akabombo"*, "*Muzimbandege"*			

The main constraints to forage production in the village were ranked and are presented in Table 25, while Table 26 shows the seasonality of the different types of fodder in relation to wet and dry seasons.

Table 25: Luwero: Forage/Feeding constraints

Constraint	Rank	AFFECTING	
		Numbers (production)	Productivity
Water scarce	1	x	
Formally communal grazing land is slowly being turned into food crop gardens - so pastureland is becoming minimal	1	x	
Pastures poor quality	2	x	x
Farmers do not plant much forage themselves	2	x	
Forages difficult to grow in dry season	3	x	

Table 26: Luwero: Seasonal feed/forage availability

MONTH	D	J	F	M	A	M	J	J	A	S	O	N
Season / FEED TYPE	Dry Long				Wet Short		Dry Short		Wet Long			
1. Napier Grass	√				√		√		√			
2. Pastures (grazing)					√		√		√			
3. Lab lab					√				√			
4. Coliandra					√		√		√			
5. Mucuna					√				√			
6. Maize Stover			√				√					
7. Sweet Potato Vines			√				√					
8. Cassava/ potato/ matooke peels					√		√		√			
9. Yam leaves; beans/groundnut stems & leaves			√									
10. jack fruits, banana stems			√									

Emerging Issues on Feeding

It was clear from the PRA discussion that most of the times, farmers rely on natural pasture. Napier grass is mostly used during the dry season. Forage availability remains a major constraint to dairy development. All forages are scarce during the dry season and no conservation action is done during the periods of planting. During pasture abundance, milk production is high, prices are low, a lot of wastage is experienced and farmer incomes are low. This makes it difficult to use extra income for forage conservation. The cooler cannot absorb all the milk produced in seasons of plenty. Farmers reported a generally low rating of their skills in pasture management hence there would be need to bolster training on fodder and pasture management.

Irrespective of feed scarcity farmers mentioned some coping strategies during times of forage scarcity, which were:

- People travel far distance to search for cut and carry forages to cattle at home
- water has to be fetched from long distances and brought home for cattle
- Give them 'non traditional feedstuffs like yam leaves, jack fruits, banana stems, etc

Requirements for input supply and service delivery to livestock keepers

From the presented findings, it is clear that dairying is an important activity for many of the community members in Luweero town council. However the challenges and constraints need to be added with specific interventions. This area is in urgent need of the following suggested interventions:

- Regular supply of semen of good quality and variability in types of bulls.
- AI services delivery should be brought closer to the more rural areas.
- Veterinary drugs and inputs suppliers should consider setting up outlets in the villages, closer to the farmers
- Milk coolers required to decrease on loss of income from milk
- Need provision of services / infrastructure for watering the livestock
- There's need for milk storage / cooling facilities closer to the rural areas.

KAKOOGE, NAKASONGOLA DISTRICT

Introduction

The site of Kakooge in Nakasongola district is a proposed traditional milk collection hub. Two PRAs were carried out in this site, the PRA sites were selected depending on the ease and accessibility to milk market. The first PRA site which was Katuugo was selected because of being closer to market, whereas the second PRA site, Kinyogoga was selected due to its remoteness and being far from the milk market. The farmers in the Kakooge had already organized themselves into a cooperative and have a Milk Cooling Plant in the sub county which was built with assistance from Land 'O' Lakes and Heifer Project International.

Table 27: Kakooge: PRA workshop profile

<table>
<tr><td>Country</td><td>Uganda</td><td>Type of Site</td><td colspan="3">Traditional hub site</td></tr>
<tr><td>District</td><td>Nakasongola</td><td>Site/hub</td><td colspan="3">Kakooge</td></tr>
<tr><td>Village (PRA site)</td><td>a) Katuugo
b) Kinyogoga</td><td>Date of interview</td><td colspan="3">14th August 2008
And 15th August 2008</td></tr>
<tr><td>Venue for the workshops</td><td>a) Katuugo Primary School
b) Kinyogoga sub-county</td><td>Duration of workshop</td><td colspan="3">1 day for each workshop</td></tr>
<tr><td rowspan="4">Language of workshop</td><td rowspan="4">Luganda and Runyankole</td><td rowspan="4">Number of participants</td><td>Site</td><td>1st</td><td>2nd</td></tr>
<tr><td>Female</td><td>3</td><td>2</td></tr>
<tr><td>Males</td><td>17</td><td>18</td></tr>
<tr><td>Total</td><td>20</td><td>20</td></tr>
<tr><td>Overall Coordinator</td><td>Dr. Mugisha, A</td><td></td><td colspan="3"></td></tr>
<tr><td>Names of facilitators</td><td colspan="5">Group 1: Dr. Maureen Mayanja
Group 2: Dr. Baluka</td></tr>
<tr><td>Names of note takers</td><td colspan="5">Group 1: Mr. Olivier Mugisha
Group 2: Dr. Sylvia Nalubwama</td></tr>
<tr><td>Names of observers</td><td colspan="5">Group 1: Mr. Frank Mugume
Group 2: Mr. James Byomuhangi</td></tr>
<tr><td>Special conditions (weather, local activities, etc)</td><td colspan="5">It rained in the afternoon on the second day</td></tr>
</table>

Participants consisted of livestock farmers in the area, who mainly have local animals plus a few who have cross breeds. These farmers came from extensive and semi intensive production systems. The workshop was attended by both youth and older person because livestock is very important to both categories in this community.The challenge met was that farmers turned up late for the meetings in all the workshops because of the long distances they had to travel to reach the venues for the workshop.

The team was introduced to the participants in both sites by the area extension officer, who afterwards requested the area Local council III chairperson to give a few welcome remarks. The team leader explained to the participants the reasons for carrying out the exercise with the local community as appraising the existing dairy development situation, the available resources, challenges and opportunities in order to design how the partners will work together to bring about development in the dairy sector in the area.

The farmers reported that the main problem of dairying in the areas was milk marketing, which is mainly hindered by poor road network and fluctuating prices.

Kakooge: Village resource mapping

From the community resource sketch map it was revealed that there are no natural water sources within the sub county rather at the boundaries, therefore making water scarce within the area. There is only one milk collection centre which has a cooler; the capacity of the cooler cannot handle all the milk in the area. The farmers only supply milk to the cooling plant in the morning, thereby leaving a constraint for farmers to look for market for the afternoon milk. Most of this milk is sold within the community but at very low prices. Farmers reported that during wet season, the milk produced is relatively high and a lot of it is spoilt and poured away. The area is also faced with a challenge of not having electricity; the cooler is run on a generator, which makes its operation very expensive. Lastly much of the land in this area is covered by forest which minimises the grazing land for the cattle in the area.

