Field Scientific Report

Gendered Food Mapping on Matooke in Uganda

Understanding the Drivers of Trait Preferences and the Development of Multi-user RTB Product Profiles, WP1

Kampala, Uganda, November 2019

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This report has been written in the framework of RTBfoods project.

To be cited as:

Pricilla MARIMO, Kenneth AKANKWASA, Innocent MPIRIRWE, Lilian NDAGIRE, (2021). *Gendered Food mapping on Matooke in Uganda. Understanding the Drivers of Trait Preferences and the Development of Multi-user RTB Product Profiles, WP1.* Kampala, Uganda: RTBfoods Field Scientific Report, 66 p.

Ethics: The activities, which led to the production of this document, were assessed and approved by the CIRAD Ethics Committee (H2020 ethics self-assessment procedure). When relevant, samples were prepared according to good hygiene and manufacturing practices. When external participants were involved in an activity, they were priorly informed about the objective of the activity and explained that their participation was entirely voluntary, that they could stop the interview at any point and that their responses would be anonymous and securely stored by the research team for research purposes. Written consent (signature) was systematically sought from sensory panelists and from consumers participating in activities.

Acknowledgments: This work was supported by the RTBfoods project https://rtbfoods.cirad.fr, through a grant OPP1178942: Breeding RTB products for end user preferences (RTBfoods), to the French Agricultural Research Centre for International Development (CIRAD), Montpellier, France, by the Bill & Melinda Gates Foundation (BMGF).

Specific acknowledgments: We are most grateful to the study participants who shared their precious time with us and the mobilisers on the ground who organised and made the process manageable. We also wish to thank the enumerators: Moreen ASASIRA, Gloria AKURUT, Innocent MPIRIRWE, Justine ARINAITWE, Elizabeth KHAKASA, Daudi MUBIRU, Charity KIBOOGA and Justine AMENET. We would like to acknowledge Nelson KISENYI and Moreen ASASIRA for assisting with part of the data analysis.

This document has been reviewed by:	
Final validation by:	
Lora FORSYTHE (NRI)	17/02/2021

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ABSTRACT

‘Matooke’, a staple food made from Highland cooking bananas in the Great Lakes region of East Africa has been a focus for genetic improvement for resistance to pests and diseases. However, the limited information on user-preferred quality traits have led to sub-optimal adoption of new varieties and their subsequent impact on food security in the region. A gendered study to identify characteristics preferred by users who produce, process, consume and market matooke was conducted using survey data from 123 farmers, 14 focus group discussions and 40 traders in two matooke growing districts of Mbarara and Nakaseke in Uganda. The study showed that majority of the farmers sourced their planting material from their own farm, and a small percentage from government initiated programs. Limited adoption and use of improved varieties was attributed to their inferior taste compared to the land races, poor soils, lack of awareness and limited access to introduced improved varieties. There were minimal geographical and gender differences in preferences. Preferred characteristics for raw cooking banana included big bunch, big fruits, and mature bunches and green peel colour. Yellow pulp colour which is an indicator of good food is preferred. Desired characteristics for cooked matooke include soft texture, good taste, good aroma. Other traits related to marketing included compactness for easy stacking during transportation, while quality is lowered by bruising, quick ripening, and fingers that fall off easily. The increased demand for matooke was attributed to population growth and competitive prices which fluctuated with different seasons such as festive season and school term. Therefore, there is need for accurate demand-led breeding programs that incorporate user-preferred quality traits to increase adoption and impact of improved banana varieties.

Key words: Matooke, quality traits, adoption, gender, Uganda

SUMMARY

'Matooke' is a staple food made from Highland cooking bananas in the Great Lakes region of East Africa. Genetic improvement of these bananas for resistance to pests and diseases has been a priority breeding objective. However, there is insufficient information on fruit quality characteristics that different users prefer, resulting in sub-optimal adoption of new varieties. This study identified matooke characteristics preferred by farmers and traders, using survey data from 123 farmers, 14 focus group discussions and 40 traders. Gender differences were considered.

Crop farming was the main and most important livelihood activity for men and women, and all household members were involved. The main crops grown include bananas, beans, sweet potatoes, coffee, millet. Banana was ranked as the most important crop in each of the focus groups, irrespective of gender or region, due to its importance for food security, as matooke is a staple food in the study areas, and income generation. These reasons were unanimous and important for both men and women.

Three main wealth categories were identified: 'poor', 'moderate/medium wealthy' and 'wealthy', some communities had over 70% of people who were classified by key informants as poor. Importantly, each wealth category had access to a banana plantation. As expected, the size of plantation was larger with an increase in wealth category. Differences in the quality of soil and farm management practices among the wealth categories therefore may have trait implications for breeders. For example, intercropping bananas with coffee or beans was common in areas with land constraints, and farmers were also unable to practice crop rotation. Wealthier farmers, particularly men, have solely banana on their plantations, use manure and mulch.

Most farm plots are shared, and a minority (circa 10%) have separate plots. This may be the reason why gender roles in the tasks associated with banana production are not clear cut, and there is variance in practices between communities (e.g. manure application). However, interestingly, much of the regular maintenance tasks (e.g. desuckering, weeding) were done by women and men. Activities such as digging trenches and making ridges were mainly for men. Women and girls partake in the matooke preparation process.

Farmers in both districts prefer and grow local landraces. There are slight differences in the cultivars grown in the 2 districts and the rankings, for example Mpologoma is only prevalent in Nakaseke, whilst Enyeru seems to be more prevalent in Mbarara. In Mbarara, women ranked Nakitembe as the best variety and men ranked Kibuzi. Overall, in both regions, Nakitembe was the preferred variety due to its high yield, quick maturity, and production of medium to big sized bunches, big fingers, and good, soft, tasty food. WP2 will need to conduct physicochemical analysis to understand the components that the breeding program should focus on.

Close to three quarters of farmers indicated that they source banana planting material from their own farm, a small percentage sourced from Government initiated programs such as NAADS. Interesting, a higher proportion of women purchased varieties compared to men. Most farmers indicated that they did not have access to or aware of the improved varieties that have been introduced, hence the need for the banana breeding program to increase awareness and dissemination of the improved varieties that have been officially released. Other reasons for not using released varieties were inferior taste, poor soils and lack of access to trainings on how best to grow the cultivars.

Farmers in Mbarara who produce banana on a commercial basis harvest and sell more bunches compared to those in Nakaseke in both peak and off-peak season. Farmers in Nakaseke keep more for home consumption. Women reported producing average number of bunches that were less than men. Results indicate that more than 50% of farmers' produce is sold. Most men and women farmers sell their produce to traders (44%) and rural markets (32%). More farmers from Mbarara (21%) indicated that they sold to urban markets compared to Nakaseke (6%).

The most important processing steps for producing a high quality matooke sited by men and women were ensuring balanced amount of water, good amount of banana leaves, regulation of amount of fire and a good amount of leaf stalk.

The main characteristics that were found to drive variety preferences were agronomic (big bunch, big fruits) and quality (soft texture, good taste, good aroma, yellow food). There were minimal geographical and gender differences for trait preferences. Quality characteristics need to be defined in terms of physical–chemical underpinnings so that breeding programmes can apply accurate high-throughput systems, thereby improving adoption and impact of new banana varieties.

There were also a number of important findings from the demand study, which included interviews with 40 traders in the two districts. While the sample size was by no means representative of the characteristics of traders, findings from interviews showed clear differences between female and male traders, which require further investigation: Women traders, on average, had higher levels of education and were more often single, they were less likely to own the means of transport and traded in half the volumes men did at peak season. There were also a greater number of male wholesalers interviewed than women, and generally, wholesalers make more profit then retailers. This presents an interesting case for further gender analysis into the banana trade.

Important characteristics of the banana were also related to large bunches, big fingers, mature bunch, yellow pulp color and green peel color as the top characteristics that consumers consider for high-quality cooking banana. An additional quality mentioned by traders was ‘compactness’ likely related to the ease of the bunches to be stacked and transported. As can be observed, the bunch and finger size are the major attributes causing variations in the selection of bananas by consumers served by Nakaseke market.

The top four most preferred cooking banana varieties are: Nakitembe, Mpologoma. Musakala and Kibuzi for consumers served by Nakaseke banana traders, and Kibuzi, Mbwazirume, Butobe and Embururu for consumers served by Mbarara markets traders.

There are a number of factors during transportation, storage and selling that affect the quality of cooking banana. some of the most pressing problems were related to ripening, bruising, shrinkage of fingers and fingers that fall off.

Majority of the traders in both market areas noted increasing demand due to increasing population and low prices due to competition in trading. Prices trends fluctuated by peak and off-peak season, festive season and school fee season.

1 INTRODUCTION

This report is part of the RTBfoods project, Work Package (WP) 1. The main objective of RTBfoods is to deploy RTB varieties that meet user-preferred quality traits to increase the adoption and impact of improved RTB varieties in sub-Saharan Africa (SSA). To do so, the project is working to (1) Define what are the key user-preferred quality traits for a range of RTB food products (cassava, yam, potato, sweet potato, banana) through surveys with end-users (product profiles); (2) Link these product profiles with biophysical and functional properties of RTB food products, and develop laboratory-based methods to assess these properties in a quantitative manner; (3) Develop high-throughput phenotyping protocols (HTPP) for rapid screening of user-preferred quality traits in new RTB varieties; (4) Integrate key user traits into breeding and variety deployment programs.

WP1 provides the evidence base for user's preferred characteristics for the selected products that are the focus of the RTBfoods project. Varietal preferences start with the demand from a range of users, such as producers, processors, retailers and consumers along the food chain. User's varietal choices are informed by the preferences they have for certain characteristics of the crop (characteristics preferred) that can be linked to traits. Preferences for characteristics, are in turn, influenced by the products, and their variations, that users make (e.g. matooke in Uganda, gari, fufu or pounded yam in Nigeria), and for what purpose (e.g. urban or rural markets, household consumption). Users often have several specific characteristics that they prefer and/or have 'non-negotiable' sets of characteristics such as cooking banana cultivars that produce soft food *(matooke*) in Uganda. Different interests can therefore culminate into trait packages that can help explain the drivers of varietal acceptance.

Sometimes there are clear differences in the characteristics preferred by user groups but other times it is more complex. Different users of a crop may live in the same household, have different interests with how the crop is used and what products are made. This can result in multiple and, perhaps, contrasting preferences that vary according to the user's role in the food chain, meaning that the input and decision-making roles of different users is of primary importance in RTB crop breeding.

Preferences for certain product characteristics stem from broader socio-economic and gender dynamics, which are in turn an integral part of understanding crop choice and use. Men, women, boys, girls, different social groups play different roles in RTB food chains, and differ in their access to, perceptions of risk for, and ability to decide on use of improved varieties. For example, gender roles regarding household food security and marketing can mean that one gender may prioritise crop or product storability characteristics (in ground or post-harvest) over yield characteristics. In addition, in locations with shared farming systems between men and women, one household member may have more decision-making authority on cropping decisions than others. Different varietal characteristics can also influence the level of labour and exertion involved in processing. In addition, consumers have their own sets of sensory preferences linked to different varieties, and consumers may have different preferences based on their background, gender, location or food culture. Therefore, characteristics that respond to multiple-use and multiple-user groups (such as yield and disease resistance), or differentiating segments of use, including men and women in all their diversity, are an important factor in breeding initiatives.

However, there is a gap in knowledge of preferences for RTB crops among different user groups, particularly food processors, retailers and consumers, and diversity within user groups (e.g. producers can have different size of landholding, access to extension etc.), as breeding programmes have historically focused on production related characteristics at the expense of post-harvest and consumer preferences. In addition, information on characteristics is often overly simplified by not including optimal range or detailed and precise descriptions that would help breeders be able to meet user needs. Furthermore, there is little known about how gender relations and norms influence and result in preferred characteristics, along with varietal uses. WP1 aims address these gaps in knowledge, which will contribute to shaping crop breeding to be more responsive to user needs along the food chain.

The WP1 approach uses participatory, interdisciplinary methods and lines of inquiry (food science, gender and economics) to collect evidence on the preferences of RTB product characteristics for different user groups in the product chain and identify factors that influence these preferences for men, women and other social segments, and how they may be prioritised differently (e.g. labour requirements and storability may be prioritised more by one group whereas another group might prioritise yield characteristics). The delivery of the information is expected to support the capacity of RTB breeding programmes to be more demand-led. The approach has the following activities:

- Activity 1: State of Knowledge review
- Activity 2: Capacity strengthening and sharing
- **Step 2: Gendered product mapping**
- Step 3: Community-based RTB Food processing/preparation diagnosis
- Step 4: Consumer taste tests in rural and urban market segments

This report presents the findings for Step 2, Gendered product mapping.

Step 2 focused on banana and the main staple (steamed mashed *matooke)* prepared from cooking banana in Uganda, in order to identify the quality characteristics along the value chain in particular production, post-harvest use and handling and trade-offs by different stakeholders, from a gender perspective.

The specific objectives of Step 2, are to:

- Understand who is producing, processing, selling and consuming banana and steamed-mashed *matooke* from a gendered perspective
- Understand the multiple uses and products of banana and possible trade-offs between uses
- Identify the quality characteristics and descriptors by stakeholder group (producers, household level preparers and demand segment (rural consumers). The banana farmers who were targeted in the study are producers, processors and consumers
- Understand how gender influences preferences and prioritisation for characteristics.

2 METHODOLOGY

Under Step 2, four activities were carried out in eight rural communities in Nakaseke and Mbarara districts where farmers grow, process and consume banana. The activities included:

- Key informant individual interviews (KIIs) with community leadership (parish councillors), agricultural extension staff, farmer group leaders and village model farmers
- Sex-disaggregated Focus Group Discussions (FGD) with farmers who produce, process and consume banana. The FGDs focused on livelihood activities, farming practices in banana productions systems, gender roles in banana production and processing and marketing, access to new banana cultivars, important crops in the community, banana uses, community wealth ranking, most and least preferred attributes of steamed *matooke* and cultivars used to make, most important steps in preparation of steamed mashed matooke,
- Individual interviews (II) with farmers who produce, process and consume banana. The IIs provided individual/household level description of preferred characteristics and priorities at different stages of product processing, household decision making, and trade-offs.
- Market Interviews (MI) with key individuals or groups involved in marketing and trading activities (Data collection and entry still ongoing)

Two districts in Western and Central Uganda were purposively selected based on banana production levels. Mbarara district in western Uganda was selected as a representation of high production areas while Nakaseke District which is in central Uganda was selected as a representation of low production areas. In addition, these districts serve as site locations where the banana program is conducting evaluation of hybrid banana varieties. Banana consumption (and production) in Uganda is concentrated in the central and western regions with the latter having the highest consumption; consumption is least

in the northern region (Kilimo trust, 2012). Production is mostly done by smallholder farmers who usually grow diverse varieties for home consumption (Kabahenda and Kapiriri 2010).

Table 1 WP1 Synthesis Table for Step 2 on Matooke (Uganda)

Activities reported in Period 1 on Matooke in Uganda			*Dates of Field Surveys*		*Regions surveyed*	*List of Localities: Villages*	*Nb of Individual Interviews*		*Nb of Focus groups*	*Nb of Key Informant Interviews*
			start	*end*			*M*	*F*		
Step 2	*Primary Country*	*Uganda*	22/20/18	15/11/18	Mbarara	Nyindo	10	3	2	1
						Kacuucu	11	8	2	1
						Mutuumo	9	7	2	1
						Keiba	9	6	2	1
					Nakaseke	Kabala	6	11	2	1
						Kabila	7	6	2	1
						Kalagala	7	8	2	1
						Nakaseeta	5	10	1	1
Total							**64**	**59**	**15**	**8**

The total sample was composed of 52% men and 48 % women (Table 2). Majority of the respondents (71%) were married. Around 35% of the Women respondents were widowed. Almost all respondents were farmers. Most of the male respondents (96%) were household heads compared to just over half of the Women respondents. The sample represented diverse ethnicities which might influence values and customs.

Table 2 Demographic characteristics of respondents by sex

Demographic characteristic		**Women (n=64)**	**Men (n=59)**	**All (n=123)**	**chi**	**p**
Marital status (%)	Divorced/ separated	8.5	4.7	6.5	22.089	0.000
	Married/ cohabiting	54.2	87.5	71.5		
	Single/ never married	6.8	6.3	6.5		
	Widowed	30.5	1.6	15.5		
Ethnicity (%)	Muganda	43.1	33.3	38.0	9.424	0.151
	Mukiga	-	1.6	0.8		
	Munyankole	44.8	61.9	53.7		
	Munyarwanda	8.6	1.6	5.0		
	Murundi	-	1.6	0.8		
	Musoga	1.7	-	0.8		
	Tanzanian	1.7	-	0.8		
Main occupation (%)	Farmer	96.6	96.9	96.8	0.007	0.934
	Non-farm employment	3.4	3.1	3.3		
Relationship to household head (%)	Daughter	1.7	-	0.8	34.577	0.000
	Head	54.2	96.9	76.4		
	Son	-	1.6	0.8		
	Spouse	44.1	1.6	22.0		

3 FINDINGS: SOCIO-ECONOMIC CONTEXT AND PRODUCT PREFERENCES

3.1 Social segmentation and livelihoods

AT A MINIMUM, ANSWER 1-2 OF THE QUESTIONS IN THIS SECTION (in BOLD). FOCUS WHERE THERE IS THE BEST QUALITY DATA IDEALLY WITH TWO TOOLS TO INCREASE CONFIDENCE IN RESPONSES.