Table 28: Kakooge Resource Analysis Matrix

Mapping issues	**Detailed information**
Natural resources	
Water	Swamp and rivers on western and southern borders of the sub-county but not within
Crop fields	scattered everywhere
Rangelands	Scattered everywhere
Gardens	scattered everywhere
Irrigation schemes	none
Mines	none
Others Forests	• Large government planted mainly pine trees – especially in Kyankonwa parish
Infrastructure	
Roads	• Kampala–Gulu road is through Kakooge-Kyabutaika,Katugo,Kyankonwa • Katugo- Kyeyindula – Kyabutaika
Electricity	No electricity supply
Settlements	scattered everywhere
Commodity markets Trading centres	None 3 of them – 1 in each parish
Milk sale point (informal or cooperative/ self-help group)	• one in Katugo parish owned by farmers cooperative
Milk cooler/ processor	• A cooler at Katugo trading centre ○ uses a generator ○ Serves 3 districts, Nakasongola, Luweero and Nakaseke.

Kakooge: Wealth ranking

The various wealth categories in the village identified were:

1. Very Rich
2. Rich
3. Moderately poor
4. Very Poor

The exercise of wealth ranking began with listing all the criteria that farmers in the area to symbolize wealth. All the listed criteria were then ranked and scored according to importance as follows:

1) Size of landholding
2) Size of herd of livestock
3) education for children
4) means of transport e.g. car, motor cycle, bicycle,
5) enough food for family
6) access to water source
7) Type of housing
8) Ownership of a forest

Table 29: Kakooge: Summary for wealth ranking

Criteria for wealth	Wealth category		
	Better-off	**Moderately poor**	**Very poor**
Livestock numbers by species. Cattle: differentiate by breed	Has over 50 exotic cattle/ crosses	Has at least 5 crosses or exotics	No crosses or exotics
	Has over 400 local cattle	Has atleast100 local cattle	Has less than 10 local Cattle
Land size	Has 5 miles & above with title	Has at least 100 acres with a title, but may rent additional land	Less than 5 acres and without title
External income (off-farm)	Hotel business Clinics, Schools Commercial vehicles	Own Boda Boda motorcycles	Sale of labor
Education for children	Up to senior 6 (UACE), tertiary & vocational institutions & universities	Senior 4 (UCE)	Primary 7 – end of UPE
Housing standard	Use bricks / blocks, cement, sand, tiles, Coloured or ordinary iron sheets. About 3 & more bedrooms	Mud & wattle, poles, ordinary iron sheets, single slanting 1-2 rooms	Grass thatched, mud & wattle / poles, small house
Water source	1-3 Dams within farm which never dry	Get water from swamp or well that dry-up during drought	Uses government Dam, borehole, well or gets water from the rich

NB: *For purposes of filling the above table, the Very rich and rich were categorised as better-off.*

The group also discussed the farmers' interest for commercialization across the Wealth Categories. It was noted that the very rich and moderately rich are the ones who are dominating dairy farming. The moderately poor are interested in dairy farming but are constrained by lack of access to good dairy breeds, pastures and other inputs. The very poor are not interested in commercial dairy production.

Kakooge: Constraints and opportunities in dairy farming

The constraints and opportunities in dairy farming that emerged out of the PRA discussion held with the farmers together with the coping strategies are presented in Table 30 below.

Table 30: Kakooge: Constraints and opportunities

Problems	Causes	Effects	Coping strategies	Proposed solutions
Ignorance about value of keeping few good quality milking cows other than just large numbers (62/180)	- We are not educated - Accustomed to traditional methods of keeping animals	No profits obtained	We do selective breeding according to performance of the indigenous cattle	Training programs & to increase awareness about good milking breeds and `A1 services *Requires outside assistance*
Only one milk collecting centre and quite far from many farmers (31/180)	- coolers are expensive - Lack of cooperation among farmers - Bad routes - Milk is not enough	- Milk goes bad / is wasted - Buyers determine the milk price	- Process left over milk into Ghee - selling at the lowest price to bicycle hawkers	- setting up coolers in other areas - processing and packing milk (e.g. yoghurt, ghee) *Needs cooperation between farmers and other service providers*
Lack of good quality pastures (30/180)	Not knowledgeable about types of good pastures and source of seeds	- Reduced growth rate and milk production of cattle	Use what is available	To be educated about good pastures and sources of seeds *Requires outside assistance*
Milk price is too low (23/180)	- Milk market is far - Poor grade of milk due to long distances travelled	Profits are low	Make an effort to get higher prices by hawking some of the milk ourselves (not sell to dairy).	Strengthening the farmers' co-operative society – to have a common voice *Farmers own effort necessary*
Many farmers do not own land so have to hire (23/180)	- Land is scarce and very expensive	Pastures for the animals are not enough	Resort to grazing (illegally) in gazetted government forests	Reduce number of animals to fit the carrying capacity of the land available - Buy few animals of high quality & production *Farmers own effort necessary*
Water is very scarce	The capacity of existing	In search for	Walk animals long	Construction of more

(11/180)	dams to hold water is small (a lot of evaporation)	water, animals get diseases	distance to different water sources	efficient dams *Requires outside assistance*

Kakooge: Community livelihoods

The main livelihood sources for this area include:

- Livestock rearing
- Crop farming
- Business / trading
- Milk churning i.e. processing milk into ghee & *eshawe*[3]
- Charcoal burning
- Drivers –boda boda cyclist, taxi
- Builders & mechanics
- Public service
- Bee keeping/ Apiary
- Brick making
- Brewing & selling alcohol

Trends in the relative importance of Livelihoods and cash income

Nakasongola district is traditionally a pastoralist area, people have always raised cattle to provide a safety net and as a source of livelihood. Livestock rearing has however, become even more important both as a source of livelihood and cash income. Farmers are increasingly adopting improved breeds, increasing livestock numbers and there is increased trade in milk.

Business or trading has become more important as a source of livelihood and cash income especially when farmers sell cattle and accumulate money, they go into business. Crop farming is becoming less important; this is dominantly a pastoral area and most households concentrate on livestock rearing, grow none or little food crops for home consumption and hardly any surplus for sale. Brewing and selling alcohol is becoming more important due to increased population and development of trading and urban centers. Charcoal burning is a new activity, it has been a major source of cash income, however, it is also destructive to the environment. Driving has become more important because people have bought more cars and motor cycles.

[3] *traditional dish made of ghee*

Table 31: Kakooge: Livelihoods and their trends

Current sources of livelihoods	**Contribution to livelihoods** (Rank in order of importance)	**Contribution to cash income** (1=very important, 2=somehow important, 3=not important)	**Trends** (1=becoming more important 2=less important, 3=new activity)	**Differences in terms of gender, age, ethnic minorities**
1.livestock rearing	1) Livestock rearing	1	1	Male & Females
2.crop farming	2) Crop farming	1	2	Females
3.business / trading	3) Business / trading	1	1	Males
4.milk churning i.e. processing milk into ghee & *eshawe*[4]	4) Apiary/ Bee keeping	1	2	
5. Charcoal burning	5) Charcoal burning	2	3	
6. Drivers –boda boda cyclist, taxi	6) Drivers - Boda boda	1	1&3	
7. Builders & mechanics	Public service	2	1	
8. Public service	6) Brewing alcohol	3	2	
9. Bee keeping/ Apiary		1	1&3.	
10. Brick making		2	3	
11. Brewing & selling alcohol		2	1	

[4] *traditional dish made of ghee*

Gender Issues in Livelihoods

Men normally inherit land from their families or buy land. For married men, making decisions to buy land involves both men and women though the men undertake the negotiations and actual buying of the piece of land. Poultry enterprises are entirely owned and managed by women; they have control over production and sale. The men are more involved in cattle keeping. While women have more control over crop production. Men still have overall ownership of the household property; this can be seen in cases where most men sell off land without women's knowledge and later the cases end up in court. Those that make decisions together are just from a few educated or religious households. Women are given user rights over land but men retain the ownership rights and control over what the women produce. More often men sell the produce and control the earnings.