What are the livelihood activities of people in the community involving food crops? How important are these activities for people in the community? FGD Q2

Table 3 Livelihood activities (FGD responses)

Male/female FGD + Community name	Livelihood activities, people more involved in activity
Women's FGD, Kabala village, Nakaseke district	crop farming for food and income (bananas, beans, maize, cassava, sweet potatoes, and coffee). animal farming (cows, pigs, goats), hand crafts and weaving (mats and baskets). brick making (men), charcoal burning (men).
Men's FGD, Kabala village, Nakaseke district	crops farming (all), sweet potatoes, maize, cassava, beans, bananas, coffee, animal farming (all), women mainly rear pigs while men rear cattle, charcoal production (men), trading (men)
Women's FGD, Kabila village, Nakaseke district	crop farming (bananas, sweet potatoes, cassava, yams, maize, coffee and beans), livestock production done for commercial purposes, brick laying and weaving baskets and mats
Men's FGD, Kabila village, Nakaseke district	crop farming (all), coffee, maize, bananas, beans, sweet potatoes, animal farming (all) cows, goats and pigs, charcoal trade (men) and brick laying (all)
Women's FGD, Kalagala village, Nakaseke district	crop farming (women, men, youth), brick making (men), weaving (women), trading (all) burning charcoal for sale (men), livestock farming (men and women)
Men's FGD, Kalagala village, Nakaseke district	crop farming (men, women and youths), animal farming (women, men and youths)
Women's and men's FGD, Nakaseeta village, Nakaseke district	trading (all), crop farming (all), livestock production (all), brick laying (all), boda-boda riding (men).
Men's FGD, Nyindo village, Mbarara district	crop farming for food and income (bananas, coffee, millet, beans and cassava), sand mining, brick laying and small retail shops.
Women's FGD, Nyindo village, Mbarara district	crop farming (bananas, sweet potatoes, beans, millet, cassava, coffee), brick laying, sand mining, building/constructing houses, retail in agricultural produce including selling matooke, coffee, millet and beans
Men's FGD, Kacucu village, Mbarara district	crop farming (coffee and bananas), sand mining, brick laying and retail trade.
Women's FGD, Kacucu village, Mbarara district	crop farming on hired land (all), cooking banana (matooke), millet, beans, cassava, sweet potatoes, groundnuts, cabbage mainly for home food, sale of casual labour for on farm activities like digging and weeding, brick making (men), sand mining (men).

Male/female FGD + Community name	Livelihood activities, people more involved in activity
Men's FGD, Mutuumo village, Mbarara district	crop farming (all), bananas, sweet potatoes, coffee(all), trading, animal farming (all).
Women's FGD, Mutuumo village, Mbarara district	crop farming (all), bananas, beans, millet, coffee, cassava, sweetpotato, onions, maize, cabbages and tomatoes, livestock farming, providing casual labour, small scale business (men).
Men's FGD, Keiba village, Mbarara district	crop farming (all) banana, coffee, beans, millet, maize, cabbage, tomatoes), animal farming (all), cattle, goats, pigs, chicken(all), fishing (men), boda-boda (male youth).
Women's FGD, Keiba village, Mbarara district	crop farming mainly for food and income (bananas, sweet potatoes, coffee, millet, cassava, groundnuts), animal farming for food, income and manure (cows, goats, pigs and poultry), trade (retail trade and hotels), women groups (saving Sacco) for soft loans to members.

Almost all FGDs mention crop farming as a livelihood activity and indicate that everyone in the household in involved. Main crops grown include bananas, beans, sweet potatoes, coffee, millet. Men are mostly involved in activities such as brick making, sand mining, boda-boda riding business and charcoal making whereas women are mostly involved in basket weaving. One FGD in Nakaseke specifically mentioned that women mainly rear pigs while men rear cattle.

What are the different wealth categories in your community? How would you describe the differences between the groups in your community? FGD Q3

Table 4 Wealth categories (FGD responses)

Male/female FGD + Community name	Wealth categories mentioned in FGDs
Women's FGD, Kabala village, Nakaseke district	• Poor (30%): own 3 acres of land and less, unable to utilise all land, stay in mud and grass thatched houses, children go for free universal primary education or don't go to school at all. • Moderate wealth (50%): own between 3-10 acres of land, stay in good house with cow dung/mud floor, own motorcycles/bicycle for their transport. • Wealthy (20%): own between 10-20 acres of land, own like 100 cows, stay in good houses with cemented floor and own a car
Men's FGD, Kabala village, Nakaseke district	• Poor (44%): own chicken, 1 pig, own less than 0.3 acres of banana plantation, no coffee plantation, are generally landless and own bicycle as transport means. • Moderate wealth (50%), own 2 acres of land, own 0.3-1 acre of banana plantation and 0.3-1 acre of coffee plantation, own 1 cow and own motorcycle as transport means. • wealthy (6%): own at least 5acres land, own at least 1acre of coffee plantation, at least 1 acre of banana plantation and at least 10 cows.
Men's FGD, Kabila village, Nakaseke district	• Poor (45%): own 0.125 acres of banana plantation, no coffee plantation, are generally landless and own no means of transport. • Moderate wealth (33%), own 0.5 acres of banana own at most 0.25acre of coffee plantation, own 1 cow and own bicycle as transport means. • Wealthy (22%): own at least 1acres land, own at least 1acre of coffee plantation, at least 1 acre of banana plantation, at least 1 cow, own a motorcycle as transport means.
Women's FGD, Kabila village, Nakaseke district	• Poor (28%): own houses and inadequate earnings. • Moderate wealth (57%), own good houses, rear animals, look after their family and own a motorcycle and bicycle as transport • wealthy (14%): own at least 30 acres of land, own good houses, rear animals, have a big family, own a motorcycle as transport means.

Male/female FGD + Community name	Wealth categories mentioned in FGDs
Men's FGD, Kalagala village, Nakaseke district	• Poor (50%): small plot or landless, buy bananas for home consumption, don't own cattle, chicken or family house • Medium (37%): own at most 1acre land, produce mostly for home and little for sale, own few local chickens, own a cow, own a family house • Rich (13%): own 4+ acres of land, produce enough food (bananas) for home and market, own 5+ cattle, own 200 chicken, landlords/ladies with houses that have 10+ rooms
Women's FGD, Kalagala village, Nakaseke district	• Poor (70%): don't own land, strive to get basics • Medium (20%: own a motorcycle, own 1 cow • Rich (10%): have good houses, own around 100acres of land, own 100+ cattle, own a car,
Women's and men's FGD, Nakaseeta village, Nakaseke district	• Poor (70%): own less than 1 acre of land, own house, own 1 cow, rear goats or chicken and have a bicycle as transport means. • Moderate wealth (20%), own house, own at least 5 cows, at least 1 acre of coffee, at least 1 acre of bananas, own car or motorcycle as transport means. • Wealthy (10%): own at least 10 acres of land, own 2 acres of banana plantation, own 3 acres of coffee plantation, own at least 50 cows, own houses, own a car or motorcycle as transport means
Men's FGD, Nyindo village, Mbarara district	• Rich (20%): harvest 70 bunches a month and 60-100 bags of dried coffee annually, own 15-30cows, own cars (good cars). • Medium class (30%): own 5 cows, harvest 25 bunches of bananas and 10 bags of coffee and 1 bag of beans. • Poor (50%): provide casual labour like in the sand mine, children are often sent away from school
Women's FGD, Nyindo village, Mbarara district	• Rich: own more than 3 cows, own coffee plantation (produce 5-6 bags/season), don't hire land for cultivation, own more than 1 banana plot, children go to school • Moderate: don't hire land for cultivation, take children to school • Poor: children don't go to school or drop out early, cannot afford to rent land for cultivation
Men's FGD, Kacucu village, Mbarara district	• Poor (70%): own ¼ acre of banana, harvest one bunch/month, don't grow coffee, don't own cattle • Moderate (20%): own 1.5acres of banana, harvest 25 bunches/month, produce 1.5 tons of coffee/yr., own 2 cows • Wealthy (10%): produce 2+tons of coffee per yr., harvest 50 bunches of bananas/month, own 5+cows
Women's FGD, Kacucu village, Mbarara district	• Poor: educate chn up to primary level or chn drop out before completing primary, own chickens only, don't sell bananas from their plantation, use banana peels as manure • Moderate: educate chn up to S4, own one cow, sell bananas from own plantation (3 bunches/month) • Wealth/rich: educate children up to university level, own 2-3 cows, sell bananas from own plantation (20+bunches per month), mulch banana plantations using coffee husks and cow dung
Men's FGD, Mutuumo village, Mbarara district	• Rich (10%): farming (banana plantation) 300 bunches\ month, enough food, cows (300 cows) a canter of milk\day, expensive house (big compound), expensive medical care, has a car (expensive and costs 40 million), educate children abroad in expensive schools • Medium (50%): harvests 50-150\month, 5-20 cows, produce 40+ litres per day, own 8-10 goats, own a good house, has a car 25million, medium healthy services, children go to good schools • Poor '*abahans*i' (40%): can only meet basic needs, rents accommodation, does manual labour, muddy houses, children don't go to school and to some UPE
Women's FGD, Mutuumo village, Mbarara district	• Poor: own half acre of land, small sized house, own less than 3 goats, has no bicycle, chn educated by women • Medium: own an acre of land, have a plastered house, can afford to pay school fees, chn go to fairly good schools • Rich: own big banana plantation, have a good house, have a lot of cattle, have a vehicle, chn are educated, chn go to school in Kampala

Male/female FGD + Community name	Wealth categories mentioned in FGDs
Men's FGD, Keiba village, Mbarara district	• Rich (10%): Farm less or equal to 50 acres, own up to 30 cows, up to 6 acres of banana, chn educated up to university level, own a car • Moderate (10%): own 1 acre, 2 cows, banana plantation 2acres, chn educated up to secondary level, own motorcycle or bicycle • Poor (80%): No farm, own one pig, own ¼ acre of bananas, chn educated up to primary level, no transport means
Women's FGD, Keiba village, Mbarara district	• Rich (10%): own banana plantation (at least 2ha), harvest at least 50 bunches per month, harvest at least 2 tonnes of coffee/year, have at least 5 heads of cattle • Medium (20%): own banana plantation (at least 1.5ha), harvest around 20 bunches per month, harvest around 1.5 tonnes of coffee/year, have around 2 heads of cattle • Poor (70%): own banana plantation (0.25acres), subsistence production (1 bunch per month), own no coffee plantation, own no livestock

All the FGDs defined three wealth categories: 'poor', 'moderate/medium wealthy' and 'wealthy'. The distribution of the proportion of household in the different categories differed slightly. In Nakaseke district, all the FGDs (except one) indicated that around 70% of the households were poor. Asset ownership and type of asset was the main criteria used define the wealth categories. Variables/factors such as land area, housing ownership and type of housing, number and type of livestock owned, car, motorcycle, bicycle ownership were used by participants to group the wealth categories.

3.2 Farming practices and social segmentation

AT A MINIMUM, SUMMARISE THE FARMING PRACTICES IDENTIFIED IN EACH OF THE COMMUNITIES, NOTING GENDER DIFFERENCES ON SHARED OR SEPARATE PLOTS. THESE FINDINGS CAN BE IMPORTANT FOR BREEDERS.

Are there differences in the ways in which people farm in your community? FGD Q 4.1

Are these differences related to different groups of people in your community? Probe social segments. FGD Q4.2

Table 5 Farming practices (FGD Q4)

Male/female FGD + Community name	Farming practice (q4.1)	People who practice (q4.2)
Men's FGD, Kabala village, Nakaseke	manure application, mulching	men
	weeding	women
	intercropping	men and women
Women's FGD, Kabala village, Nakaseke	manuring, desuckering, detrashing, fibre removal	women and men
	trenches, monocropping	men, rich men
	intercropping	women
Men's FGD, Kabila village, Nakaseke	weeding, manuring, pruning, spraying, digging ridges, supporting stack, putting wind breakers	men
	mulching, cutting male bud	women
	desuckering	men and women
Women's FGD, Kabila village, Nakaseke	dig trenches, manuring, early planting, pruning, mono-cropping, mulching, inter-cropping, desuckering	not specified who does what
Women's FGD, Kalagala village, Nakaseke	mulching, manure application	not specified
Men's FGD, Kalagala village, Nakaseke	mulching, manure application	not specified
Women's and men's FGD, Nakaseeta village, Nakaseke	ridges and trenches	men
	mulching, watering	men and women

Male/female FGD + Community name	Farming practice (q4.1)	People who practice (q4.2)
Men's FGD, Nyindo village, Mbarara	monocropping, manuring, mulching	rich
	ridging, digging trenches	men
	intercropping	women
	weeding	men and women
Women's FGD, Nyindo village, Mbarara	water retention (*ebitaba*), disease control, pruning, intercropping	not specified
	manuring	rich
Men's FGD, Kacucu village, Mbarara	mono-cropping	rich
	manuring	women
	terraces/trenches	men
	desuckering, pruning, weeding, corm removal, fibre cuttings, mulching, compost manuring, intercropping	
Women's FGD, Kacucu village, Mbarara	*okutera enkonya*, digging ditches	men
	weeding, manuring,	women
Women's FGD, Mutuumo village, Mbarara	intercropping, tilling, desuckering, weeding	men and women
	applying cow dung manure, ridging, mulching	men
Men's FGD, Mutuumo village, Mbarara	monocropping, intercropping, detrashing	men and women
	desuckering, corm removal, trenches	men
	weeding, mulching, manuring	whole family
Men's FGD, Keiba village, Mbarara	weeding	all family members and some hired labour
	desuckering	men and women
	tilling, manuring, corm removal, pruning, mulching, water basins, stacking	men
Women's FGD, Keiba village, Mbarara	intercropping, mulching, corm removal, desuckering, fibre cutting, pruning	not specified
	Terracing	men
	weeding	men and women
	monocropping, manuring	Rich

Some quotes:

"Women practice intercropping more but normally it is an agreement between men and women" Men FGD, Mbarara

"Intercropping bananas with coffee or beans is done because land is not enough. There is no option and its usually subsistence. Men and women agree but women do it more." Men FGD, Mbarara

Do men and women farm on separate plots or shared farms in this community? If separate, what are the differences and similarities between men and women's plots? If shared, what proportion are each? If men and women farm together, are there differences in the type of work that men and women do? FGD 4.3

Table 6 Differences in men and women's plots (FGD 4.3)

Male/female FGD + Community name *	Women's plots	Men's plots
Men's FGD, Kabala village, Nakaseke district	intercropped with coffee, ground nuts, and don't apply manure or mulch	intercropped with coffee, apply manure and mulch
Men's FGD, Kabila village, Nakaseke district		men's garden cared for more, apply cow/animal manure, mulch and pesticides

Seven of the 15 FGDs indicated that plots are jointly shared; four highlighted that a few families have separate plots whilst majority have shared plots. The FGDs which highlighted any differences between men's and women's plots are listed in the table 6. Only one FGD in Mbarara mentioned sole ownership by men, *"Men own the banana plots unless he passes on and the woman takes over"*

"The participants agreed that there is a difference between women and men plots. Individual plots are about 10%. The men's garden receives more care - apply cow/animal manure, mulch and pesticides." Men's FGD, Kabila village, Nakaseke district

3.3 Important crops in the community

Priority question: What are the three most important crops for people in your community, in order of importance (1 is most important)? FGD 5.1

Table 7 Frequency of mention of the 3 most important crops by sex and district

Count	Women	Men	Mbarara	Nakaseke	Women	Men	Mbarara	Nakaseke	Women	Men	Mbarara	Nakaseke
	1st	1st	1st	1st	2nd	2nd	2nd	2nd	3rd	3rd	3rd	3rd
Banana	3	3	4	2	1	1	1	1	0	0	0	0
Beans	0	0	0	0	3	2	4	1	0	2	1	1
Maize	0	0	0	0	0	0	0	0	2	0	0	2
Coffee	1	1	1	1	0	1	0	1	0	1	1	0
Millet	0	0	0	0	0	0	0	0	0	1	3	0

Table 8 Important crops in rural communities (FGD 5.1)

Crop importance	Women	Men	Mbarara	Nakaseke	ALL
1st	Banana	Banana	Banana	Banana	Banana
2nd	Beans	Coffee	Beans	Coffee	Beans
3rd	Coffee	Beans	Coffee	Beans	Coffee
4th	Maize	Millet	Millet	Maize	Millet
5th					Maize

In total, 8 FGDs (4 men only and 4 women only) provided rankings of the 3 most important crops in their communities. Banana was ranked highest irrespective of district or sex of respondents.

Why are those crops important? FGD 5.2

Are there groups of people in the community for whom the crop is more important? (Probe differences in social segments) FGD 5.3

Table 9 Reasons why the crop is important and for who (FGD 5.2 and 5.3)

Crop	Reasons why the crop is important (FGD 5.2)	People for who the crop is important (FGD 5.3)
Banana	Food security (all FGDs) Income (all FGDs)	Household (all FGDs)
Coffee	Income/ perennial income (**10 FGDs**; 4 women only, 5 men only, 1 both; 5 Mbarara, 5 Nakaseke) Collateral and clearance for loans (**2 FGD**s; men FGD, Kacucu, Mbarara; women's FGD Nyindo, Mbarara)	Household but mostly men (women's FGD, Kabala, Nakaseke; men's FGD, Kabila, Nakaseke) Men (men's FGD, Kacucu, Mbarara; men's FGD, Nyindo, Mbarara; Men's FGD, Kabila, Nakaseke) Men and women (Women+ men's FGD, Nakaseeta, Nakaseke)
Beans	Food (**12 FGDs**; 5 women, 6 men only, 1 both; 6 Nakaseke, 6 Mbarara) Income (**9 FGDs**; (5women only, 3 men only, 1 both; 5 Mbarara, 4 Nakaseke)	Household Men and women
Cassava	Food (**8 FGDs**; 3 men only, 4 women only, 1 both; 5 Nakaseke, 3 Mbarara) Income (**1 FGD**; women + men's FGD, Nakaseeta)	Household
Maize	Food (**9 FGDs**; 5 women only, 3 men only, 1 both; 6 Nakaseke, 3 Mbarara) Income (**3 FGDs**; 1 men only, 2 women only; all from Nakaseke)	Household
Sweet potato	Food (**6 FGDs**; 3 men only, 3 women only; 4 Nakaseke, 2 Mbarara)	Household
Irish potato	Food (**2 FGDs**; women's FGD, Kalagala, Nakaseke, men's FGD, Kalagala, Nakaseke	
Millet	Food (**6 FGDs**; 4 women only, 2 men only; all from Mbarara) Cultural purposes (**1 FGD**; Men's FGD, Keiba, Mbarara) Beverage (1FGD) Income (1FGD; Men's FGD, Mutuumo, Mbarara)	Household

Banana is mentioned as an important crop for food and income in all FDGs. Coffee is an important cash crop grown in both districts. Some crops were mentioned in only one of the districts e.g. millet was only mentioned by FGDs in Mbarara whilst maize was mentioned as one of the most important crops in Nakaseke.