Women dominate crop farming and brewing, men dominate business/ trading and driving taxis, Lorries, trucks, motor cycles (commonly known as Boda Boda) and bicycles. Both men and women are involved in livestock rearing and public service. Charcoal burning is done by all ages and gender. Both men and women are involved in livestock rearing though the role of women is increasing. Crop farming is carried out by mainly women who produce food mainly for home consumption.

Kakooge: Innovation systems and actors

The farmers discussed key innovations under selected aspects of livestock production including breeding, feeds and fodder, animal health, milk value addition. The results are shown in table 32, while Plate11 illustrates the linkages between the actors as perceived by the dairy farmers in the PRA meeting.

Table 32: Kakooge: Dairy Innovations

Conventional activities	Innovations	Innovating farmers
Inputs **-** acaricides, vet drugs, labor, vaccines, mineral salts, water, hoes, spades, spraying pump, pastures/ fodder, ropes	***Inputs*** **-** use of dip tanks, modern feeding troughs	Site 1- Mr. Kigayaza Mr Ssozi Peter, Kitangala farm or ranch owned by foreigners
Practices **–** dehorning, branding, ear-tagging, tail docking, castration, bull breeding, spraying, giving watering, cleaning shelter daily, use of paid labor, milk vending, slashing forests for better pastures, farm planning, weaning calves, paddocking / fencing	***Practices*** **–** dipping, paddocking, bush clearing i.e. slashing forests to allow fresh pasture to grow.	Site 2- Sabiti, Kalekwa Eric, Ruzindana, Nganwa.
Breeds **–** -Nganda, Ankole long horn, Enkaramojja	***Breeds*** **–** crossing Friesians, Guernsey, Zebu, boran & Saihawal with locals/ Nganda,	
Products **–** milk, meat, manure / cow dung, urine, skins & hides, Ghee	***Products*** **–** None	
ACTORS- Farmers, DDA, AHWs- Vets, LG/, Cooperative, Land O'Lakes, AMREF, PLAN International, Save the Children, milk vendors/ traders/ buyers, consumers, MAALF.		

Actors, Activities (including technologies), Achievements and Challenges

Animal health workers/vets – treat farmers' animals and also vaccinate in cases of disease outbreaks. Major challenges for vets include failure to turn-up when called by farmers due to lack of transport or facilitation. The sub-county has one motorcycle and sometimes it breaks down due to the poor condition of the road, especially during the rain seasons. They come from far and cover a vast area. They said that they hardly see the vet which has forced all the farmers to become "experts" in treating their animals. "When we are lucky the animals recover but if unfortunate they die".

The milk vendors help in bridging the gap between the producer and the final consumer. Unfortunately, they tend to add water or other sub-stances that adulterate and spoil the milk. This discourages the final consumers or causes them to change their tastes to processed milk.

Farmers face challenges of high costs of drugs, feeds, good breeds and rearing poor breeds that produce less milk. However, the cooperative tries to organize the farmers together, advises them and gives them a platform to address common challenges. The cooperative pools their milk, chills the milk and provides a milk tank to transport their milk to prime markets in Kampala. Land O' Lakes helped the farmers through the cooperative to establish the dairy and organize milk marketing in Nakasongola and neighboring Nakaseke districts.

The vet officer and other animal health workers are key actors. They treat sick animals and also give extension advice to farmers. They carryout mass vaccinations whenever there is disease outbreak (e.g., Foot and Mouth Disease), provide routine treatment of sick animals and majority of vets also double as the artificial inseminators. Sub-county local government brought the NAADS programme in the area and ensures security and a favorable environment for NGOs to come and operate in the community.

Consumers are able to buy milk from farmers; the challenge is that most consumers are in urban centers in Luwero and Kampala hence necessitating middle men (i.e. milk traders or milk vendors). The input suppliers, i.e. drug and feed suppliers, are not reliable. They opened shops within the area but many times the shops are empty. Drugs are currently supplied by the extension staff when they are called to treat sick animals. Hence farmers cannot access drugs as often as they need.

Farmers' Assessment of Services / Inputs (Levels of Satisfaction)

Farmers are dissatisfied with the vets because they are not available when they need them.
Farmers' satisfaction with MAAIF was rated poor because they have no linkage and they don't see how the ministry helps them.
Drug supplier is satisfactory because the supplier stocks most drugs that they need but they fail to buy themselves due to high costs. Also when you go to the drug shop and you find when the particular drug you need is missing, you can ask the supplier to bring it for you from Kampala, whenever they promise they always fulfill.

Sub-county administration coordinates the various activities in the sub-county and all the various actors in the community always come through the sub-county local government.

Farmers assessed the cooperative's service delivery as good because it has helped to bulk their milk and take it to Kampala every day which has improved the milk prices and reduced wastage in form of milk spoilage.

Save the children, AMREF and Land O' Lakes (LOL) were assessed as satisfactory because they have delivered to the expectations of the beneficiaries. Save the children has sponsored their children, LOL established the dairy for them and trained them in milk handling and hygiene and AMREF helped set up and facilitate health centers.

Actors and linkages considered important but are weak or missing in the dairy sector and the reasons

The artificial inseminator who has no link with the farmers and yet farmers wish to cross breed and improve their cattle for milk production and yet they cannot access improved bulls.