"Coffee is our major cash crop. Banana is important because we get food for family survival and daily income…Whereas income from coffee is on a yearly basis, banana income is constant" (Men's FGD, Nyindo, Mbarara)

"Coffee most important to the man. He buys family needs, pays tuition and buys other items of food" (Men's FGD, Kacucu village, Mbarara)

3.4 Crop of focus

***Please describe how the crop is generally grown in this community (KII Q4)**

***What is the estimate proportion (%) of people in the community who grow the crop? KII Q5**

***Can you estimate the proportion (%) of the crop that the average household uses for making the product? Probe on social segmentation gender, ethnicity, age, wealth status. KII Q8.**

Table 10 Banana crop production and consumption in the target communities (KII Q4, 5 and 8)

District	Village /Community	Description of how the crop is grown	Proportion (%) of people in the community who grow the crop	Proportion (%) of the crop that the average household uses for making mashed matooke
Nakaseke	Nakaseeta	Intercrop with coffee, beans. 2 seasons (Mar to June and Aug to Nov. Harvest throughout the year.	65%	Home consumption- 55% Sale-35% Other products (mwenge)- 10%
Mbarara	Nyindo	Intercrop with beans, coffee. 2 seasons: Feb- May then Aug-Dec. Harvesting (May- June then Nov-Feb)	100%	Home consumption- 60% Sale-40%
Mbarara	Kacuucu	Grown using spacing of (3x3) meters. Intercrop with beans, coffee, yams, soybean. Crop rotation not common due to land shortage. Planting done from late Feb to Jun	100%	Home consumption- 60% Sale (bunches of matooke)-40% No other products
Mbarara	Keiba	Intercrop with beans cassava, maize throughout the year. Planting done with 1st rains, Mar -May and 2nd rains Aug – Dec. Harvesting, Jun- Jul and then Jan - Feb	100%	Home consumption- 60% Sale-40%
Nakaseke	Kalagala	Intercropped with other crops Matooke is harvested throughout the year. Planted during 1st rains from Mar - Jun and 2nd rains from Aug - Nov	75%	Home consumption- 70% Sale-30%
Nakaseke	Kabila/Kabala	Intercrop with coffee, beans, maize, groundnuts and soybeans	90%	Home consumption- 75% Sale-25%
Nakaseke	Kabila/Kabala	Intercropped with coffee, beans, groundnuts, cassava, maize and soybeans.	80%	Home consumption- 70% Sale-30%
Mbarara	Mutuumo	Intercrop with beans and groundnuts. Space banana in rows with (3x3) metres. Don't practice crop rotation Planting time: 1st rains from Apr-Jun and 2nd rains Aug-Nov. Harvesting times: 1st rains Jun-Jul the from Dec	10	Home consumption- 30% Sale -70%

There are no significant differences in the proportions of harvested bananas kept for home consumption and sold. Majority of communities intercrop banana with other crops, plant and harvest bananas using two seasons per year. No differences between men and women were highlighted.

3.5 Varieties of the crop and planting material

What are the varieties of the [crop under study] that you grow? Rank in order of importance 1=most important. (Note local and technical name – verify with key informant) II Q15.1

Table 11 Top 5 varieties grown in order of importance (II Q15.1)

	Rankings							Summary scores						
	Mbarara			Nakaseke				Mbarara			Nakaseke			
Cultivar	Women	Men	ALL	Women	Men	ALL	Grand Total	Women	Men	ALL	Women	Men	ALL	Grand total
Nakitembe (L)	1	3	2	1	1	1	1	30	32	62	50	22	72	134
Kibuzi (L)	2	1	1	7	6	6	2	25	54	79	5	6	11	90
Mbwazirume (L)	7	3	4	4	3	4	3	3	32	35	14	12	26	61
Enyeru (L)	3	2	3				4	18	33	51	0	0	0	51
Nshakala (L)		12	13	2	5	2	5	0	1	1	29	9	38	39
Mpologoma (L)				3	4	3	6	0	0	0	21	10	31	31
Kisansa (L)				6	2	5	7	0	0	0	6	13	19	19

Farmers in both districts prefer and grow local landraces. There are slight differences in the cultivars grown in the 2 districts and the rankings, for example Mpologoma is only prevalent in Nakaseke, whilst Enyeru seems to be more prevalent in Mbarara.

Why do you grow this variety? II Q ~~15.2~~ 16.2 a+b

Table 12 Reasons why the variety is grown (IIQ15.2 16.2).

Variety* ** and products	Reasons why preferred	% of respondents citing (n=122)
Nakitembe (L)	Medium-big bunch	25.4
	Quick maturity	19.7
	Produces good, soft, tasty food	17.2
	Big fingers	9.0
	High yielding	8.2
Kibuzi (L)	Medium-big bunch	26.2
	Quick maturity	25.4
	Produces good, soft, tasty food	24.6
	Big fingers	23.7
Mbwazirume (L)	medium-big bunch	27.9
	Quick maturity	26.2
	Produces good, soft, tasty food	23.8
	High demand/ marketable	20.5
	Tolerant to drought	9.0
Enyeru (L)	Quick maturity	32.8
	Has medium-big bunch	24.6
	Produces good, soft, tasty food	23.8
	High demand/ marketable	23.0
	Produce big fingers	6.6

Variety* ** and products	Reasons why preferred	% of respondents citing (n=122)
Nshakala (L)	Has medium-big bunch	28.7
	Produces good, soft, tasty food	23.0
	Quick maturity	18.0
	High demand/ marketable	12.3
	Produce big fingers	10.7
Mpologoma (L)	Has medium-big bunch	21.3
	Produces good, soft, tasty food	13.1
	Quick maturity	13.1
	High demand/ marketable	12.3
	Produce big fingers	11.5
Kisansa (L)	Has medium-big bunch	15.6
	Produces good, soft, tasty food	11.5
	Quick maturity	9.8
	High demand/ marketable	6.6
	Produce big fingers	6.6

* Local (L), Improved variety (I)

The top 5 reasons for growing preferred cultivars are related to agronomic characteristics, and post-harvest characteristics such as marketability and suitability for producing good, soft, tasty food.

Are there [crop] varieties that are less preferred in the community? Why? FGD 6.b.

NOTE: this was added to the questionnaire and may not be included on all versions.

Table 13 Banana varieties that are less preferred and reasons why

Variety	Reasons why variety is less preferred
Mukunku	very small compact bunch with short fingers which does not fetch high prices at the market
Bukumu	small bunch, low market, short and very small fingers, long maturity time
Enkunku	many suckers, takes up a lot of nutrients which affects other species (compete for food) leading to disappearance of other varieties, not marketable
Butoobe	after maturing, some of the clusters and fingers fall off from the peduncle so not good for market (selling), small and short fingers, small bunches, less income, very small in size, not marketable
Entazinduka	believed to cause bad luck, very long, less marketable
FHIA	too much sap, low prices, hard food, less marketable
Kibuzi	long maturity
Musakala	its scarce
Nakamali	small fingers
Namwezi	doesn't grow big bunches
Nalugolima	scarce planting material, can even grow two suckers only
Siira	not tasty, cools quickly, hard texture
Mpologoma	hard food when steamed, produces very few suckers, hard peel, dotted appearance
Mukubakonde	small bunch
Kabana	no market, not yet appreciated and known by the community
Katwalo	grows too tall thus prone to wind, small and short fingers
Kawanda	source of bacterial wilt, multiplies fast, hard food, depletes soil, outcompetes other varieties
Enzirabahima	produces few suckers, hard food when steamed, low demand, does not make good katogo because of its hardness

Farmers mention several varieties that are less preferred and provide reasons why. Reasons include scarcity of planting material, small bunches and fingers, non-marketability and consumption related characteristics such as production of hard food.

Planting material

From what source did you receive this planting material? (specify if they received it, from who directly, and if third party) II Q 15.3

Table 14 Source of planting material (II Q15.3)

Source of planting material	% of women citing	% of men citing	% of respondents - Mbarara	% of respondents - Nakaseke
	N=55	N=61	N=63	N=53
Free from NAADS	1.8	3.3	1.6	3.8
Free from NARO	-	1.6	-	1.9
Free from neighbour/ fellow	32.7	65.6	55.6	43.4
Own plantation	74.6	73.8	74.6	73.6
Purchase	16.4	4.9	1.6	20.8

Close to three quarters of farmers indicated that they source banana planting material from their own farm. A small percentage reported that received planting material from Government initiated programs such as NAADS.

Which factors/challenges could be limiting use of improved crop varieties in this community? And, how have these been addressed? KII Q7

Five (out of eight) of the key informants indicated that the communities did not have access to or were not growing improved banana cultivars. Reasons for not growing improved cultivars included inferior taste (Female KI, Keiba, Mbarara); Male KI, Kacucu, Mbarara; soils were not good for growing improved cultivars (Male KI, Kacucu, Mbarara) and lack of access to trainings on how best to grow the cultivars (Male KI, Mutuumo, Mbarara). The other 3 KIs indicated that only a few people had access

3.6 Important characteristics of the crop (in general not specific to the product)

Relevant questions from II:

What are the most important characteristics that would make it a good crop you would use? **OPEN QUESTION NOT SPECIFIC TO A PRODUCT. Rank in order of importance. The question aims to understand the indicator the participants use to assess a good crop – (agronomical characteristics, post-harvest characteristics: morphological and storability characteristics, technological characteristics) II Q14.1 and 14.2

Table 15 Characteristics of a good crop (rankings by sex and district) (II Q14)

Characteristics	Rankings					Summary scores				
	Women	Men	Mbarara	Nakaseke	ALL	Women	Men	Mbarara	Nakaseke	ALL
Mature bunch*	1	1	1	1	1	93	96	98	91	189
Big fingers	3	3	2	4	2	35	43	49	29	78
Easy to peel	2	5	4	2	3	53	24	31	46	77
Soft peel	4	4	5	3	4	30	31	25	36	61
Soft pulp	5	2	3	5	5	15	44	44	15	59
Straight fingers	8	7	7	6	6	11	13	12	12	24

Characteristics	Rankings					Summary scores				
Low amount of sap	6	8	6	11	7	13	9	18	4	22
No pop sound	7	8	8	6	8	12	9	9	12	21
Long fingers	14	6	12	6	9	5	14	7	12	19
Prefer specific varieties**	9	11	10	10	10	9	6	9	6	15
Smooth fingers	10	8	14	9	10	6	9	5	10	15
Round shaped fingers	10	13	9	14	12	6	5	9	3	12
Short cooking time	10	13	11	11	12	6	5	7	4	11
Not diseased	15	11	13	13	14	2	6	5	2	7
Spaced fingers/not compact	10	15	15	15	15	6	1	5	2	7

*not so much a characteristic of the variety, rather it is the preferred state of the bunch when harvesting for consumption. It is not specific to a variety but cuts across all varieties.
**prefer specific local varieties that make good food

Characteristics of the raw material preferred in general are related to the size and shape of fingers, disease resistance, ease of peeling and cooking time. The most mentioned characteristics include mature bunch, big fingers, ease of peeling, soft peel and soft pulp

- **What are the characteristics of the crop that would make it a good crop? Open Question. FGD Q7.1**
- **What are the most important? Rank in order of importance. The question aims to understand the indicator the participants use to assess a good crop – (agronomical characteristics, post-harvest characteristics: morphological and storability characteristics, technological characteristics) FGD Q7.2**
- **Do you think these would be different characteristics/criteria for your spouse? Why or why not? II Q14.3**

List all the products from the crop FGD Q8.1

***only in revised version: What are the main important characteristics of the crop for this product? FGD 8.3**

All FGDs mentioned mashed *matooke* as one of the main food products irrespective of location and sex. Other variations which don't involve mashing include boiled peeled fingers, katogo and mpogora (boiled with peels).

***only in revised version: What are the main important characteristics of the crop for this product? II Q16.4**

Table 16 Frequency of citations that crop has good processing ability into steamed mashed matooke by sex and region (II 16.4 26)

	All (n=112)		Women (n=53)		Men (n=59)		Mbarara (n=61)		Nakaseke (n=51)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Yellowish/creamish pulp	61	54.5	29	54.7	32	54.2	32	52.5	29	56.9
Easy to peel	41	36.6	23	43.4	18	30.5	19	31.2	22	43.1
Mature enough	34	30.4	17	32.1	17	28.8	14	23	20	39.2
Big fingers	32	28.6	16	30.2	16	27.1	20	32.8	12	23.5
Soft peel	30	26.8	15	28.3	15	25.4	14	23	16	31.4
Soft pulp	29	25.9	11	20.8	18	30.5	19	31.2	10	19.6
Straight fingers	20	17.9	10	18.9	10	17	10	16.4	10	19.6
Little/no sap	15	13.4	9	17	6	10.2	6	9.8	9	17.7
Much sap	13	11.6	8	15.1	5	8.5	11	18	2	3.9
No pop sound when starting to peel	7	6.3	5	9.4	2	3.4	5	8.2	2	3.9
Non diseased	7	6.3	1	1.9	6	10.2	3	4.9	4	7.8
Cooks fast/ short cooking time	6	5.4	3	5.7	3	5.1	5	8.2	1	2
Long fingers	6	5.4	2	3.8	4	6.8	3	4.9	3	5.9
Smooth fingers	6	5.4	3	5.7	3	5.1	2	3.3	4	7.8
Prefer specific variety*	6	5.4	3	5.7	3	5.1	5	8.2	1	2
Round shaped fingers	5	4.5	3	5.7	2	3.4	5	8.2		
Bright green fingers	4	3.6	2	3.8	2	3.4	3	4.9	1	2
Spaced/not compacted fingers	2	1.8	1	1.9	1	1.7	2	3.3		
Has some ripe fingers	1	0.9	1	1.9			1	1.6		
Tastes like yellow bananas	1	0.9	1	1.9					1	2
No visible lines on fingers	1	0.9			1	1.7			1	2

**prefer specific local varieties that make good food

Mentioned characteristic are related to the colour, maturity of bunch/fingers, fingers size and shape, processing related characteristics (e.g. ease of peeling, cooking time etc).

3.7 Labour

There are the same questions in the II and the FGD. Choose either one to analyse where you have the best data. If you have time and good data for both, show both.

II questions:

***this question may not be in all questionnaires… Who does production & processing labour for each of the products in your household? Probe household members, gender, age (II Q16.2revised questionnaire)**

Who sells [product] in your household? Probe household members, gender, age (II Q16.3 original or 16.2 revised) – Not applicable because the participants (farmers) did not make steamed matooke for selling, it was only for home consumption.

FGD questions:

In your community and in general, who does processing labour for each of the products? Probe household members, gender and social segments FGD Q 8.2

In your community and in general, who sells [product]? FGD Q8.3 - original or FGD Q8.2 -revised

FGD respondents indicated that women and girls are mostly involved in matooke preparation process. There is no difference across all communities and sex. As highlighted earlier, questions on selling the product were not applicable because of the targeted sample.

3.8 Decision making and trade-offs between the different uses of the crop

What is your level of independence in making decisions regarding… II Q31.1-31.4?
31.1 what [variety of crop] material to plant
31.2 a) use of crop (what product)
31.2 b) Marketing
31.3 use of profits from sale of [product under study]
31.4 use of profits from sale of alternative product sold from [crop under study], if different household member (e.g. fresh)

Table 17 Mean score of independence in decisions by sex and region (II 16.4)

Decision	Mean score of independence 1-4*							
	Women	Men	Mbarara	Nakaseke	Women - Mbarara	Men-Mbarara	Women Nakaseke	Men-Nakaseke
N	59	64	63	60	24	39	35	25
Variety of banana to plant	3.53	3.45	3.46	3.52	3.58	3.44	3.54	3.48
Use of banana crop	3.58	3.03	3.19	3.40	3.67	2.90	3.59	3.24
Marketing	3.51	3.33	3.44	3.39	3.58	3.36	3.45	3.29
Use of profits from sale of matooke	3.35	3.27	3.29	3.33	3.42	3.21	3.30	3.38

*Legend
1=no independence the decision is made by someone else,
2=a little independence to suggest ideas but decision is taken by someone
3=most independent but need to consult someone
4 = complete independence.

Average responses do not differ much between men and women in the two districts. Statistical tests would have to be done to check if the means are significantly different from each other. Results seem to suggest that most households take joint decision making.

Are there people in your household that take most of the decisions regarding the [product]? Probe specific household members, gender, age. Please describe. II Q16.4 (original) or 16.3 (revised)

***Thinking about when the [crop under study] is harvested, how do you make the decision to harvest? Who was involved and what was considered? II ~~Q17.1~~ Q18.1**

***How were decisions made on how the crop would be used among the different products? About what is consumed at home or sold? Who was involved and what was considered? II ~~Q17.2~~ Q18.2**

Table 18 Decision making on use for different products, proportion consumed, and proportion sold

	Women		Men		Mbarara		Nakaseke		ALL	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Decision on how banana crop will be used for different products										
Husband/male head makes final decision	2	3.4	11	17.5	5	7.9	8	13.6	13	10.7
Joint-both husband and wife	13	22.0	36	57.1	29	46.0	20	33.9	49	40.2
Whole family make decision	8	13.6	7	11.1	7	11.1	8	13.6	15	12.3
Wife/ female head makes final decision	36	61.0	9	14.3	22	34.9	23	39.0	45	36.9
Total	59		63		63		59		122	
Decision on what proportion will be consumed at home										
Husband/male head makes final decision	4	7.0	10	15.9	4	6.4	10	17.5	14	11.7
Joint-both husband and wife	7	12.3	25	39.7	19	30.2	13	22.8	32	26.7
Whole family make decision	7	12.3	6	9.5	6	9.5	7	12.3	13	10.8
Wife/ female head makes final decision	39	68.4	22	34.9	34	54.0	27	47.4	61	50.8
Total	57		63		63		57		120	
Decision on what proportion will be sold										
Husband/male head makes final decision	7	12.5	17	27.4	12	19.1	12	21.8	24	20.3
Joint-both husband and wife	6	10.7	30	48.4	21	33.3	15	27.3	36	30.5
Son/ daughter make final decision	1	1.8	-	-	-	-	1	1.8	1	0.9
Whole family make decision	8	14.8	5	8.1	7	11.1	6	10.9	13	11.0
Wife/ female head makes final decision	34	60.7	10	16.1	23	36.5	21	38.2	44	37.3
Total	56		62		63		55		118	

Most women indicate that they make the final decisions regarding products and what proportion will be used for home consumption whilst more men report that the decisions are jointly made in the household. The discrepancies can be explained by the large percentage (45%; refer to table xx) of single, divorced and widowed women who are essentially household heads. There is need to probe further, and/or do more analysis and research to understand these dynamics. Results can be also be influenced by the coding process used. Ideally 2 or 3 people should code qualitative responses to reduce any biases

Some quotes:

"Sit together and agree with wife. Small bunches are generally for home consumption. Number of bunches to harvest depend on the wife" (Male respondent, Mbarara)

"We both agree but I (wife) decide mostly since my husband has a retail shop." (Female respondent, Nakaseke)

*"The wife is in full control of the home, so she decides for all products" (*Male respondent, Mbarara)

"School fees, bank loan payments and household demands determine what proportion will be sold. I agree with my wife on proportion to sell after considering above." (Male respondent (Male respondent, Mbarara)

"The man discusses with wife. During holidays, decisions are taken after supper with all the children" (Male respondent, Mbarara)

"Depends on how much is in the garden. We have a small family so most is sold" (Female respondent, Nakaseke)

"Decisions made by head (wife). Husband is too old to participate in any decision. We mix small and big bunches for sale (Female respondent, Mbarara)

"I am the household head, so I make decisions depending on the needs of the household" (Female respondent, Mbarara)

Choose to analyse one the questions below, depending on where you have the best data. If you have time, and both sets of data are good, please answer both:

***In your community, if the crop is used for different purposes and products, does it happen where there is disagreement on how the crop is used? FGD Q9**

***Have there ever been challenges or disagreements in the household about these decisions? Please explain. II Q17.3 E.g. For example, in some areas, men may prefer to sell the crop fresh while women prefer to sell the crop processed. This is linked to who has control over the product's sale and profit.**

Table 19 Disagreements in household about decisions on use of banana crop

	Women (n=54)	Men (n=60)	Mbarara (n=62)	Nakaseke (n=52)	ALL (n=114)
No (%)	94.4	85.0	85.5	94.2	89.5
Yes (%)	5.6	15.0	14.5	5.8	10.5

The majority of participants despite of location or sex indicate no challenges or disagreements in decision making regarding how banana crop will be used for different products, what proportion would be consumed at home and what proportions would be sold. For the few who indicate disagreements, issues include selling without partner/spouse consent, wife wanting fewer bananas sold, wife wanting bigger bunches for home whereas husband wants them for sale etc.

3.9 Household food budgeting

Obtaining good data on these questions is difficult. Try to answer the questions in this section but if the data doesn't support, focus on the questions that you have the best data for.

Thinking about when you harvest the [crop under study]. How much of the harvest was used for consumption at home? As what product? (kg/t) (II Q33.1)

How much of the harvest was sold? (kg/t) Fresh or processed into what product(s)? To what market(s)? Probe between rural or urban market, trader, restaurant, food vendor, large company. II Q33.2

Table 20 Quantity of harvest consumed by sex and region (II Q33.1, 33.2)

		All	Women	Men	Mbarara	Nakaseke
	n	**118**	56	62	63	55
Peak season	Range of harvested bunches	5-2400	5-460	5-2400	5-2400	5-720
	Mean number of harvested bunches	117	117	164	173	105
	Mean number of bunches used for home consumption	35	35	43	39	38
	% of harvest used for home consumption	30%	30%	26%	23%	36%
Off peak season	Range of harvested bunches	5-460	0-492	0-800	0-800	0-600
	Mean number of harvested bunches	68	66	97	103	57
	Mean number of bunches used for home consumption	27	27	41	41	27
	% of harvest used for home consumption	40%	41%	42%	40%	48%

As expected, farmers in Mbarara who produce banana on a commercial basis harvest and sell more bunches compared to those in Nakaseke in both peak and off-peak season. Farmers in Nakaseke keep more for home consumption. Women reported producing average number of bunches that were less than men. Results indicate that more than 50% of farmers' produce is sold. Most men and women farmers sell their produce to traders (44%) and rural markets (32%). More farmers from Mbarara (21%) indicated that they sold to urban markets compared to Nakaseke (6%).

When has it been different? Under what circumstances? II Q 33.3

Have changes in the production, processing or sale of the product affected you/your spouse/children? II Q34.1

Table 21 Changes in production, processing or sale affecting respondent and/or spouse, partner or children

	Women (n=56)	Men (n=63)	Mbarara (n=62)	Nakaseke (n=57)	ALL (n=119)
No (%)	91.1	88.9	91.1	87.7	89.9

Almost all farmers indicated no effects on themselves or their spouses/partners and children from changes in the production, processing and sale of banana, irrespective of sex or district.

Have there been any changes in the market or mechanization in your community? How has this affected your work? What about other groups of people? II Q34.2

In the last 5 years, have there been changes in the market or mechanization in your community? **

Table 22 Changes in marketing over the past 5 years

	Women (n=53)	Men (n=62)	Mbarara (n=62)	Nakaseke (n=57)	ALL (n=115)
no change	26.4	14.5	16.1	24.5	20.0
yes, marketing has decreased	50.9	53.2	59.7	43.4	52.2
yes, marketing has increased	22.6	32.3	24.2	32.1	27.8

Around 80% of the farmers indicated that there had been a change in marketing over the past 5yrs. Reasons for deceased marketing include low prices, unstable prices, poor quality bunches etc. Reasons for increased marketing include more buyers, increased prices and better bargaining power for farmers.

3.10 Preparation and processing the product

***What are the processing and preparation steps for the[product]? FGD Q12**

AND

***Are there variations of the product and variations of the processing of the [product]in your community? Are the variations related to different varieties, food processes or food preferences? Please describe. FGD Q13.**

Who typically is involved in conducting this step? Probe: social segments and hired or household labour etc. e.g. female hired labourers; women and girls in the household FGD Q12.2

***Please refer to the SOK for a pictorial shared in period 1 of the matooke cooking process

Steps in steamed then mashed *matooke* preparation

1. Harvesting, cut a fully-grown banana bunch(es)
2. De-hand -remove hands from bunch
3. Remove fingers from clusters
4. Peel fingers
5. Wash fingers
6. Prepare saucepan – put strips of banana fibres and stalks as a foundation at the bottom of a cooking pan to avoid the boiling water touching the bundle of matooke being steamed.
7. Prepare leaves – carefully slice off the midribs
8. Tie up the peeled and washed (in some areas) banana fingers in a bundle of banana leaves
9. Place tied bundle into a cooking pot on top of the fibres and/or stalks with enough water to steam the leaves.
10. Steam for about 1hr? – depends on the type of firewood
11. After steaming, smash cooked bananas by pressing with the palms of one's hands to make matooke.
12. Let the *matooke* simmer for a little bit
13. Serve *matooke*

Women and girls are responsible for the preparation process. Both men and women FGDs could describe the matooke cooking process in detail.

***What are the most important processing steps or parameters you need to control very well to obtain of high quality [product under study]? II Q22.**

Table 23 The most important processing steps to obtain a higher quality steamed matooke cited by sex and gender (II Q22)

Most important processing steps and/or parameters	% of women citingN=59	% of men citingN=63	% of Mbarara citing N=62	% Nakaseke citing N=60
Ensuring balanced amount of water	80%	68%	71%	77%
Careful peeling (leave no peel)	20%	25%	27%	18%
Duration of cooking (cook till wrapping leaves turn black)	20%	19%	27%	12%
Good amount of banana leaves	90%	73%	81%	82%
Good amount of fibres	3%	10%	5%	8%
Good amount of leaf stalk (*emizingoonya*)	54%	49%	55%	48%

Most important processing steps and/or parameters	% of women citingN=59	% of men citingN=63	% of Mbarara citing N=62	% Nakaseke citing N=60
Little fire after simmering	31%	21%	27%	23%
Mashing in a basket	0%	2%	0%	2%
Mashing using hands	15%	17%	10%	23%
Regulation of amount of fire	75%	71%	66%	80%
Size of saucepan in relation to amount of food	0%	2%	2%	0%
Use of old yellow leaves for wrapping	0%	2%	0%	2%
Use of very clean saucepan	2%	3%	5%	0%
Washing bananas before peeling	2%	0%	0%	2%

Both men and women mention the same steps and parameters as most important.

Processing resources and access

***What are the resources required for processing the [product]?(e.g. gari fryer, mixing bowls, note if they are community or household based) FGD Q12.3**

In yesterday's group discussion, it was mentioned that people require a number of resources [list] for processing the product. How do you access those resources? See codes 1 to 5 below. II Q32

Do you experience any constraints in accessing these resources? Please describe. II Q32.2

List of resources required for preparing steamed mashed matooke
Firewood
Water
Saucepan
Banana leaves
Banana leaf stalk (mizingonya)
Banana fibres
Knife
Basket (kibbo)
Peduncle
Matches
Obuwuuwo (Old yellow banana leaves)
Panga
Labour

Table 24: Mean score of access (1-4*) to equipment or utensils required for processing the crop into the product by sex, region and ethnicity

Equipment or utensils required for processing the crop into the product	Mean score of access 1-4*			
	Women	Men	Mbarara	Nakaseke
Banana leaves	1.00	1.02	1.02	1.00
Banana leaf stalk	1.00	1.00	1.00	1.00
Water	1.02	1.03	1.02	1.05
Saucepan	1.00	1.00	1.00	1.00

Equipment or utensils required for processing the crop into the product	Mean score of access 1-4*			
	Women	Men	Mbarara	Nakaseke
Firewood	1.02	1.02	1.01	1.03
Panga	1.00	1.00	1.00	
Knife		1.00	1.00	1.00
Banana fibres	1.00	1.00		1.00
Basket		1.00		

*Legend
1-own outright, 2-use but wouldn't take in a divorce, 3-rent, 4-borrow from husband, 5-other

Respondents indicated that they have outright access to all materials required for processing mashed matooke irrespective of sex or district. Some materials such as firewood and water are owned communally where all community members have equal rights to access and use. Constraints in accessing some of the resources include scarcity in certain periods for example firewood.

Processing challenges

Are there any challenges you experience with processing and sale of the product? Please explain. Rank in order of importance 1=most important challenge. II Q26.

Not Applicable and not included in the questionnaire because the target sample group were farmers who produce, process and consume steamed mashed matooke for household consumption.

3.11 Consumption of the product

How is the [product] prepared? (immediately prior to consumption) (cooked into paste, added with water, with ingredients, boiled, steamed…) FGD Q16.1

Same process as in section "Preparation and processing the product". Please refer to that section.

What is the [product] consumed with? FGD Q16.2

Steamed mashed matooke is consumed with sauces made from: beans, groundnut sauce, meat, dodo, cabbage, mushrooms, mukene (silver fish), beans with cow ghee, peas, greens, eggplants, bitter solanum, eshabwe.

***When a person (you or a member of your family) says that the quality of the [product under study] is not good when they eat it, what are the general reasons for this? II ~~Q29~~ Q30**

Table 25 Characteristics of bad quality steamed mashed matooke

	All (n=122)		Women (=59)		Men (n=63)		Mbarara (n=62)		Nakaseke (n=60)	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Hard/ brittle	80	65.6	35	59.3	45	71.4	38	61.3	42	70.0
Watery	43	35.3	22	37.3	21	33.3	25	40.3	18	30.0
Burnt/ smoky	42	34.4	16	27.1	26	41.3	23	37.1	19	31.7

	All (n=122)		Women (=59)		Men (n=63)		Mbarara (n=62)		Nakaseke (n=60)	
Not fully cooked/ half cooked	37	30.3	23	39.0	14	22.2	14	22.6	23	38.3
White in colour	31	25.4	15	25.4	16	25.4	22	35.5	9	15.0
Separates easily/ not compact	30	24.6	13	22.0	17	27.0	16	25.8	14	23.3
Poor/flat taste	26	21.3	16	27.1	10	15.9	8	12.9	18	30.0
No steamed banana aroma	16	13.1	8	13.6	8	12.7	5	8.1	11	18.3
Blackish colour	15	12.3	7	11.9	8	12.7	6	9.7	9	15.0
Non homogeneous	5	4.1	4	6.8	1	1.6			5	8.3
Not yellow	5	4.1	4	6.8	1	1.6			5	8.3
With "*enturugunyu*"	4	3.3	3	5.1	1	1.6	3	4.8	1	1.7
Served cold not hot	3	2.5	3	5.1			1	1.6	2	3.3
Brownish colour	2	1.6	1	1.7	1	1.6	2	3.2		
Fast cooling	2	1.6	1	1.7	1	1.6			2	3.3
With soil particles	1	0.8			1	1.6			1	1.7
With thread like materials	1	0.8	1	1.7					1	1.7

There are no major differences by sex and district Characteristics of a bad product are related to texture, colour, smell and cooking process. More men mention hard/brittle as an undesired characteristic compared to women. There is need to do statistical tests to assess the statistical significance.

Thinking of people in your community, how often is the product consumed. Is this the same for everyone in the community? Probe on social segmentation. How has this changed in the last five years? KII Q9.

All the KIs from Mbarara reported that steamed matooke is consumed daily. In Nakaseke, the KIs indicated that consumption differs by season and in times of scarcity farmers substitute with cassava, sweet potato, maize and Irish potatoes.

Do you think people are buying more or less compared to five years ago? Why? Probe on social segmentation. How has this changed in the last five years? KII Q~~10~~ 34.3.

Alternative qn used: Have there been changes in the sale of the banana crop? Explain

****Please refer to Table 22

Are there any taboos or restrictions of people in growing, processing or consuming the crop or its products? Probe differences in social segments. KII Q11.

Are there any taboos or restrictions of people in growing, processing or consuming the crop or its products? Please explain. (Probe differences in social segments) II Q18.

Using responses from the II, ninety-three respondents (76%) indicated that there were no taboos. Please find below some quotes from a sample of the taboos that were mentioned by respondents.

"Pseudo stem cannot be cut after household head has died until some ritual is performed otherwise someone else dies"

"The banana stack should never be placed on the ground. It should instead be stacked against another plant"

"Someone from outside household cannot cut a bunch for themselves"

"One should not cut all the mature bunches in a plantation to allow the young ones to grow"

"When selling to a new person, must leave behind a piece or finger"

"You should not share the panga you use in your field with anyone, even neighbours"

3.12 Product characteristics

This section is priority and should be completed with the product profile already – and copy and pasted in this section with text to support.

Please refer to Appendix 2 for the product profile tables for: ALL, men, women, Mbarara and Nakaseke

There are minimal differences in preferences of male and female farmers in the 2 districts. The only slight difference is on the types of banana varieties farmers in the different areas prefer, however the preferred characteristics of the varieties and quality characteristics of steamed mashed matooke converge.

4 FINDINGS: MARKET STUDY

4.1 Description of the Sample

Table 26: Characteristics of traders in Mbarara and Nakaseke Markets

	Mbarara				Nakaseke			
	Women Frequency		Men Frequency		Women Frequency		Men Frequency	
Total N	6		11		9		14	
Ethnicity								
Muganda	1		3		7		11	
Mukiga	1		0		0		0	
Munyankole	4		8		0		1	
Mudama	0		0		0		1	
Muruli	0		0		1		1	
Musoga	0		0		1		0	
Marital status								
Single-never married	1		1		1		0	
Married-monogamous	5		9		5		13	
Married-polygamous	0		1		0		1	
Divorced/separated	0		0		1		0	
Cohabiting	0		0		1		0	
Widowed	0		0		1		0	
Education level								
None	0		1		0		0	
Primary	4		7		4		8	
Secondary	2		3		5		5	
Post-secondary	0		0		0		1	
Level of trade								
Bicycle trader	0		3		0		4	
Motorcycle trader	0		3		0		7	
Vehicle trader (lorry, pick-up, car)	0		0		0		1	
Wholesaler	3		8		2		2	
Retailer	4		1		7		5	
Access to means of transport (yes)	5		11		7		14	

	Mbarara				Nakaseke			
	Women Frequency		Men Frequency		Women Frequency		Men Frequency	
Total N	6		11		9		14	
Means of transport								
Bicycle	0		3		3		5	
Motorcycle	2		3		4		6	
Vehicle	3		10		3		4	
Means of accessing transport								
Own	1		6		1		12	
Hire	5		9		5		3	
Means of sourcing market information								
Mobile phones	6		11		9		14	
Farmers	0		1		0		0	
Mobile traders	0		1		0		0	
Physical contact	3		1		0		3	

Table 27: Summary Statistics of Traders Continued

	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (years)	32.7	11.5	36.3	6.6	35.1	9.2	34.4	11.9
Marketing experience (years)	4.1	2.2	9.5	7.7	8.6	7.7	11.4	6.6

The study utilized a cross section market survey conducted on traders of cooking banana in Mbarara and Nakaseke markets. The survey included a sample of 40 cooking banana traders (17 in Mbarara and 23 in Nakaseke. The proportion of female traders was 35% and 39% in Mbarara and Nakaseke markets, respectively. Table 26 shows the descriptive characteristics of the traders. The average age of female traders was 33 and 35 years in Mbarara and Nakaseke, respectively while male traders in Mbarara and Nakaseke were aged 36 and 34 years, respectively. The majority of the traders in Mbarara markets hail from Ankole ethnic group while the Ganda ethnic group dominates the banana trade in Nakaseke. Primary education was the highest level of education attained by most of the traders in Mbarara (just over 60%). On the contrary, the majority of female traders in Nakaseke attained secondary level education (56%), while the male traders mainly attained primary level education (57%). In contrast to male traders who were mainly in monogamous marriages (82 and 93%) in Mbarara and Nakaseke, some of the female traders especially in Nakaseke were either divorced, widowed or single and have never married.