The farmers appreciate the services rendered buy the cooperative but they still need strengthening of their linkage with the cooperative. The linkages between the vets, MAAIF, NAADS, DDA, Sub-county local government and the farmers were assessed as weak and need strengthening

AMREF, Drug supplier, milk vendor, and the consumer have strong and effective links

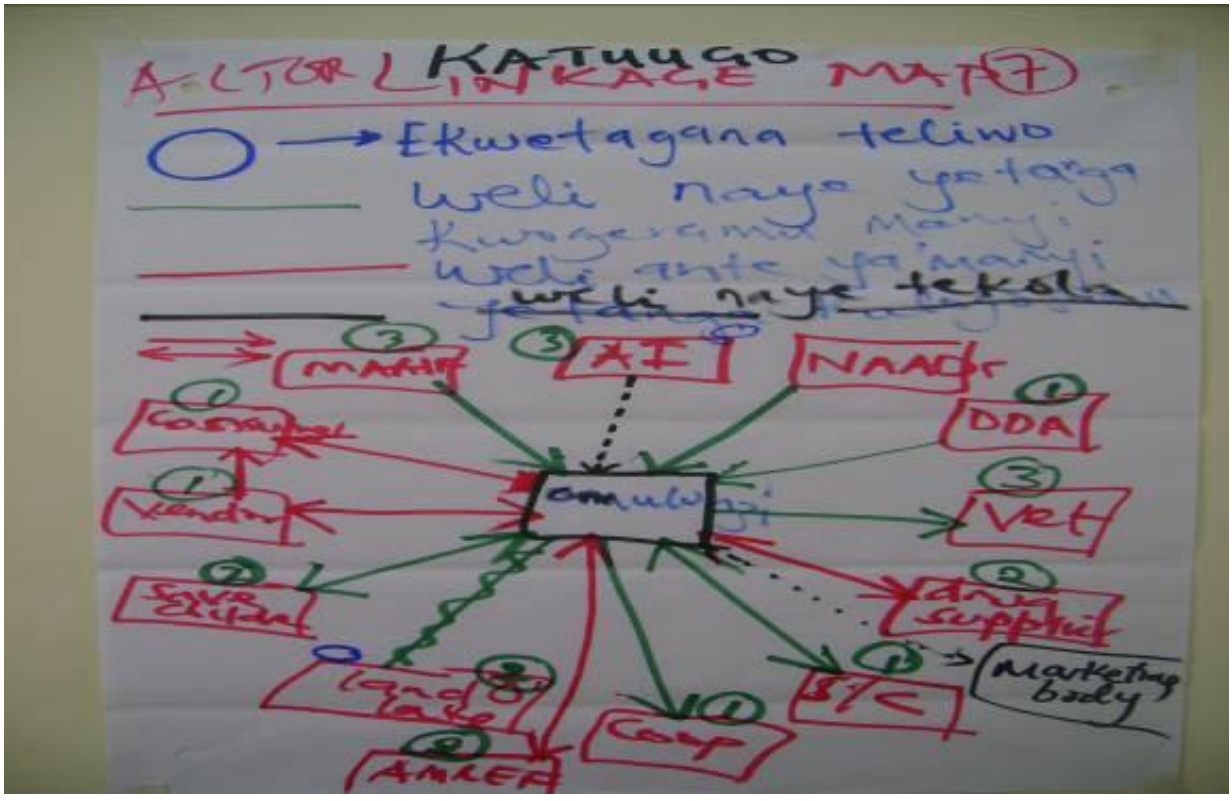


Plate 11: Kakooge: The linkages between dairy actors

Emerging Issues and Government Policy

There are various policy issues important for the development of the dairy sector in the area. The farmers were able to note the following institutional and policy changes:

- DDA banned use of jerrycans for transporting milk. If they breach this policy and are found transporting milk in jerry cans, DDA confiscates or pours their milk and they lose.
- Disease control policies from MAAIF prohibit them from transporting sick animals or moving animals without movement permit issued and stamped by the area vet.
- They are not supposed to move animals on foot for long distances. These polices are not well implemented or enforced, crafty people transport animals without fulfilling these conditions.
- Farmers are unauthorized to handle or administer vet drugs according to National drug authority regulations but because NDA has failed to restrain them they have continued to handle or even administer vet drugs including injectables.

Kakooge: Livestock breeding and feeding

BREEDING

The discussion was able to bring out the traits the farmers look for in a breed. Farmers noted that important traits of dairy breeds preferred are;

a) big udder
b) heifer has loose flesh at thighs

Common breeds kept in this area are indigenous; Nduli/Nganda 60%, Nyankole 30%, and Karamoja 10% of the total herd kept. There are few crosses and exotics mainly owned by the very rich farmers.

FEEDS AND FEED SOURCES

The area is mainly a rangeland, therefore the most common forages are natural grazing pastures. The farmers have no choice so there is no preferred forages. There are few other sources of feed in the community which are; Matooke, potatoes and cassave peels. A few farmers feed supplements but the only one given is salt.

Forage production constraints in order of importance

Constraint	Rank	AFFECTING	
		Numbers (production)	Productivity
Water/ extremely dry season	1	√	√
Lack of forages – depend on grazing pastures only	2	√	
Coping strategies They give "non-traditional" feeds e.g. tree leaves & branches of Migali, Enongo			

Feed/ Forage calendar and estimation of feed sufficiency

MONTH	***D***	***J***	***F***	***M***	***A***	***M***	***J***	***J***	***A***	***S***	***O***	**N**
Season / Feed Type	**Dry Long**				**Wet Short**		**Dry Short**		**Wet Long**			
Pastures (grazing)					√		√		√			
Cassava/potato/ Matooke peels				√			√					
Tree leaves				√								

Emerging issues on Feeding

The area is a semi arid, with low annual rainfall; it has a few natural water sources, thus making water availability a very big problem. The farmers and their cattle have to walk long distances to access water sources. However, those farmers who are better off have solved the water scarcity problem by building dams within their farms.

There is no communal grazing land and watering places for the cattle anymore because most of the land has been taken over by private individuals who have fenced it off, thus making pasture availability even more difficult for poor farmers. There are no other forages fed, farmers depend mainly on grazing pastures which are unreliable because of the long draught periods experienced in the area.

Farmers future aspirations related to livestock production and marketing

- Introduction of exotic milking breeds via AI or by pure exotic bulls
- Farmers trained on better Dairy farming practices
- Acquisition of pasture seeds/ better quality pastures
- Increased number of veterinary staff and AI technicians
- Subsidies to farmers on veterinary drugs and vaccines
- Road network in the rural areas be improved and existing ones repaired
- milk collection points / cooler built closer to the farmers in the more rural / remote areas

MASAKA MUNICIPALITY, MASAKA DISTRICT

Introduction

Masaka Municipality was selected as a proposed traditional Hub for milk marketing in Masaka district. Two PRA sites were selected in Masaka Municipality study site; this was based on accessibility to milk market. The first PRA exercise was conducted in Kyajovu parish- Buwunga subcounty, which is far from the milk markets. Farmers have to ferry their milk on daily basis to milk sale points in town/ trading centres or to the milk processing plant. This site was selected because it was perceived to have difficulty in accessing milk market as compared to the other villages that were nearer to the township. The second PRA exercise was conducted in Nyendo parish which comparised of Nyendo Township and its surroundings. This second site was particularly selected because it was perceived to have relatively easier access to milk market as compared to other villages in Masaka Municipality.

Table 33: Masaka: PRA village workshop profile

<table>
<tr><td>Country</td><td>Uganda</td><td>Type of Hub</td><td colspan="3">Proposed Traditional Hub</td></tr>
<tr><td>District</td><td>Masaka</td><td>Site/hub</td><td colspan="3">Masaka Municipality</td></tr>
<tr><td>Village (PRA site)</td><td>c) Nyendo parish
d) Kyajovu parish</td><td>Date of interview</td><td colspan="3">25th and 26th August 2008</td></tr>
<tr><td>Venue for the workshop</td><td>c) Lead farmers' home
d) MADDO Milk processing plant</td><td>Duration of workshop</td><td colspan="3">1 day for each workshop</td></tr>
<tr><td rowspan="4">Language of workshop</td><td rowspan="4">Luganda</td><td rowspan="4">Number of participants</td><td>Site</td><td>1st</td><td>2nd</td></tr>
<tr><td>Female</td><td>15</td><td>10</td></tr>
<tr><td>Males</td><td>6</td><td>8</td></tr>
<tr><td>Total</td><td>21</td><td>18</td></tr>
<tr><td>Overall Coordinator</td><td>Dr. Mugisha. A</td><td></td><td colspan="3"></td></tr>
<tr><td>Names of facilitators</td><td colspan="5">Group 1: Dr. Maureen Mayanja
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<tr><td>Names of observers</td><td colspan="5">Group 1: Mr. Frank Mugume
Group 2: Mr. James Byomuhangi</td></tr>
<tr><td>Special conditions (weather, local activities, etc)</td><td colspan="5">On first day, extreme hot weather, meeting was held outside under a shade, constant shifting was experienced as shade kept moving. On second day, one participant dropped out during the first session due to personal reasons.</td></tr>
</table>

The team was introduced to the participants by the area extension officer, who later invited the team leader to give the objective of the workshop. The team leader informed participants that the workshop was a baseline survey being carried out with main objectives of obtaining information related to the current situation in dairy sector in the area and to identify farm-level constraints and opportunities to increased milk productivity, improved milk market access and finally to identify potential interventions.

Participants of the workshops consisted of livestock farmers, who are mainly members of Masaka Diocese Development Organisation (MADDO) heifer project. These farmers came from mainly zerograzing production system. These farmers all had cows that were given to them by Heifer Project, and they all supplied part of their milk to MADDO milk processing plant, located in Nyendo Township. Majority of the participants comprised of mainly moderate poor. They were mainly older persons, over 35 years of age, although a few youth attended. Most of the youth are not interested in farming but rather get engaged in activities that generate income quickly like motorcycle transport referred to as Boda, boda and brick making.

Masaka: Village resource profile



Plate 12. Masaka: Sketch map of resources

Masaka Municipality is completely surrounded by Mukungwe Sub-county. It is composed of six parishes, namely; Kayirikiti, Kilumba A & B, Senyange Wards/ Parishes, Nyendo, and Namasenene. Most important economic activity is agriculture – particularly food crops some of which are sold in Masaka town. Overall land use is for growing of crops, settlements and business

premises; this covers half of the land area. The rest of the area is forests, wetlands and grazing land.

The relationship between the map items, challenges and opportunities.

The map revealed the following:

- That within the area there were not many natural water sources, no cattle dams and also very few spring wells and boreholes for water for domestic use. This is strengthened by the challenge that water is quite scarce and very far for many farmers.
- There were no veterinary input shops in the area which is supported by the challenge that stated that these shops are very far away from the farmers.
- There are no financial services and the challenge that supports this is the fact that there are no credit facilities available especially that consider cows as worthwhile security.
- One cooler / processor - challenge raised was that milk prices were too low because farmers mainly relied on one buyer / processor.

Table 34: Masaka: Resources Profile

Mapping issues	**Detailed information**
Natural resources	
Water bodies	River, swamps, wetlands
Crop fields	Scattered throughout the area
Rangelands	No area specifically reserved for rangelands
Gardens	Scattered through area
Irrigation schemes	None existent in this area
Mines	None existent in the area
Others (specify) a) Forests	Planted forests – 1) government forest- Kamwozi parish, 2) Private forest- Ggulama parish.
Infrastructure Water	Spring wells, Boreholes, Piped / Tap water
Transport	All weather roads • Ggulama- Kitengeesa- Mazinga • Ggulama –Kitengeesa –Buwunga –Kanywa Very well distributed network and roads in fairly good condition
Electricity	Good supply spread throughout in Nyendo, but none in Kyajovu.
Settlements	scattered everywhere
a) Commodity markets b) Trading centre	• None in rural area, available in township. • Kanywa, Kitengeesa, Ggulama, Kamwozi in Buwunga, several in Nyendo
Milk sale point (informal or cooperative/ self-help group)	• Some informal selling points at Kitengeesa, Kyanjovu and Ggulama Trading centres • MADDO dairy with cooler & processor in Nyendo is used by all farmers. (MADDO dairy cooperative members) • Milk is also sold to milk vendors who move on bicycles or shops in trading centers.

Milk cooler/ processor	MADDO dairy with cooler & processor in Nyendo township.
Dip tank/cattle crush	• None • Use either spray pumps or pour on acaricides.
Dams	None
Vet Clinic	• None • Call Veterinarians by telephone- Several veterinary staff (government & private) – with their offices in Masaka town.
Stock feed sources	Several present in Masaka town
Others (specify) a) Veterinary drugs b) AI services	• Several veterinary drug shops in Masaka town, fully functional. • Traditional Health workers – one known in Kayirikiti. • Many farmers use some herbs for some conditions e.g. deworming • AI technicians got from Masaka Dioceses Development Organization (MADDO) in Kitovu.
Social services	
Health	• Health centre II in Kamwozi ,Ggulama, Kilumba & Nyendo. • Referal hospital in Kitovu;
Schools/ Institutions	• 4Primary schools, 2 secondary schools in Buwunga Subcounty. • Several primary and secondary schools (government and private) in municipality. • One Farm school in Kamwozi parish • 2 Home economics schools in Ggulama & Kamwozi parishes. • One University – in Kilumba parish (Mutesa Royal University)
Church	Churches & mosques available
Local administration	Offices at subcounty headuarters • Police • Prisons • Community center
Traditional Authorities	None mentioned
Extension offices	None, but staff may meet at district headquarters (Ssaza-Masaka) once a month or when ever need arises.
NGO offices	• MADDO, World Vision, Kitovu Mobile HealthcareVI Agroforestry • All have offices in Masaka Municipality

Others (specify) a) Finance	• One micro-finance in Nyendo (MAMEDICOT). • Community self-help groups (circles)
Land use system	
Croplands and use of crop residues	– scattered throughout. Mainly sweet potatoes, matooke, cassava, beans, maize and vegetables.
Communal rangelands	• Individual (Private land) - Kamwozi, Kilumba & Senyange parishes. • R. Namajuzi Swamps,but wetland areas are restricted • Roadsides
Grazing reserves	Grazing - of total heads cattle: • Individual farms – 10 % • Communal – 53 % • Tethering – 12 % • Zero grazing – 25 %
Seasonal herd movements	Kyajovu- to Namajuzi River banks just to drink water and back.
Others (specify) a) Livestock diseases infected areas	• Kamwozi – at communal grazing areas

Masaka: Wealth ranking

The participants identified the key local criteria for wealth ranking in order of priority as follows

1. Land size
2. Livestock quality and numbers
3. Type of house
4. Owning transport means (vehicle, motorcycle, bicycle)
5. Education of the children
6. Coffee plantation.
7. Owning trees (forestry)
8. Small scale industries

Based on these criteria the following wealth categories were identified to exist in the village

1. Very Rich
2. Rich
3. Moderately poor
4. Very poor

The participants said that those in the very rich category are few, and are mainly found in the municipality or live in the capital city. They are mostly involved in businesses like schools, hotels, transport, commercial property rather than farming parsec, however they also own farms with exotics and crosses outside the municipality. The community members do not view them as part of it because they don't reside there. The category of the very rich and rich in the community are the biggest percentage that educate their children in this community.