In Mbarara, 72% of the interviewed male traders operate at wholesale level with only a handful operating as bicycle and/or motorcycle traders. The female traders mainly (80%) operate at retail level. In both regions, male traders have been in banana trade business for over ten years while the female traders have been in business for an average of four and seven years in Mbarara and Nakaseke regions, respectively. Different from Mbarara banana traders, 50% of male traders in Nakaseke trade using motorcycles while (35%) operate at retail level. The female traders are mainly (79%) retailers. Wholesale trade was evident among 22% and 14% female and male banana traders, respectively. Notably, across both regions, there were no women who were bicycle, motorcycle or vehicle traders (i.e women did not physically ride or drive these means of transport to trade bananas). In order to move bananas from production areas or to consumers, traders need means of transport. Around 79% of traders in both regions had access to means of transport. The majority of the traders in Mbarara markets used vehicles such as lorries and pick-ups followed by motorcycles as means of transport. In Nakaseke, 67% and 43% female and male traders, respectively used motorcycles to move bananas. Vehicles and bicycles were also used to transport bananas in lower but comparable proportions. In order to access the vehicles, motorcycles or bicycles, over 80% of traders in Mbarara markets used the hire arrangement. The means of access to means of transport was mainly individual ownership among male traders while the Women traders settled for the hire arrangement in Nakaseke. Information being an inevitable component in marketing, all traders in both regions mainly used mobile phones to source information.

4.2 Raw Cooking Banana Sources, Markets and Demand Segments

Raw Cooking Banana Sources, Markets and Demand Segments in Nakaseke

Table 28: Major Sources of Raw Cooking Banana for Traders in Nakaseke markets

Geographical location	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Nakaseke (town in Nakaseke district)	4	8	12	21.43
Kikyusa (Kikyusa Parish in Semuto subcounty, Nakaseke district)	1	3	4	7.14
Mazzi (village in Kamira Subcounty, Luwero district)	1	2	3	5.36
Mbarara (Mbarara city, Mbarara district)	1	2	3	5.36
Balikyewunya market (Luwero town, Luwero district)	1	1	2	3.57
Bowa (Luwero district)	0	2	2	3.57
Kalagala (Kalagala Parish, Kapeeka subcounty, Nakaseke district	0	2	2	3.57
Kasana (Kasana village /parish in Nakaseke and/or Luwero district)	1	1	2	3.57
Kituntu (Kituntu Village, Bulyake Parish Kasangombe Subcounty, Nakaseke District)	1	1	2	3.57
Masaka (Masaka city, Masaka district)	0	2	2	3.57

Table 29: Major Market destinations of Raw Cooking Banana for Traders in Nakaseke markets

Geographical Location ()	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Wobulenzi market (Wobulenzi town in Luwero district)	2	6	8	22.86
Nakaseke town (Nakaseke district)	0	6	6	17.14
Balikyewunya market (Luwero town**,** Luwero district)	2	2	4	11.43
Nakaseke town (Nakaseke district)	2	2	4	11.43
Kasana market (Luwero town, Luwero district)	2	1	3	8.57
Katikamu (Katikamu Parish, Wobulenzi Tc subcounty, Luwero District)	0	2	2	5.71
Butuntumula (Butuntumula Subcounty, Luwero District)	1	0	1	2.86
Gulu (Gulu District)	1	0	1	2.86
Kampala Industrial area (Kampala city)	0	1	1	2.86
Kalule (Kalule town in Luwero district)	0	1	1	2.86

Tables 28 and 29 indicate the ten major raw cooking banana sources and markets destination for banana traders in Nakaseke markets. As can be seen, the dominant sources of banana for interviewed traders in Nakaseke markets are in Nakaseke and Luwero districts and as far as Masaka district. These bananas are then sold to consumers (traders, individuals, restaurants, and schools) located mainly in Luwero town (Wobulenzi, Balikyewunya and Kasana markets), Nakaseke town, other areas in Nakaseke district, Luwero district and as far afield as Gulu district and Kampala.

Table 30 shows the major demand segments and the related characteristics of raw cooking banana looked for by the different consumers and the forms in which consumers buy banana. The dominant demand segments are individual consumers, restaurants operators, banana traders and schools. Individual consumers buy fingers and bunches and they mainly look for bananas characterized by; big or medium bunch sizes, big fingers, yellow pulp color, long fingers, and compact bunches. Restaurant operators buy both fingers and bunches and mainly look for characteristics such as: big or medium bunches, big fingers, yellow pulp color, compact bunches and banana that takes longer to ripen (longer shelf life). The consumer segment of 'other banana-traders' prefer bunches and mainly looks for characteristics such as big or medium bunch size, big fingers, yellow pulp color, long fingers and bananas that take longer to ripen. Lastly, the schools mainly buy bunches and look for bananas characterized by big or medium bunch size, big fingers, yellow pulp color, compact bunch as well as long fingers.

Table 30: Traders' Perceptions of Desired Form and Characteristics of Cooking Banana for Different Demand Segments- Nakaseke

	Women traders		Men Traders	
Consumer segment	**Product form bought (Frequency)***	**Characteristics looked for (Frequency)**	**Product form bought (Frequency)**	**Characteristics looked for (Frequency)**
Restaurant operators	Fingers (7) Bunch (6)	-Compactness (3) -Big/medium (7) bunch -Big fingers (7) -Long fingers (2) -Dark green peel color (2) -Yellow pulp (4) -Easy to peel (1) -Takes longer to ripen (2)	Bunch (5)	-Compactness (1) -Big/medium bunch sized (4) -big fingers (3) -Long fingers (1) -Yellow pulp (4) -Takes longer to ripen (2)
Individuals	Fingers (7) Bunch (7)	- Compactness (3) -Big/medium bunch size (8) -Big fingers (8) -Long fingers (3) -Dark green peal color (2) -Yellow pulp (4) -Takes longer to ripen (2) -Easy to peel (1)	Fingers (1) Bunch (11)	-Compactness (4) -Big/medium bunch size (9) -Mature bunch (1) -Big fingers (8) -long fingers (3) -Yellow pulp (6) -Takes longer to ripen (3) -Easy to peel (1)
Other banana traders	Bunch (4) Fingers (4)	-Compactness (2) -Big/medium bunch size (5) -Big fingers (5) -Long fingers (2) -Dark green peel color (2) -Yellow pulp (3) -Takes longer to ripen (2)	Bunch (4)	-compactness (1) -Big/medium bunch size (4) -Big fingers (3) -Long fingers (3) -Yellow pulp (3) -Takes longer to ripen (2)
Schools	Bunch (4) Fingers (2)	-Big/medium bunch size (4) -Big fingers (4) -Long fingers (1) -Yellow pulp (3) -Takes longer to ripen (1)	Bunch (14) Fingers (1)	-Compactness (5) -Big/medium bunch size (12) -Mature bunch (1) -Big fingers (11) -long fingers (5) -Yellow pulp (8) -Takes longer to ripen (1)

*in (brackets) is the number of traders who mentioned that specific aspect

Raw Cooking Banana Sources, Markets and Demand Segments in Mbarara

Table 31: Major Sources of Raw Cooking Banana for Traders in Mbarara

Geographical Location	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Kashari (Kasari county, Mbarara district**)**	2	6	8	17.78
Isingiro (Isingiro District)	3	2	5	11.11
Mwizi (Mwizi Subcounty, Mbarara district)	0	3	3	6.67
Rugando (Rugando Subcounty, Mbarara district)	0	3	3	6.67
Buhweju (Buhweju District)	2	0	2	4.44
Ruti (Ruti parish or village in Nyamitanga Subcounty, Mbarara district)	2	0	2	4.44
Rwemigina	0	2	2	4.44
Rwentondo (Rwentondo village in Mbarara district)	0	2	2	4.44
Ngarama (Ngarama village or subcounty in Isingiro district)	0	2	2	4.44

Table 32: Major Market Destinations of Raw Cooking Banana for Traders in Mbarara

Geographical Location	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Kampala (Kampala city)	1	3	4	11.76
Kizungu market (Kampala city)	4	0	4	11.76
Ruti market (Ruti Trading Centre, Mbarara city)	0	3	3	8.82
Rwebikona market (Mbarara Municipality)	0	3	3	8.82
Gayaza (Mbarara District)	0	2	2	5.88
Kibuye market (Kampala city)	1	1	2	5.88
Entebbe (city in Wakiso District, Central Uganda)	0	1	1	2.94
Kajjansi (town in Wakiso District, Central Uganda)	0	1	1	2.94
Kalerwe (Kampala city)	0	1	1	2.94
Kasubi market (Kampala city)	0	1	1	2.94

Tables 31 and 32 display the ten major sources and market destinations of raw cooking banana traded in the sampled Mbarara markets. Kashari, Mwizi, and Rugando subcounties/counties in Mbarara districts,Isingiro district and Buhweju District are the major production areas supplying traders in the markets. Traders in Mbarara indicated that the bananas are mainly sold in Kampala and Mbarara (Kizungu market in Kampala, Ruti and Rwebikoona markets in Mbarara).

Table 33 shows the major raw cooking banana demand segments, characteristics that consumers look for as well as the forms in which bananas are bought. Overall, the different demand segments desired similar quality characteristics of the raw material. Restaurant and hotel operators, individual consumers, banana traders as well as schools are the major demand segments served by traders in Mbarara. Restaurant operators mainly buy bunches and mainly look for characteristics such as; big fingers, big bunch size, compact bunch, straight fingers and shiny-green peel color. Hotel operators mainly buy bunches and look for characteristics such as; big fingers, big bunch, mature bunch, compact bunch and cooking banana variety. Individual consumers mainly buy big, mature, compact bunches with big fingers, shinny-green peel color and yellow pulp color. The banana traders mainly buy big, mature and compact

bunches with big fingers and shiny-green peel color. Lastly, the schools' demand segment comparably buys both fingers and bunches and mainly look out for characteristics such as; big fingers, mature and compact bunches.

Table 33: Traders' Perceptions of Desired Form and Characteristics of Cooking Banana for Different Demand Segments- Mbarara

	Women Traders		Men Traders	
Consumer segment	**Product form (Frequency)**	**Characteristics looked for (Frequency)**	**Product form (Frequency)**	**Characteristics looked for (Frequency)**
Restaurant operators	Fingers (2) Bunch (2)	-Compactness (1) -Big bunch (2) -Mature bunch (1) -Big fingers (1) -Straight fingers (2) -Shinny-light green peel color (1) -Freshness (1)	Bunch (6) Fingers (1)	-Compactness (3) -Big bunch (5) -Mature bunch (1) -Big fingers (6) -Long fingers (1) -Shinny-light green peel color (2) -Yellow pulp (1)
Hotel operators	Bunch (2) Fingers (1)	-Compactness (2) -Big bunch (1) -Mature bunch (2) -Big fingers (2) -Straight fingers (1) Shinny-light green peel color (1)	Bunch (7) Fingers (2)	-Compactness (2) -Big bunch (6) -Mature bunch (3) -Big fingers (7) -Long fingers (1) -Shinny-light green peel color (1) -Yellow pulp (1) -Variety* (2) -Freshness (1)
Individuals	Fingers (3) Bunch (2)	-Compactness (2) -Big bunch (1) -Mature bunch (4) -Big fingers (4) -Straight fingers (1) -Shinny-light green peel color (3) -Yellow pulp (2)	Fingers (3) Bunch (7)	-Compactness (2) -Big bunch (5) -Mature bunch (5) -Big fingers (7) -Long fingers (1) -shinny-light green peel color (2) -Yellow pulp (2) -Variety* (2) -Medium sap content (1) -Freshness (1)
Banana traders	Bunch (4) Fingers (2)	-Compactness (2) -Big bunch (2) -Mature bunch (2) -Big fingers (3) -Straight fingers (2) -Shinny-light green peel color (2) -Freshness (1)	Bunch (9) Fingers (4)	-Compactness (3) -Big bunch (7) -Mature bunch (4) -Big fingers (9) -long fingers (1) -Shinny-light green peel color (3) -Yellow pulp (2) -Variety* (2) -Medium sap content (1) -Freshness (1)
Schools	Bunch (4) Fingers (4)	-Compactness (2) -Big bunch (2) -Mature bunch (4) -Big fingers (5) -Straight fingers (2) -Shinny-light green peel color (4) -Freshness (1)	Bunch (3) Fingers (2)	-Compactness (2) -Big bunch (1) -Mature bunch (2) -Big fingers (3) -Shinny-light green peel color (2) -Yellow pulp (1) -Variety* (1) -Medium sap content (1)

*Customers prefer specific varieties

4.3 Characteristics of High-Quality Raw Cooking Banana

Table 34: High-Quality Raw Cooking Banana Characteristics Ranked- Nakaseke

Rank	Characteristics by Women	Characteristics by Men
1	Medium or big sized bunch and fingers	Medium or big sized bunch and fingers
2	Mature bunch	Yellow pulp color
3	Yellow pulp color	Mature bunch
4	Dark-green peel color	Long fingers
5	Long fingers	Straight fingers
6	Compact bunch	Dark-green peel color

Table 35: High-Quality Raw Cooking Banana Characteristics Ranked- Nakaseke

Rank	Characteristics by Women	Characteristics by Men
1	Big fingers	Big fingers
2	Mature bunch	Shinny-light-green peel color
3	Shinny-light-green peel color	Big bunch
4	Yellow pulp color	Mature bunch
5	Big bunch	Yellow pulp color
6	Long fingers	Variety
7	Compact bunch	Freshness of the bunch

Across both regions, Women traders ranked medium or big bunch size, big fingers, mature bunch, yellow pulp color and green peel color as the top characteristics that consumers consider for high-quality cooking banana. The male traders in Nakaseke ranked medium or big bunch size, big fingers, yellow pulp color and bunch maturity as the top characteristics their consumers consider for high-quality cooking banana. The male traders in Mbarara ranked big fingers, shinny-green peel color, big bunch and mature bunch as the top characteristics considered by their consumers for high-quality cooking banana. It is important to note that these are aggregated results that do not take into account the different customer segments and level of trade hence must be treated with caution. Additional analysis and/data collection would be needed to make more robust conclusions.

4.4 Varieties of cooking banana preferred by consumers

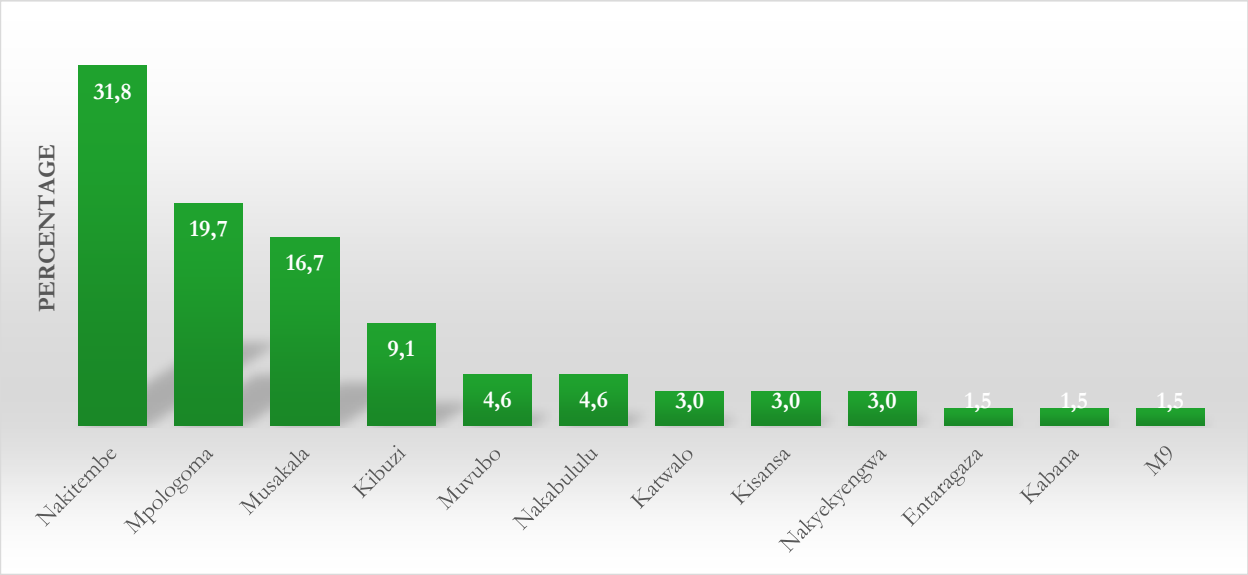

Fig 1: Cooking Banana Varieties preferred by consumers served by banana traders in Nakaseke (n=23)

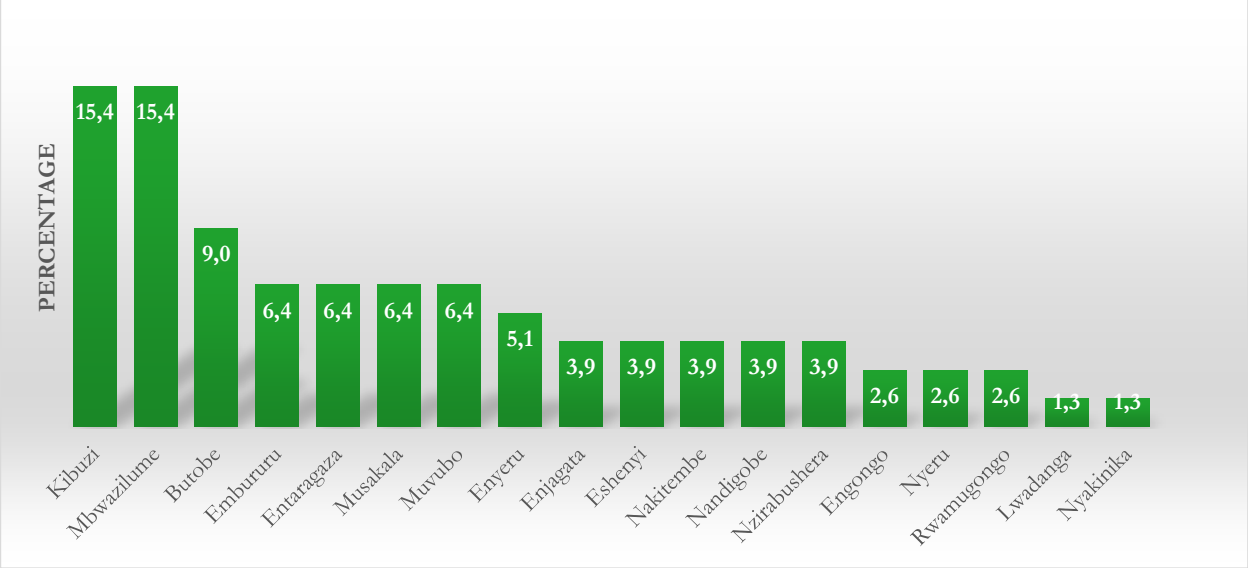

Figure 2: Cooking Banana Varieties Preferred by Consumers Served by Traders in Mbarara (n=17)

The top four most preferred cooking banana varieties are Nakitembe, Mpologoma. Musakala and Kibuzi for consumers served by Nakaseke banana traders and Kibuzi, Mbwazirume, Butobe and Embururu for consumers served by Mbarara markets traders (Figures 1 and 2).

4.5 Volume of Raw Cooking Banana Traded

Table 36: Monthly Volume of Cooking Banana Traded in Luweero (unit is number of bunches)

		Women (n=9)				Men (n=14)			
		Mean monthly stock-bunch	Mean (%) of monthly sale-bunch	Mean monthly stock-sack	Mean (%) of monthly sale - sacks	Mean monthly stock-bunch	Mean (%) of monthly sale - bunch	Mean monthly stock-sack	Mean (%) of monthly sale - sacks
Peak season									
Frequency of stocking	Everyday	420	280 (67%)	28	28 (100%)	375	375 (100%)	-	-
	Once a week	60	60 (100%)	-	-	320	320 (100%)	-	-
	More than once a week (3 times)	813.3	808.3 (99%)	120	120 (100%)	1017	967 (95%)	-	-
Off-Peak season									
Frequency of stocking	Everyday	513	495 (96%)	28	28 (100%)	487	456 (94%)	-	-
	Once a week	68	68 (100%)	20	20 (100%)	-	-	-	-
	More than once a week (3 times)	-	-	-	-	799	799 (100%)	-	-

Table 36 displays the average monthly stock and turnover of cooking banana measured as number of bunches or sacks of fingers traded respective to the frequency of re-stocking in Nakaseke markets. An average of 1,293 bunches and 148 sacks of fingers are stocked by Women banana traders monthly. Of the monthly cooking banana stock, an average of 1,148 (89%) bunches and 148 (100%) sacks of fingers are successfully sold off for consumption in a given peak banana production month. On the other hand, the average monthly banana stock by male traders is 1,712 bunches and no sacks of fingers. Of the bunches stocked, 1,662 (97%) are sold off to the different consumer segments (restaurants, individuals, banana traders and schools) (Table 30) in a given peak banana production month. Notably, the monthly turn over by male traders is greater than that of Women traders. These results indicate that male traders trade on average more stock at a faster rate compared to the female traders. This could be because more men are operating at the higher level of the market chain i.e., wholesale whereas women are more at the lower end of the chain operating as retail traders.

In a given off-peak banana production month, Women traders stock an average of 581 bunches and 48 sacks of fingers while the male traders stock an average of 1,286 bunches and no sacks of fingers at all. The bunch and sack of fingers' turnover is 97% and 100% for Women traders, respectively and 98% for male traders. The percentage turnover of both trader groups in a given off-peak banana production month is closely comparable.

Table 37 shows the average monthly stock and turnover of cooking banana measured as number of bunches and sacks of fingers traded respective to the frequency of re-stocking in Mbarara markets. The average monthly volume of cooking banana stocked is 7,230 bunches and 53 sacks of fingers of which, 1193 bunches and 41 sacks of fingers are stocked by Women traders.

Table 37: Monthly Volume of Cooking Banana Traded in Mbarara

		Women (n=6)				Men (n=11)			
		Mean monthly stock-bunch	Mean (%) of monthly sale - bunch	Mean monthly stock-sacks	Mean (%) of monthly sale - sacks	Mean monthly stock-bunch	Mean (%) of monthly sale - bunch	Mean monthly stock-sacks	Mean (%) of monthly sale - sacks
Peak season									
Frequency of stocking	Everyday	70	56 (80%)	21	18 (90%)	1784	1664 (93%)	-	-
	More than once a week (3 times)	1123	1007 (90%)	20	14 (70%)	2333	2301 (99%))	12	12 (100%)
	More than once a month (3 times)	-	-	-	-	1920	1770 (92%)	-	-
Off-Peak season									
Frequency of stocking	Everyday	1715	1715 (100%)	-	-	1688	1568 (93%)	12	12 (100%)
	Once a week	530	452 (85%)	30	28 (93%)	-	-	-	-
	More than once a week (3 times)	-	-	-	-	580	580 (100%)	7	7 (100%)
	More than once a month (3 times)	-	-	-	-	1080	1065 (99%)	-	-

While 6,037 bunches and 12 sacks of fingers are stocked by male traders in a given peak banana production month. The turnover of Women traders is 89% (1,063) bunches and 78% (32) sacks of fingers whereas that of male traders is 95% (5,735) bunches and 100% (12) sacks of fingers in a given peak banana production month.

In a given off-peak banana production month, the average volume of bunches and sacks of fingers stocked is 5,593 and 49, respectively. The Women traders contribute 2,245 bunches and 30 sacks of fingers while the male traders contribute 3,348 bunches and 19 sacks of fingers to the average volume of bunches and sacks of fingers stocked. Women traders then sell 97% (2,167) bunches and 93% (28) sacks of fingers while the male traders sell 96% (3,213) bunches and 100% (19) sacks of fingers of the average volume of bunches and sacks of fingers stocked.

4.6 Transport, storage, and means of selling the crop

Table 38: Summary statistics of Post-Harvest Handling Stages

	Mbarara				Nakaseke			
	Women Frequency		Men Frequency		Women Frequency		Men Frequency	
Total N	6		11		9		14	
Means used to transport bananas								
Bicycle	1		2		2		5	
Motorcycle	2		2		2		6	
Vehicle	4		9		1		3	
Carried by people	1		0		0		0	
Form banana is transported								
Fingers	11		4		3		0	
Bunches	6		11		5		13	
Means of storage (where are bananas stored, what is used to keep them fresh)								
Stall	4		1		1		3	
Open space	2		7		5		4	
Store	1		3		0		0	
Do not store	0		0		0		4	
Own house	0		0		1		2	
Form banana is stored								
Fingers	3				0		0	
Bunches	4				8		9	
Forms banana is sold								
Fingers	4				-	-	-	
Bunches	4				-	-	-	

Vehicles (lorries and pick-ups) are the dominant means used by both Women and male traders of Mbarara to transport bananas followed by motorcycles whereas, Nakaseke traders mainly use motorcycles followed by bicycles to move bananas from place to place (Table 38). In both regions, bananas are predominantly transported as bunches rather than fingers by both Women and male traders. In Mbarara, Women traders mainly store bananas in sheltered stalls. The other majority cover their bananas with banana leaves or papyrus mats in rented open space of the market. Male traders too predominantly keep their bananas in the open rented space and built up stores. In Nakaseke, both Women and male traders keep their bananas in the rented open space of the market. Notably, 30% of male traders in Nakaseke do not store their stock. The majority of both Women and male traders in Nakaseke and Mbarara store their bananas as bunches. In Mbarara, traders sell bananas as bunches and fingers in closely comparable proportions. The type of transportation and form used when transporting is related to the level of trade done. In Mbarara, a large proportion of the interviewed traders were wholesalers and hence use vehicles to transport bunches. Whereas in Nakaseke, most were small scale traders who were either mobile or stationary stall traders using motorcycles or bicycles.

Table 39: Factors Likely to Affect the Quality of Raw Cooking Bananas at Transportation-Nakaseke

Factor	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Bruising and decoloring/blackening	3	6	9	39.13
Rain makes roads inaccessible	2	5	7	30.43
Fingers fall off bunch, breakage and squashing of fingers	2	1	3	134
Ripening	0	2	2	8.7
Heat from respiration and sunshine	0	2	2	8.7
Total	7	16	23	100

Table 40: Factors Likely to Affect the Quality of Raw Cooking Bananas at Transportation- Mbarara

Factor	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Careless loading and off-loading, overloading	5	4	9	238
Ripening	2	5	7	17.95
Delays due to mechanical problems	2	4	6	15.38
Fingers fall off bunch, breakage and squashing of fingers	3	3	6	15.38
Bruising and decoloring/blackening	0	4	4	10.26
Accidents	1	2	3	7.69
Loaders pluck off fingers from bunches	3	0	3	7.69
Contamination by dust and soil	0	1	1	2.56
Total	16	23	39	100

Tables 39 and 40 display the factors that compromise the quality of raw cooking banana at transportation. Traders in Nakaseke are mainly bothered by; bruising and decoloring/blackening of fingers, restricted accessibility to some markets and banana sources caused by impassable roads in the rainy season, and fingers falling off the bunch while others break and others get squashed. In Mbarara markets, careless loading; off -loading and over loading; ripening; delays in transit caused by mechanical problems; and breakage, squashing of fingers as well as fingers falling off the bunch, are the major factors retarding the quality of banana at transport.

Table 41: Factors Likely to Affect the Quality of Raw Cooking Bananas at Storage- Nakaseke

Factor	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Shrinkage and withering of fingers from sunshine	4	6	10	43.48
Ripening	4	3	7	30.43
Bruising and decoloring/blackening	2	0	2	8.7
Fingers fall off bunch, breakage and squashing	1	1	2	8.7
Damage by rats	0	1	1	4.35
Poor facilities	0	1	1	4.35
Total	11	12	23	100

Table 42: Factors Likely to Affect the Quality of Raw Cooking Bananas at Storage- Mbarara

Factor	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Ripening	4	5	9	32.14
Heat from respiration and sunshine	2	2	4	14.29
Fingers fall off bunch, breakage and squashing of fingers	0	3	3	10.71
Damage by rats and goats	0	3	3	10.71
Decoloring/blackening	1	2	3	10.71
Shrinkage and withering of fingers	0	3	3	10.71
Contamination from muddy ground	1	0	1	3.57
Loss of freshness	0	1	1	3.57
Thieves pluck off fingers from bunch	1	0	1	3.57
Total	9	19	28	100

Tables 41 and 42 show the effect of storage means on the quality of cooking banana. Traders in Nakaseke attribute the retardation in quality of banana at storage to scorching from the hot sun that causes fingers to shrink and wither, as well as ripening. However, in Mbarara markets, ripening and decoloring/ blackening of fingers influenced by heat generated from respiration and sunshine are the major factors that compromise the quality of banana at storage.

Table 43: Factors Likely to Affect the Quality of Raw Cooking Bananas while selling- Nakaseke

Factors	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Shrinkage and withering of fingers from sunshine	4	3	7	53.85
Bruising	3	0	3	238
Fingers fall off bunch, breakage and squashing of fingers	2	0	2	15.38
Ripening	0	1	1	7.69
Total	9	4	13	100

Table 44 Factors Likely to Affect the Quality of Raw Cooking Bananas while selling - Mbarara

Factors	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Ripening	5	2	7	26.92
Decoloring/blackening	0	5	5	19.23
Fingers fall off bunch, breakage and squashing of fingers	2	2	4	15.38
Heat from the sun	2	2	4	15.38
Contamination from muddy ground	0	2	2	7.69
Intentional breakage of fingers to check maturity	2	0	2	7.69
Bruising	0	1	1	3.85
Careless loading and off-loading,	0	1	1	3.85
Total	11	15	26	100

Shrinkage and withering of fingers I the major factor that retards banana quality at sell according to traders in Nakaseke (Table 43). Traders in Mbarara mentioned ripening; decoloring/blackening as well as breakage, squashing and fingers falling off the bunch as the major factors responsible for retarding the quality of banana at sell (Table 44).

Table 45: Consumption Trends of Cooking Banana- Nakaseke

		Women (n=9)		Men (n=14)	
Has demand for raw cooking banana changed in past 10 years?		Frequency	Reasons	Frequency	Reasons
	Increased	8	- Population and home consumers have increased - Raw cooking banana sells faster than roots and tubers	9	- More home consumers buying larger quantities
	Decreased	-	-	5	- Many subsistence producers
	Fluctuates	1		-	-
Will demand for raw cooking banana change in coming 10 years?	Increase	9	- More home consumers - Greater supply so low prices - Sold in different forms to favor every income group -Frequently consumed than roots and tubers	9	- Greater supply so low prices - More home consumers
	Decrease			3	- Adoption of family planning hence lower population
	Fluctuate	-		-	-

The majority of the traders in Nakaseke market noted that demand had increased in the past ten years and attributed the increment to more home consumers, larger quantities of matoke bought by the home consumers as well as faster rate of turn over for banana compared to other common staples. Similar traders project an increment in the demand for banana in the coming ten years due to; the current increase production as such lower prices that boost effective demand, banana being sold in different forms (bunches or fingers) in order to attract consumers of varying financial levels and a greater frequency of consumption of banana relative to the other common staples (Table 45).

The banana fruit possesses characteristics that influence consumer behavior respective to its demand. Table 46 indicates the characteristics of banana that influence its demand. As can be observed, the bunch and finger size are the major attributes causing variations in the selection of bananas by consumers served by Nakaseke market.

Table 46: Drivers of Change in Demand for Cooking Banana- Nakaseke

Factors	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Size of bunch and fingers	7	13	20	23.81
Changes in supply/production seasonality	5	9	14	16.67
Changes in price of cooking banana	5	6	11	13.1
Changes in price of substitutes/availability of substitutes such as maize, sweet potato, Irish potato	3	4	7	8.33
Color and texture of peel/ diseased	2	4	6	7.14
Changes in disposable income	1	3	4	4.76
Cooking banana variety	0	4	4	4.76
Freshness	2	1	3	3.57
Level of maturity of raw cooking banana	2	1	3	3.57
Compactness of bunch	1	1	2	2.38
Pulp color	0	2	2	2.38
Taste of cooked matooke	1	1	2	2.38
Texture of cooked matooke	1	1	2	2.38
Transport costs	2	0	2	2.38
Finger shape	0	1	1	1.19
Ripeness	0	1	1	1.19
Total	32	52	84	100

Table 47: Consumption Trends of Cooking Banana- Mbarara

		Women (n=6)		Men (n=11)	
Has demand for raw cooking banana changed in past 10 years?		Frequency	Reasons	Frequency	Reasons
	Increased	4	- Increased competition from more banana traders causing price to fall	9	- Population has grown
	Stagnant	1	-	0	-
	Fluctuates	1	-	2	-
Will demand for raw cooking banana change in coming 10 years?	Increase	5	- Population has grown	10	- Increase in banana farmers so prices will fall -Population has grown
	Decrease	0	-	0	-
	Fluctuate	0	-	1	-

Table 47 indicates that most traders in Mbarara markets have noticed an increase in demand for banana in the past ten years. The traders attribute the increment to increased competition emanating from an expansion in level of trade and number of traders which has resulted in low banana prices that boost effective demand. Majority of the traders also project a future increase in consumption for banana which they attribute to a growth in the population as well as an increase in subsistence producers who will reduce demand in markets and force suppliers to react by cutting prices.

Table 48: Drivers of Change in Demand for Cooking Banana- Mbarara

Factors	Women Frequency	Men Frequency	Pooled Frequency	Pooled Percentage
Changes in supply/production seasonality	5	10	15	33.33
Changes in price of cooking banana	3	6	9	20
Schooling calendar	4	2	6	13.33
Changes in disposable income	2	3	5	11.11
Changes in price of substitutes/availability of substitutes such as maize, sweet potato, Irish potato	1	4	5	11.11
Festive seasons	2	0	2	4.44
Inaccessible roads in rainy season	1	1	2	4.44
Changes in consumer tastes and preferences	0	1	1	2.22
Total	18	27	45	100

Among the factors that cause demand for banana to change, drivers such as changes in; production seasons, price of cooking banana, disposable income and price of foods that can substitute banana (sweet and Irish potato, maize flour, cassava) as well as schooling calendar (school fees season) score highest (Table 48).

4.7 Economics of the product

Price trends of banana in different seasons across 2017, 2018, 2019, and 2020

In Uganda, there are four main seasons that influence the fluctuations in the price and consumption of banana. These are:

a) Peak Season: the rains received between the beginning of May until end of August (wet season) result in bumper production so the price of banana tends to fall. Therefore, it is typical for the peak season to register the lowest prices relative to all the other seasons as can be observed in Figures 3 to 10. The figures present a synthesis of price data collected from traders who participated in the survey in Nakaseke and Mbarara.

b) Off-Peak Season: the dry spell that usually starts at beginning of September until end of December stresses production causing a decline in supply of banana. When demand exceeds supply, prices of banana increase. As can be observed in Figures 3 to 10, prices in the off-peak seasons are generally higher than those in the peak and school fees period but not as high as prices of the festive season.

c) Festive Season: these are national holidays characterised by festivities mainly Christmas, Easter, and Eid. During such periods, foods considered prestigious in households such as banana are often prepared in greater proportions compared to other common staples. Therefore, the increase in demand and favourable consumer tastes and preferences cause traders to react by increasing the price of banana. It is no surprise that prices in the festive seasons are persistently the highest compared to the other seasons in both Nakaseke and Mbarara (Figures 3 to 10)

d) School Fees Season: this is a period where most schools in the country expect parents/ guardians to make school fees payments. Parents/guardians are usually given an allowance to pay in two instalments that is, at the beginning of first two months and last two months of the

academic term for pre-school, primary and secondary school levels. At tertiary level, complete tuition payment is expected towards the end of each four-month academic year. These periods not only reduce consumers' disposable income but also cause panic among traders who tend to cut prices in order to raise school fees in time. A combination of such behaviour trickles down into reduced prices but also lower demand for banana.