Livestock in this community is regarded as important wealth criterion because, irrespective of the constraint of enough area for livestock rearing, they had gone ahead to change to breeds that is high yielder which can be reared intensively. The reasons they gave for maintaining livestock were; Milk was source of daily income, farmers could sell the bull calves for cash income, Cow dung was collected and sold to those who needed it as fertilizer, Milk was used for home consumption thus improving on nutritional status of household members and Livestock was seen as a wealth multiplier/gains valve as numbers increase and productivity improves.

The characteristics of the households in each group are presented in table 35. In the table the Very rich and rich are categorized as better- off.

Table 35: Masaka: Wealth ranking analysis matrix

Criteria for wealth	**Wealth category**		
	Better-off	**Moderately poor**	**Very poor**
Livestock numbers, by species. For cattle, differentiate by breed	1-5 & cross bred cattle	0 exotics / crosses	No cattle
	10-30 local	1-6 local cattle	Keep a few local chicken and pigs
Land size	1-20 acres with title	Less than 1 acre with title or plot without title	No land ownership but stay on a small plot as sitting tenants without title or are caretakers of this land.
External income (off-farm)	Business/ trading -Schools -Commercial vehicles -Commercial buildings (arcades) -Small scale industry- coffee factories, fuel stations	Own Boda Boda motorcycles	Sale of labour
Education for children	Up to senior 6 (UACE), tertiary & vocational institutions & universities	Senior 4 (UCE)	Primary 7 – end of UPE
Housing standard	Use bricks, cement, sand, tiles Colored or ordinary iron sheets. Bungalow or flat with about 3 or more bedrooms.	Bricks, ordinary iron sheets, with or without cement, single slanting. A few rooms.	Grass thatched, mud & wattle / poles
Vehicle	All types. Lexus, trucks Salon car, motorcycle, bicycle	Motorcycle, bicycle	none

Masaka: constraints and opportunities in dairy farming

Table 36: Masaka: Constraints and opportunities in dairy farming

Problems	Causes	Effects	Coping	Proposed solutions
Price of milk is too low Price of milk - 400/=	-There is mainly 1 buyer (MADDO) to whom many people supply – and is the one who determines what to pay. -Farmers not united - with one voice – so as to determine a fair common price	Farmers don't earn much compared to what they spend and this limits their development	Have tried to negotiate with current buyer (MADDO) to increase of price.	-Need help to look for other milk buyers elsewhere- thus increase competition / get better prices *Requires outside assistance* -Unity and cooperation among farmers *Local efforts can be made together with outside assistance*
Water is scarce and far	We have no means of storing water / harvesting in rainy season	Lack of enough water for the animals	Some have constructed small tanks to hold water	Farmers to be helped on construction of water harvesting facilities – even if its loans. *Requires outside assistance*
Lack of enough land for planting forage	- Land available is used for many other activities including growing crops - developing township thus plenty of housing units leaving little agricultural land	- Cattle are not fed well – thus give little milk	- Search around for forages in other places	- Farmers to have only that number of cattle on zero grazing that can be supported by available land - Farmers buy land outside municipality for pasture/ forage planting *Local efforts can be made by farmers*
Veterinary inputs like drugs, feed supplements are very expensive	-Taxes are high / drugs come from outside Uganda - Feed ingredients are expensive and scarce since some are exported	-Animals not treated at the right time and sometimes die. -Farmers do not earn enough	- some farmers use some herbal medicines - others have no coping strategies	-Scrap off tax or subsidize veterinary drugs and inputs *Requires outside assistance* -Farmers should unite or cooperate so as to start their own Vet inputs shop. *Local efforts can be made together with outside assistance*
- A.I services are	-Semen only got from	-Cattle sometimes miss	Nothing – just pay	-Semen and storage facilities

expensive - A.I conception rate is so low-resulting into repeat insemination thus increased expense	Entebbe and is from outside Uganda -Farmers are not fully practicing their knowledge on heat detection and timing of AI.	services - Cattle end up not calving / infertile - Farmers spend a lot of money before cattle conceive	when possible - Nothing – just find money and pay for the services - Some try improved cattle feeding for better conception	/ equipment should be brought nearer to the farmers *Requires outside assistance* - Farmers should practice better husbandry e.g. good feeding, heat detection and call inseminators in time *Local efforts can be made by farmers*
Shops of feeds & other inputs are very far from some farmers	Farmers in the area have not done enough to attract relevant traders.	It costs a lot to acquire inputs – prices and transport	Trying to solicit aid from NGO's	Farmers should unite / cooperate to either: -set up a well stocked Veterinary input shop themselves -or attract business people to do so. *Local efforts can be made together with outside assistance*
Credit facilities do not allow cows as a security	People seem ignorant about the value of dairy cows	Farming business does not develop	-Still lobbying various organisations for help -Have made their own farmers' "lending circle" To unite for easy services and credit facilities	Organize training programs - for the whole community - about the usefulness / value of dairy cows Cooperate and as a body try to attract a convenient credit service *Requires outside assistance*
Neighbors with "bad hearts" hurt cows - throw polythene bags, nails, etc	- Hatred without cause - Competition	Animals die	Try to act friendly e.g. give free milk sometimes	Try to set up security measures (e.g. dogs, construction of wall fences) *Local efforts can be made by farmers*
Its difficult to separate quacks from the right veterinary practitioners	Use the right doctors/ trained doctors – surgery and AI	Animals die		We have tried to consult the most technical people. *Requires outside assistance*

Farmers discussed their future aspirations related to livestock production and marketing and these were summarised as follows;

1. Improving on local breeds – AI
2. Setting up a farmers shop with all types of inputs as required
3. Get access to credit facility / services close by.
4. Need a price reduction in A.I services – especially in repeat cases
5. Increase in water harvesting facilities e.g. tanks, piped water
6. Farmers with Zero grazing units – to be educated and facilitated on biogas production
7. Get better breeds of high quality production of milk
8. Unity and cooperation so that they have one voice to get services

Masaka: Community Livelihoods

The main livelihood sources for the farmers in Masaka municipality include;

1. Livestock rearing
2. Crop farming
3. Business / trading
4. Public service
5. Boda boda (motor cycle transport business)
6. Catering services
7. Welding/ mechanics
8. Crafts
9. Carpentry
10. Builders
11. Casual labour
12. Fishing
13. Tree planting (nursery)
14. Brewing

Ranking of the above livelihood activities was done and represented in the Table 37 below.

Table 37: Masaka: Livelihoods analysis matrix

Current sources of livelihoods	Contribution to livelihoods (Rank in order of importance) (selected 6)	Contribution to cash income (1=very important, 2=somehow important, 3=not important)	Trends (1=becoming more important 2=less important, 3=new activity)	Differences in terms of gender, age, ethnic minorities
1. livestock rearing	1) Livestock rearing	1	1	Females and Males

2. crop farming	2) Business / trading	3	2	Youth
3. Business / trading	3) Crop farming	1	1	Youth, males and Females
4. Public service	4) Public service	1	2	male and female
5. Boda boda	5) Boda boda	2	1 & 3	Youth
6. Catering services	6) Catering services	2	1 & 3	Youth and Females
7. Welding/ mechanics			1	Males
8. Crafts			1	Youth and Females
9. Carpentry			1	Males
10. Builders			1	Males
11. Casual labour			2	Youth and Males
12. Fishing			1	Youth
13.Tree planting(nursery)			1 & 3	Women
14. Brewing			2	Women

Role of livestock in terms of livelihoods and cash income

Livestock was ranked highly as a source of livelihood in this community. However when it came to incomes, it was ranked less than trade and crop farming to be a source of income. This was explained by the farmers as follows;

- Irrespective of a number of households possessing livestock and strive to get money out of it, the inputs are very expensive yet the products sold from the livestock are at low prices, thus failure to break even. This makes it a lesser income earner compared to trade and public service.
- The quality of the products by many farmers was not so good, thus fetched less amount of money
- Some farmers reared livestock for other purposes like prestige, home consumption, and ceremonial rather than for business purposes.
- Few farmers were engaged in livestock rearing for commercial purposes, therefore less motivation to improve on breeds so as to increase milk production which would cater for home consumption later alone sale to earn an income.

Trends in the relative importance of Livelihoods and cash income

The farmers reported that new activities had become important sources of livelihoods and cash incomes, for example, Motorcycle transport (commonly known as boda boda taxi), brick making, and catering services. There were changes in relative importance of crops as a source of livelihood and cash income. This is due to the seasonal changes which affected crop yield, pests and diseases, increased urbanization and population increase. These factors put pressure on farm land. The number of farmers engaged in crop farming was becoming few; most farmers preferred getting engaged in trading or business because earning from it was quicker than farming. Livestock rearing gained importance as a source of livelihood and as a cash income, though with limitations mentioned earlier. Farmers were increasing adopting improved breeds especially milk breeds, seeking knowledge for better management, selling off local numbers in preference to a few high milk producing cows. New trends were seen in roles too with women increasing getting more involved in livestock keeping thus getting engaged in activities like milking.

Gender issues

In this area women and men were involved in livestock rearing. However most management aspects were left to the women since they stay home, thus taking responsibility of the cow like any other responsibility at home. The men usually move out to do off farm activities like trading, boda boda, brick making, employment etc. Crop farming was done by mainly the older people. The youth were more and more interested in quick cash yielding livelihood activities like riding boda boda, brick making and charcoal burning. Welding/ mechanics and building are mainly by males. Public servants and all those in monthly paid employment included females, youth and males. It was noted that the number of females was increasing, supposedly due to government's efforts in promoting education of the girl-child.

Masaka: Innovation systems and actors

Table 38: Masaka: Innovations and actor analysis

Conventional activities	Innovations	Innovating farmers
Inputs- Acaricides, labour, vet drugs, Vaccines, salt, water, crushes, spraying pump, pastures/fodder, housing for calves, ropes, wheel barrow, labour, fodder	***Inputs-*** Maize brand, mineral licks/salts, brewers waste	Site 1- Deo Walusimbi, John Bosco Lule, Hamida Namusoke, Ssempijja Samuel
Practices – Spraying, cross breeding, use of paid labor dehorning, making yoghurt, giving minerals, milk vending, castration, ear tagging, deworming, cushion	***Practices –*** zero grazing, Feeding brewers' wastes, maize brand, dehorning, crossbreeding with AI, , ear tagging, growing & feeding legumes, , selling pasture, cushioning cattle sleeping area, coat washing, bulking milk at dairy cooperative, udder washing before milking	Site 2- Maria Senkiima Lubyayi Mrs. Mpagi Mr and Mrs. Lubega
Breeds – Ankole long horn, Karamanjong(Locals)	***Breeds –*** Crosses (Nganda & Friesians), Jersey, Guernsey, Boran, shorthorn	
Products – Meat, Milk, hides & Skins, dung, Ghee	***Products –*** yoghurt, cheese, flavoured milk, ice cream.	
ACTORS Vet- HPI, Vet- Government, Consumers, HPI Herdsmen, Inseminator, Milk traders, Send a Cow, World Vision, Restocking project, Masaka Diocese, West Buganda Diocese(Anglician), subcounty, MADDO-dairy, Microfinance, Feed suppliers, Drug suppliers, CARITAS, CBOs, M.P (Joh Baptist Kawanga), NARO, UBOS, Private Vets, VI-Agroforestry		

Table 39: Masaka: Innovation actor matrix

Key actors	**Activities and services**	**Achievements**	**Challenges**	**Status** 0= Not active in the village 1= present in the village but less active 2= Present in the village and fully active	**Linkages** 0=not functioning 2=weak 3=needs strengthening 4=strong	**Satisfaction** 1=good 2=satisfactory 3= poor
Government Vets	- treat animals, control diseases, give advisory services		- ill facilitation from the local government - farmers failure to pay for services - Limited budget for municipality to facilitate livestock keeping	-Not active in the village	- not functioning	- poor
HPI- vet officer	Treats animals Advises farmers inseminates	Increased number of farmers with improved cross breeds Increased milk yields	-Large area of operation -Sometimes repeated heats - farmers failure to report heat and disease on time	Present in the village and fully active	strong	satisfactory
Input suppliers	- avail inputs in form of drugs, acaricides and feeds	- availed all different inputs in the area.	- high costs of the inputs leading to high pricing, thus failure for rural farmers to purchase these inputs	- Present in the village and fully active	- needs strengthening	- good
Send a Cow	Provided heifers trainings	Dairy cows in the area	Farmers failure to pass on cows	present in the village but less active	needs strengthening	Good
HPI	- trainings - facilitates the vet -facilitated building	- increased number of farmers involved in dairy production	- slow adoption	Present in the village and fully	Strong	Satisfactory

	of dairy - gives out cows	- increased number of cross- breeds -more knowledgeable local farmers in dairy animal management. - MADDO dairy				
Key actors	**Activities and services**	**Achievements**	**Challenges**	**Status** 0= Not active in the village 1= present in the village but less active 2= Present in the village and fully active	**Linkages** 0=not functioning 2=weak 3=needs strengthening 4=strong	**Satisfaction** 1=good 2=satisfactory 3= poor
Milk traders	- buys milk from farmers and vends in town	- acted as middle men thus assisted farmers who have no access to market	- fluctuating prices of milk - milk spoilage	Present in the village and fully active	needs strengthening	Good
NARO	Carries out research in area			present in the village but less active	needs strengthening-	Poor
Dioceses	- link various NGOs to farmers eg, HPI, CARITAS, Send a Cow - involved in dairy farming, sensitization	- various NGOs operating in the area. - farmers livelihoods and incomes improved through milk consumption and marketing	- farmers failure to join projects	present in the village but less active	Strong	Satisfactory

Extension workers such as the government sub-county based vet and other animal health workers are considered important actors but have weak linkages with the community. They are often ill-facilitated; lack motorcycles or have motorcycles without fuel budget at the sub-county. They also experience problems such as non-payment by farmers, being given false information about onset of heat by farmers.