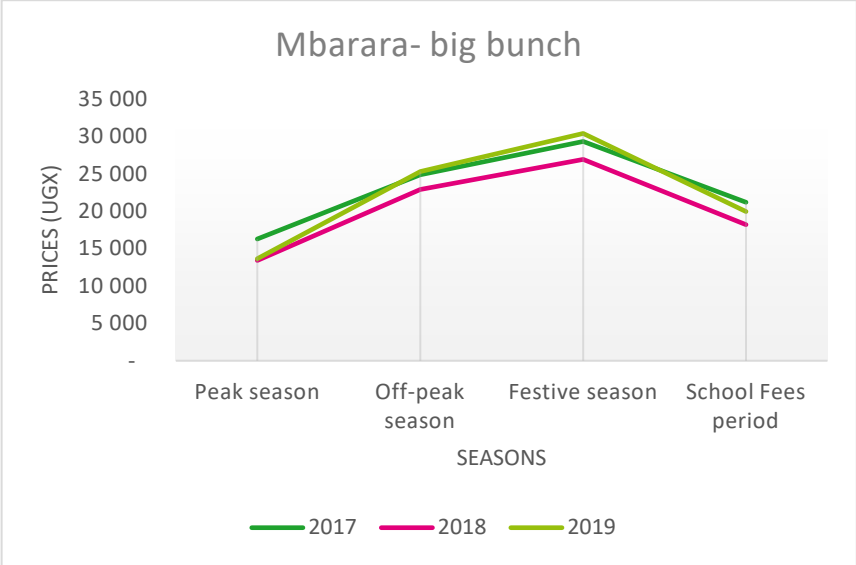

Fig 3: Price trend of big bunch (44kg) over different seasons in 2018, 2019 & 2020

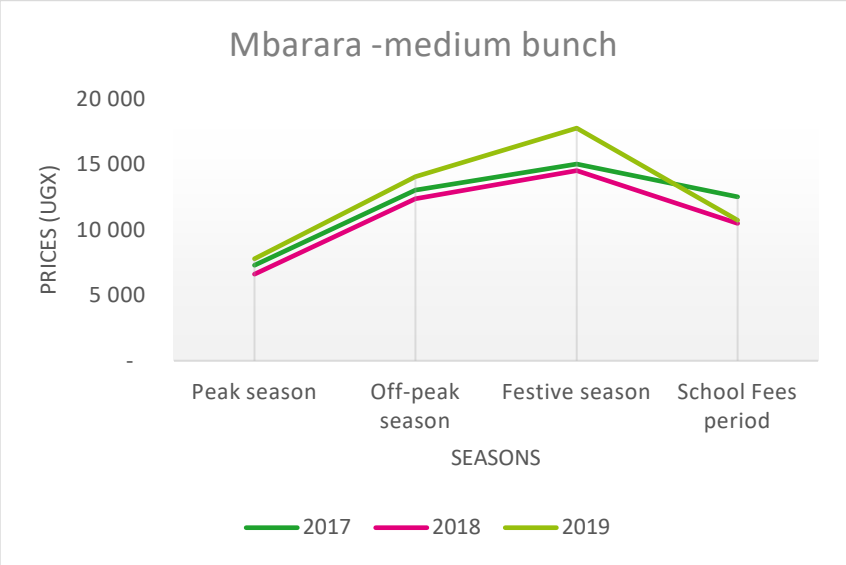

Fig 4: Price trend of medium bunch (27kg) over different seasons in 2018, 2019 & 2020

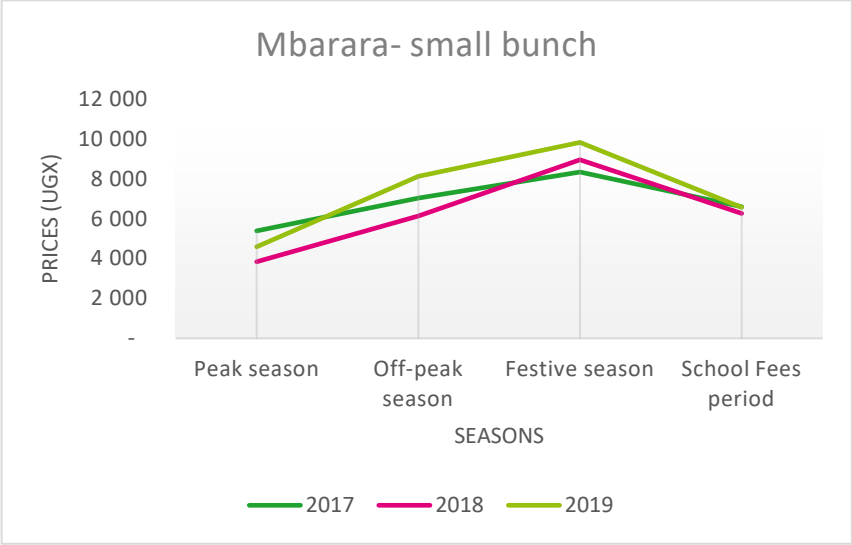

Fig 5: Price trend of small bunch (14kg) over different seasons in 2018, 2019 & 2020

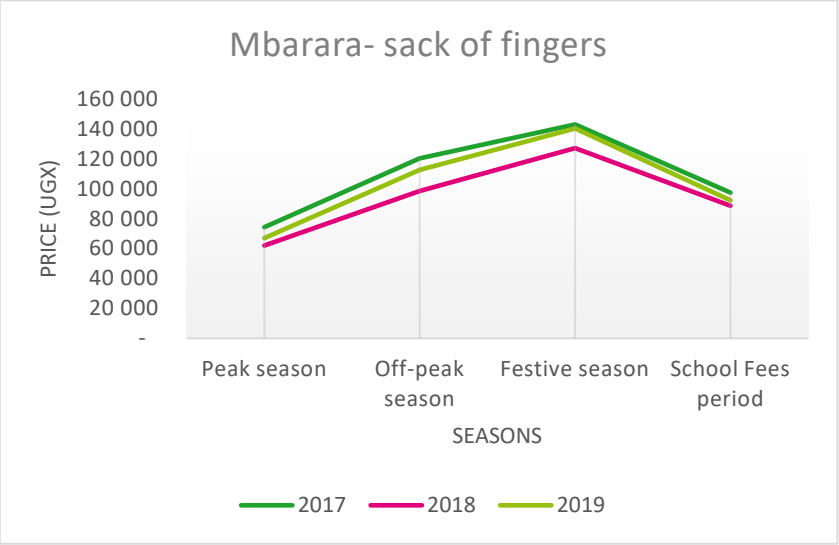

Fig 6: Price trend of sack of fingers (172kg) over different seasons in 2018, 2019 & 2020

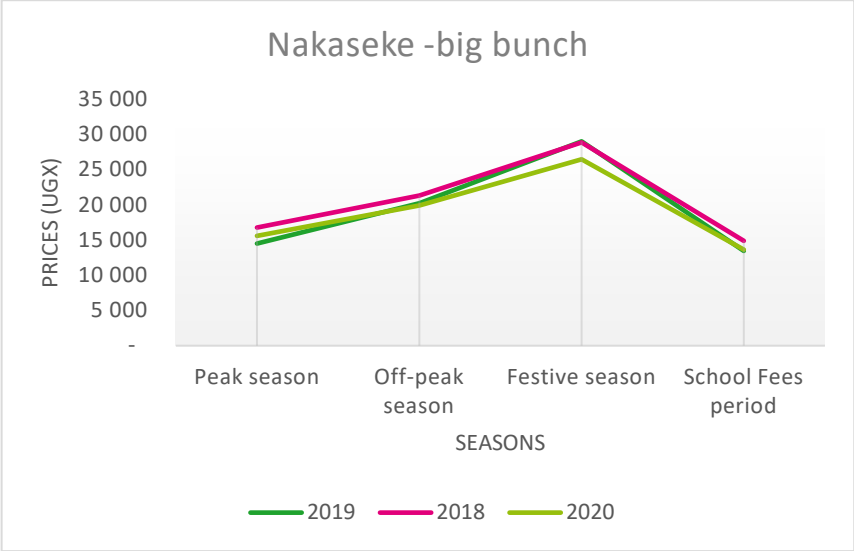

Fig 7 : Price trend of big bunch (26kg) over different seasons in 2018, 2019 & 2020

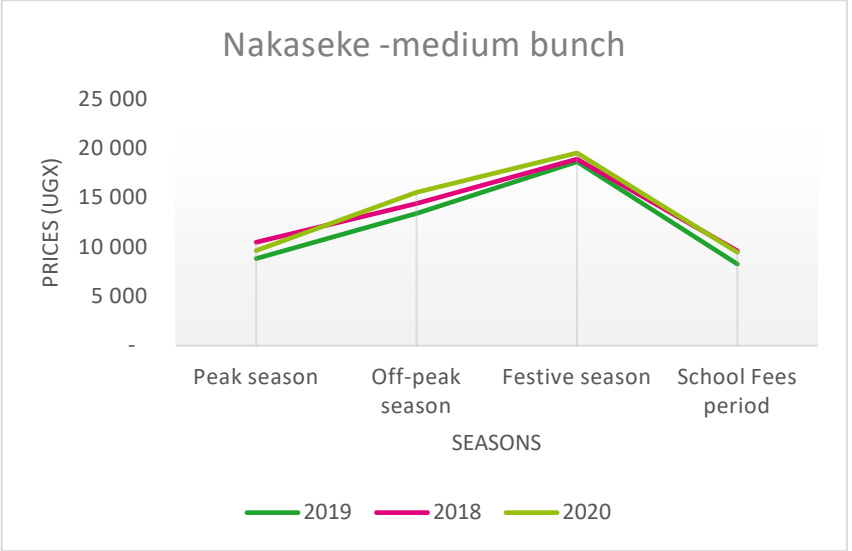

Fig 8: Price trend of medium bunch (14kg) over different seasons in 2018, 2019 & 2020

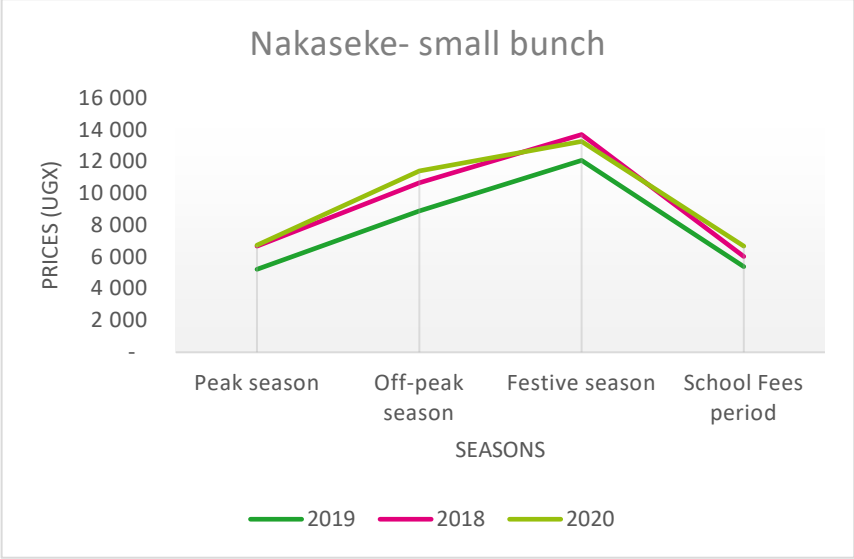

Fig 9*:* Price trend of small bunch (8kg) over different seasons in 2018, 2019 & 2020

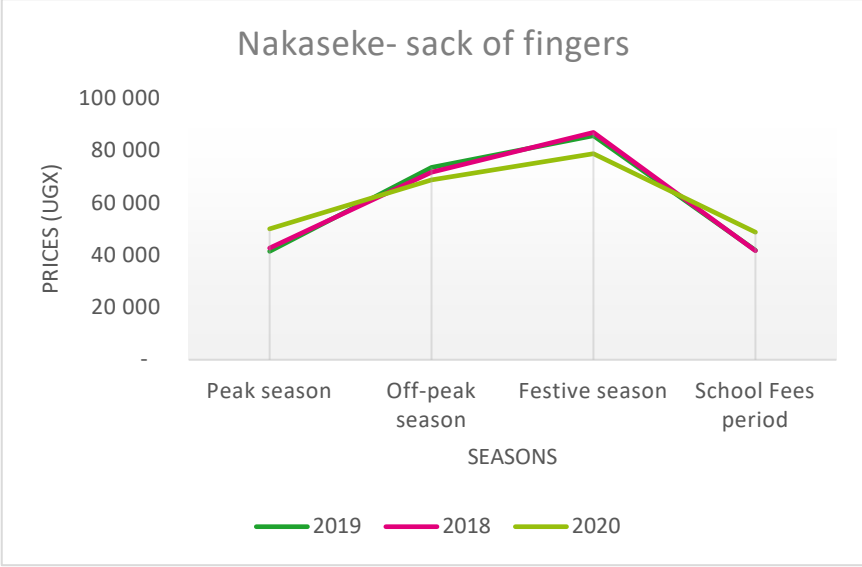

Fig 10*:* Price trend of sack of fingers (117kg) over different seasons in 2018, 2019 & 2020

Table 49: Sales Turnover for Traders in Nakaseke Markets

		Average Monthly Cost of Sales (UGX)		Average Monthly Gross Revenue (UGX)		Proportion of Stock Expenses on stock Revenue (%)	
		Women	Men	Women	Men	Women	Men
Peak-Season	Level of trade						
	Bicycle trader		4,384,000		5,450,000		80
	Motorcycle trader		5,734,286		7,285,714		79
	Retailer	3,660,000	5,733,600	5022857	7,672,000	73	75
	Wholesaler	6,706,667	27,600,000	11,100,000	35,800,000	60	77
Off-Peak Season	Level of trade						
	Bicycle trader		2,880,000		3,636,000		79
	Motorcycle trader		7,251,429		15,300,000		47
	Retailer	2,437,714	8,232,000	3,017,143	10,600,000	81	78
	Wholesaler	4,840,000	37,400,000	7,370,667	47,800,000	66	78

In both production seasons (peak and off-peak), wholesalers in Nakaseke markets earn the highest gross income compared to retailers, motorcycle and bicycle traders. Motorcycle trade is comparably competitive and profitable especially in the off-peak production season given the low (47%) proportion of stock expenses on stock revenue (Table 49).

Table 50: List of Operating Expenses for Traders in Nakaseke Markets

Nakaseke Traders	
Daily Operating Expenses	**Monthly Operating Expenses**
- Meals - Transport costs - Loading and off-loading fees - Storage rent - Utilities e.g. water, toilet fees	- Operating License fees - Rent - Tax - Loan repayment instalments

Table 51: Sales Turnover for Traders in Mbarara Markets

		Average Monthly Cost of Sales		Average Monthly Gross Revenue		Proportion of Stock Expenses on stock Revenue (%)	
		Women	Men	Women	Men	Women	Men
Peak-Season	Level of trade						
	Motorcycle / Bicycle trader		4,760,000		14.20000		34
	Retailer	7,900,250	16,900,000	14,400,000	21,200,000	55	80
	Wholesaler	6,757,083	19,000,000	10,400,000	28,400,000	65	67
Off-Peak Season	Level of trade						
	Motorcycle / Bicycle trader		6.486,480		9,557,240		68
	Retailer	7,905,500	1,950,000	11,900,000	3,000,000	66	65
	Wholesaler	8,825,000	18,100,000	13,100,000	30,300,000	67	60

As can be observed in Table 51, the wholesale level of trade is the most profitable compared to retail, bicycle and motorcycle as wholesalers registered the highest gross revenue and a comparably low proportion of stock expense on stock revenue in both production seasons.

Table 52: List of Operating Expenses for Traders in Mbarara Markets

Mbarara Traders	
Daily Operating Expenses	**Monthly Operating Expenses**
- Meals	- Rent
- Daily tax "Empooza"	- Loan repayment instalments
- Transport costs e.g. Vehicle hire fees	- Storage rent
- Loading and off-loading fees	- Car service
- Labor (packing fingers in sacks)	- Car wash
- Buying sacks	- Market membership
- Broker commission	- Operating license fees
- Market cleaning fees	- Utilities e.g. water

4.8 Conclusion

The results show minimal differences in the preferred characteristics for men and women in the two sampled districts. Consumption related traits should be given priority in the cooking banana breeding program. Most of the varieties that participants prefer are local landraces hence the need for WP2 to do physicochemical analysis to understand the components that the breeding program should focus on. Most farmers indicated that they did not have access to or aware of the improved varieties that have been introduced, hence the need for the banana breeding program to increase awareness and dissemination of the improved varieties that have been officially released.

There is need to do statistical tests, which are currently lacking to assess the robustness of the results. The method used to calculate rankings assumes a linear relationship between weights. However, rank 1 could be much more important than rank 2 which might not be captured by the weight used. There is need to assess other analytical methods.