Farmers are not willing to give them transport refund when they come to attend to their animals. Extension workers are few and have to work in a very wide area which makes them ineffective. Vet drugs are very expensive e.g. drugs for East Coast Fever and yet farmers are unwilling to pay highly for the vet services.

Although the inseminators are available in the area, the quality of the semen they use is not satisfying the farmers, this is evidenced by the offspring born after AI. There is therefore need for Semen bank that would guarantee the quality of semen, so that what farmers get as offspring are high yielding cross breeds.

The missing actors for improved dairy production and marketing listed by the participants were;

- Cooling plant/ dairy chilling plant in milk producing areas. (closer to farmers)
- The government veterinary officer.
- Good quality semen supplier

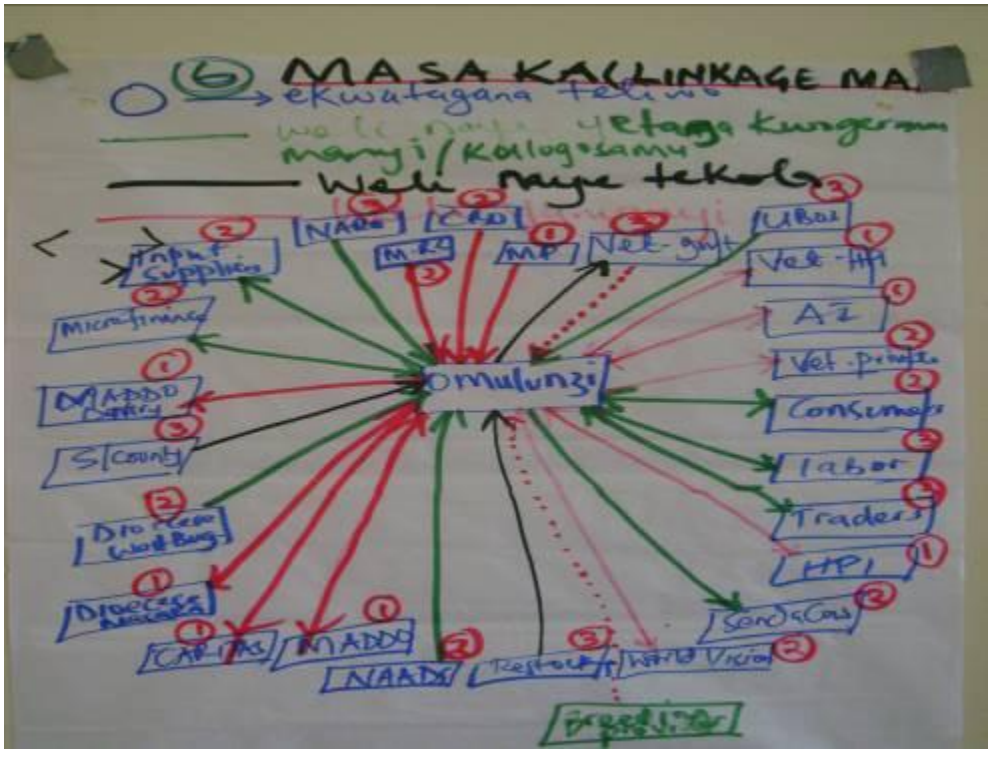


Plate 13: Masaka: Dairy Actor Linkages Network Diagram

Masaka: Livestock feeds and breeding systems analysis

Breed and Breeding Services

The PRA session started by facilitators asking farmers to identify the traits they consider important in dairy cattle. The following traits were mentioned in order priority.

1. long teats
2. number of teats (4)
3. Well spaced teats
4. wide behind quarter
5. back is arched (Friesian)
6. showing prominent big bones
7. Small neck (indigenous)
8. Protruding pelvic bones
9. Big udder

The most common breeds are Ankole/Nsagala and Nkaramoja (Indigenous breeds), Friesian and Jersey (Exotics) and Crosses of indigenous and Friesian.

Breeding Service Used is mainly Artificial Insemination which is provided by MADDO Heifer Project technicians. No Bulls are used because the farmers are well sensitized against using them and because of small pieces of land (being a municipality) – it is not conducive for rearing a bull.

Forages and Feeding Systems

Table 40: Masaka: Livestock feed types in Masaka municipality

Forages in communiity	Forage Prefered	Other feed sources	Feed suppliments
Grazing pasture: • *"Kalandalugu", "akacwamba",* • Pannicum maximum	• Napier grass	Banana peels, potato vines, potato / cassava peels Dried pastures / preserved silage, star grass, banana stems, banana pods (*empumumpu*)	- Salt - Dairy Meal - Mineral lick Feed supplementation is done by a few farmers because these inputs are expensive. Supplementation is done only for milking cows.
Forages: Napier grass, Guatemala, "*Kakirakambwa"*, Cariandra, lablab			

Forage production constraints in order of importance

Table 41: Masaka: Ranking of constraints

Constraint	Rank	AFFECTING	
		Numbers (production)	Productivity
Very small pieces of land	1	x	
Water / dry weather	1	x	x

Water is a big problem generally, but more especially for those farmers who stay in the hills and have to fetch water from the valleys.

Coping strategies during times of forage scarcity

- Give Preserved silage (Napier)
- Use "non traditional" feeds e.g., banana stems, banana leaves and banana pods (Empumumpu)
- Feed crop residues from Maize, cassava and groundnuts.

Table 42: Feed/ Forage seasonal calendar and estimation of feed sufficiency

MONTH	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
Season **FEED TYPE**	DRY LONG			WET SHORT			DRY SHORT		WET LONG			
1. Napier Grass				√			√		√			
2. Pastures (grazing)				√			√		√			
3. Legumes (Lab lab)				√			√		√			
4. Cariadra			√	√			√		√			
5. Kakirakambwa				√			√		√			
6. Silage (of napier)			√									
7. Sweet Potato Vines			√									

8. Cassava / potato / matooke peels	√	√	√	
9. Banana stems / pods	√			

Requirements for input supply and service delivery to livestock keepers

1. Need veterinary drugs and other inputs made cheaper and readily available to all dairy farmers
2. Need supply of veterinary drugs and other inputs brought closer to the rural areas
3. Need AI services to be made more readily available affordable and of good quality
4. Need to have qualified veterinary professionals and within easy reach to handle difficult cases.
5. Need reliable water supply of clean water

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