5 APPENDICES

5.1 Appendix 1: KII and FGD participants

- KII Q1 (list of participants): % men and women, age range, ethnic composition, role in the community etc.

	n	sex	age
Youth councillor	1	M	34
Parish councillor	1	M	44
Chairman (LC1)	1	M	59
Chairman (LC1)	1	M	50
Agricultural extension worker	1	F	39
Key farmer	1	M	34
Farmer group chairperson	1	F	61

- FGD Q1 (list of participants): % men and women, age range, ethnic composition, crop producers/processors etc (from Y/N responses)

15 FGDs were conducted; 8 in Mbarara and 7 in Nakaseke districts. In total we had 7 women only, 7 men only and one with both men and women with an average of 12 participants in each FGD.

5.2 Appendix 2: Product profile tables by sex & region

Step 2 Product profiles (Matooke, Uganda) Compiled by P Marimo

Table 53 Summary Step 2 WP1 product profile (ALL)

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety recently released*
1	***Raw material characteristics*** *for product quality (agronomic, post-harvest)*	II Q21	II Q21	II Q21	II Q23	II Q23	Q19 Kibuzi (L) Nakitembe (L) Enyeru (L) Mbwazirume (L) Enjagata (L	From FGDs Bukumu (L) Butoobe (L) Nshakala (L) Entazinduka (L) Enkunku (L) Enzirabahima (L) Kawanda (I)
		1. mature bunch	visual assessment of a combination of characteristics - no angles/ disappearing angles on fingers, dark-yellow/ creamish pulp colour, light green finger colour, shiny green colour, smooth skin/fingers, smooth when touched, tips fall off, well filled fingers, bunch changes colour, no black tips on fingers	1	1. small short fingers	visual assessment of fingers on a bunch		
		2. big fingers	visual assessment	2	2.immature	fingers - still have angles, fingers not fully filled, fingers not smooth		
		3. big bunch	number of clusters (many), visual assessment	3	3.spotted/diseased	unhealthy looking fingers, spots on fingers		
		4. disease free	spotless fingers	4	4.hard/brittle fingers	feel in hands		
		5. long fingers	visual assessment	5	5.white/ creamish pulp colour	observed after cutting finger		
2	***Processing characteristics of raw material for the product quality during processing)***	II Q26	II Q26					
		1. mature bunch	see above	1				
		2. big fingers	visual assessment	2				
		3. easy to peel	takes short time to peel; straight fingers, short fingers described as easy to peel	3				
		4. soft peel	feels soft during peeling, knife easily slides in	4				
		5. soft pulp	feel with fingers when peeling	5				

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
	Characteristics of raw material	II Q26	II Q26	II Q26				
3	*To look at*	big fingers, mature bunch	big fingers – visual assessment mature bunch (see above)	1. mature bunch 2. big fingers 3. easy to peel 4. soft peel 5. soft pulp *simple ranking				
	To touch	soft pulp, soft feel, easy to peel	soft pulp - feel with fingers when peeling soft peel - feels soft during peeling, knife easily slides in easy to peel - feel with fingers when peeling					
	To smell	not applicable						
	To taste	not applicable						
	Texture in mouth	not applicable						
4	***Characteristics of cooked/ready to eat final product***	II Q29	II Q29	II Q29	II Q30			
	To look at	yellow colour	visual assessment; yellow, golden yellow	1.soft texture 2.nice smell 3.yellow colour 4. good taste 5. smooth mouthfeel *simple ranking	3. pale yellow 4. easily separates	pale yellow - visual assessment easily separates – not compact, does not mash properly after steaming, easily separates when being served		
	To touch	soft texture	on eating –feel in the mouth, smooth on fingers, easy to cut,		1.hard texture	visual assessment, by touching, feels hard during eating, does not feel soft when using spoon/fork to eat		
	To smell	good smell	inhaling under the nose/ by smelling, smells like it's been cooked in banana leaves		bad smell	does not have steamed matooke smell, determined by inhaling under the nose/ by smelling		
	To taste	good taste	good taste when eating		5.poor/flat taste	flat taste like water		
	Texture in mouth	smooth mouthfeel	smooth in the mouth during eating,		2. watery	doesn't satisfy/fill the stomach, too soft, has high water content after mashing		

*for steamed mashed matooke, please note that characteristics for 2 and 3 are similar as "raw final product" is not applicable…3 has been rephrased to 'Characteristics of final raw material'

Table 54 Summary Step 2 WP1 product profile (WOMEN)

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety recently released*
1	***Raw material characteristics*** *for product quality (agronomic, post-harvest)*	II Q21	II Q21	II Q21	II Q23	II Q23	**Women (Mbarara)** Nakitembe (L) Kibuzi (L) Enyeru (L) Muvubo (L) Enjagata (L) **Women (Nakaseke)** Nakitembe (L) Nshakala (L) Mpologoma (L) Mbwazirume (L) Nakabululu (L)	**Women (Mbarara)** Butoobe (L) Enkunku (L) Enzirabahima (L) Kawanda (I) **Women (Nakaseke)** Kabana (I) Mpologoma(L) Nakamali (L) Mukubakonde (L) Namwezi (L) Siira (L)
		1. mature bunch	visual assessment of a combination of characteristics - no angles/ disappearing angles on fingers, dark-yellow/ creamish pulp colour, light green finger colour, shiny green colour, smooth skin/fingers, smooth when touched, tips fall off, well filled fingers, bunch changes colour, no black tips on fingers	1	1. small short fingers	visual assessment of fingers on a bunch		
		2. big fingers	visual assessment	2	2.spotted/diseased	unhealthy looking fingers, spots on fingers		
		3. big bunch	number of clusters (many), visual assessment	3	3.immature	fingers - still have angles, fingers not fully filled, fingers not smooth		
		4. long fingers	visual assessment	4	4.hard/brittle fingers	feel in hands		
		5. disease free	spotless fingers	5	4.white/ creamish pulp colour	observed after cutting finger		
2*	***Processing characteristics of raw material for the product quality during processing)***	II Q26	II Q26					
		1. mature bunch	see above	1				
		2. easy to peel	takes short time to peel; straight fingers, short fingers described as easy to peel	2				
		3. big fingers	visual assessment	3				
		4. soft peel	feels soft during peeling, knife easily slides in	4				
		5. soft pulp	feel with fingers when peeling	5				

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
	Characteristics of raw material	II Q26	II Q26	II Q26				
3 3*	*To look at*	big fingers, mature bunch	big fingers – visual assessment mature bunch (see above)	1. mature bunch 2. easy to peel 3. big fingers 4. soft peel 5. soft pulp *simple ranking				
	To touch	soft pulp, soft feel, easy to peel	soft pulp - feel with fingers when peeling soft peel - feels soft during peeling, knife easily slides in easy to peel - feel with fingers when peeling					
	To smell	not applicable						
	To taste	not applicable						
	Texture in mouth	not applicable						
4	***Characteristics of cooked/ready to eat final product***	II Q29	II Q29	II Q29	II Q30			
4	*To look at*	yellow colour	visual assessment; yellow, golden yellow	1.soft texture 2.nice smell 3. good taste 4. yellow colour 5. smooth mouthfeel *simple ranking	4. pale yellow 5. easily separates	pale yellow - visual assessment easily separates – not compact, does not mash properly after steaming, easily separates when being served		
	To touch	soft texture	on eating –feel in the mouth, smooth on fingers, easy to cut,		1.hard texture	visual assessment, by touching, feels hard during eating, does not feel soft when using spoon/fork to eat		
	To smell	good smell	inhaling under the nose/ by smelling, smells like it's been cooked in banana leaves		bad smell	does not have steamed matooke smell, determined by inhaling under the nose/ by smelling		
	To taste	good taste	good taste when eating		3.poor/flat taste	flat taste like water		
	Texture in mouth	smooth mouthfeel	smooth in the mouth during eating,		2. watery	doesn't satisfy/fill the stomach, too soft, has high water content after mashing		

*for steamed mashed matooke, please note that characteristics for 2 and 3 are similar as "raw final product" is not applicable…3 has been rephrased to 'Characteristics of final raw material'

Table 55 Summary Step 2 WP1 product profile (MEN)

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
1	***Raw material characteristics*** *for product quality (agronomic, post-harvest)*	II Q21	II Q21	II Q21	II Q23	II Q23	**Men (Mbarara)** Kibuzi (L) Enyeru (L) Nakitembe (L) Mbwazirume (L) Rwamigongo (L) **Men (Nakaseke)** Nakitembe (L) Kisansa (L) Mbwazirume (L) Mpologoma (L, I) Nshakala (L)	**Men (Mbarara)** Bukumu (L) Butoobe (L) Nshakala (L) Entazinduka (L) Enkunku (L) Enzirabahima (L) **Men (Nakaseke)** Kabana (I) Mpologoma (L) Nakamali (L) Katwalo(L) Nalugolima (L) FHIA (I)
		1. mature bunch	visual assessment of a combination of characteristics - no angles/ disappearing angles on fingers, dark-yellow/ creamish pulp colour, light green finger colour, shiny green colour, smooth skin/fingers, smooth when touched, tips fall off, well filled fingers, bunch changes colour, no black tips on fingers	1	1. small short fingers	visual assessment of fingers on a bunch		
		2. big fingers	visual assessment	2	2.spotted/diseased	unhealthy looking fingers, spots on fingers		
		3. big bunch	number of clusters (many), visual assessment	3	3.immature	fingers - still have angles, fingers not fully filled, fingers not smooth		
		4. long fingers	visual assessment	4	4.hard/brittle fingers	feel in hands		
		5. disease free	spotless fingers	5	4.white/ creamish pulp colour	observed after cutting finger		
2*	***Processing characteristics of raw material for the product quality during processing)***	II Q26	II Q26					
		1. mature bunch	see above	1				
		2. soft pulp	feel with fingers when peeling	2				
		3. big fingers	visual assessment	3				
		4. soft peel	feels soft during peeling, knife easily slides in	4				
		5. easy to peel	takes short time to peel; straight fingers, short fingers described as easy to peel	5				

	A	B	C	D	E	F	G	H
	ALL	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
3*	***Characteristics of raw material***	II Q26	II Q26	II Q26				
	To look at	big fingers, mature bunch	big fingers – visual assessment mature bunch (see above)	1. mature bunch 2. soft pulp 3. big fingers 4. easy to peel 5. soft peel *simple ranking				
	To touch	soft pulp, soft feel, easy to peel	soft pulp - feel with fingers when peeling soft peel - feels soft during peeling, knife easily slides in easy to peel - feel with fingers when peeling					
	To smell	not applicable						
	To taste	not applicable						
	Texture in mouth	not applicable						
4	***Characteristics of cooked/ready to eat final product***	II Q29	II Q29	II Q29	II Q30			
	To look at	yellow colour	visual assessment; yellow, golden yellow	1.soft texture 2.nice smell 3. yellow colour 4. good taste 5. smooth mouthfeel *simple ranking	3. pale yellow 4. easily separates	pale yellow - visual assessment easily separates – not compact, does not mash properly after steaming, easily separates when being served		
	To touch	soft texture	on eating –feel in the mouth, smooth on fingers, easy to cut,		1.hard texture	visual assessment, by touching, feels hard during eating, does not feel soft when using spoon/fork to eat		
	To smell	good smell	inhaling under the nose/ by smelling, smells like it's been cooked in banana leaves		bad smell	does not have steamed matooke smell, determined by inhaling under the nose/ by smelling		
	To taste	good taste	good taste when eating		5.poor/flat taste	flat taste like water		
	Texture in mouth	smooth mouthfeel	smooth in the mouth during eating,		2. watery	doesn't satisfy/fill the stomach, too soft, has high water content after mashing		

*for steamed mashed matooke, please note that characteristics for 2 and 3 are similar as "raw final product" is not applicable…3 has been rephrased to 'Characteristics of final raw material'

Table 56 Summary Step 2 WP1 product profile (Mbarara)

	A	B	C	D	E	F	G	H
	MBARARA	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety recently released*
1	***Raw material characteristics*** *for product quality (agronomic, post-harvest)*	II Q21	II Q21	II Q21	II Q23	II Q23	Q19 Kibuzi (L) Nakitembe (L) Enyeru (L) Mbwazirume (L) Enjagata (L)	From FGDs Bukumu (L) Butoobe (L) Nshakala (L) Entazinduka (L) Enkunku (L) Enzirabahima (L) Kawanda (I)
		1. mature bunch	visual assessment of a combination of characteristics - no angles/ disappearing angles on fingers, dark-yellow/ creamish pulp colour, light green finger colour, shiny green colour, smooth skin/fingers, smooth when touched, tips fall off, well filled fingers, bunch changes colour, no black tips on fingers	1	1. small short fingers	visual assessment of fingers on a bunch		
		2. big fingers	visual assessment	2	2.immature	fingers - still have angles, fingers not fully filled, fingers not smooth		
		3. big bunch	number of clusters (many), visual assessment	3	3.white/ creamish pulp colour	observed after cutting finger		
		4. disease free	spotless fingers	4	4.hard/brittle fingers	feel in hands		
		5. long fingers	visual assessment	5	5.spotted/diseased	unhealthy looking fingers, spots on fingers		
2*	***Processing characteristics of raw material for the product quality during processing)***	II Q26	II Q26					
		1. mature bunch	see above	1				
		3. big fingers	visual assessment	2				
		2. soft pulp	feel with fingers when peeling	3				
		4. easy to peel	takes short time to peel; straight fingers, short fingers described as easy to peel	4				
		5. soft peel	feels soft during peeling, knife easily slides in	5				

	A	B	C	D	E	F	G	H
	MBARARA	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
	Characteristics of raw material	II Q26	II Q26	II Q26				
3*	*To look at*	big fingers, mature bunch	big fingers – visual assessment mature bunch (see above)	1. mature bunch 2. big fingers 3. soft pulp 4. easy to peel 5. soft peel *simple ranking				
	To touch	soft pulp, soft feel, easy to peel	soft pulp - feel with fingers when peeling soft peel - feels soft during peeling, knife easily slides in easy to peel - feel with fingers when peeling					
	To smell	not applicable						
	To taste	not applicable						
	Texture in mouth	not applicable						
	Characteristics of cooked/ready to eat final product	II Q29	II Q29	II Q29	II Q30			
4	*To look at*	yellow colour	visual assessment; yellow, golden yellow	1.soft texture 2.nice smell 3.yellow colour 4. good taste 5. smooth mouthfeel *simple ranking	3. pale yellow 4. easily separates	pale yellow - visual assessment easily separates – not compact, does not mash properly after steaming, easily separates when being served		
	To touch	soft texture	on eating –feel in the mouth, smooth on fingers, easy to cut,		1.hard texture	visual assessment, by touching, feels hard during eating, does not feel soft when using spoon/fork to eat		
	To smell	good smell	inhaling under the nose/ by smelling, smells like it's been cooked in banana leaves		bad smell	does not have steamed matooke smell, determined by inhaling under the nose/ by smelling		
	To taste	good taste	good taste when eating		5.poor/flat taste	flat taste like water		
	Texture in mouth	smooth mouthfeel	smooth in the mouth during eating,		2. watery	doesn't satisfy/fill the stomach, too soft, has high water content after mashing		

*for steamed mashed matooke, please note that characteristics for 2 and 3 are similar as "raw final product" is not applicable…3 has been rephrased to 'Characteristics of final raw material'

Table 57 Summary Step 2 WP1 product profile (Nakaseke)

	A	B	C	D	E	F	G	H
	NAKASEKE	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and *indicate (L)-local, (I) improved older released variety or (N) new variety recently released*
1	***Raw material characteristics*** *for product quality (agronomic, post-harvest)*	II Q21	II Q21	II Q21	II Q23	II Q23	Q19 Nakitembe (L) Nshakala (L) Mpologoma (L, I) Mbwazirume (L) Kisansa (L)	From FGDs Kabana (I) Mpologoma (L) Nakamali (L) Katwalo (L) Nalugolima (L) Mukubakonde (L) FHIA (I) Namwezi (L) Siira (L)
		1. mature bunch	visual assessment of a combination of characteristics - no angles/ disappearing angles on fingers, dark-yellow/ creamish pulp colour, light green finger colour, shiny green colour, smooth skin/fingers, smooth when touched, tips fall off, well filled fingers, bunch changes colour, no black tips on fingers	1	1. small short fingers	visual assessment of fingers on a bunch		
		2. big bunch	number of clusters (many), visual assessment	2	2.spotted/diseased	unhealthy looking fingers, spots on fingers		
		3. big fingers	visual assessment	3	3.immature	fingers - still have angles, fingers not fully filled, fingers not smooth		
		4. long fingers	visual assessment	4	4.hard/brittle fingers	feel in hands		
		5. disease free	spotless fingers	5	5.white/ creamish pulp colour	observed after cutting finger		
2*	***Processing characteristics of raw material for the product quality during processing)***	II Q26	II Q26					
		1. mature bunch	see above	1				
		2. easy to peel	takes short time to peel; straight fingers, short fingers described as easy to peel	2				
		3. soft peel	feels soft during peeling, knife easily slides in	3				
		4. big fingers	visual assessment	4				
		5. soft pulp	feel with fingers when peeling	5				

	A	B	C	D	E	F	G	H
	NAKASEKE	***High quality characteristics*** *Characteristics that give a good, high quality product*	***Indicator of high-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Priority of high-quality characteristic*** *simple ranking*	***Poor quality characteristics*** *Characteristics that give a bad, poor quality product*	***Indicator of poor-quality characteristic*** *Where data available, describe characteristics (e.g. how sour)*	***Varieties-GOOD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety released*	***Varieties-BAD*** scientific names and indicate *(L)-local, (I) improved older released variety or (N) new variety recently released*
	Characteristics of raw material	II Q26	II Q26	II Q26				
3*	*To look at*	big fingers, mature bunch	big fingers – visual assessment mature bunch (see above)	1. mature bunch 2. easy to peel 3. soft peel 4. big fingers 5. soft pulp *simple ranking				
	To touch	soft pulp, soft feel, easy to peel	soft pulp - feel with fingers when peeling soft peel - feels soft during peeling, knife easily slides in easy to peel - feel with fingers when peeling					
	To smell	not applicable						
	To taste	not applicable						
	Texture in mouth	not applicable						
4	***Characteristics of cooked/ready to eat final product***	II Q29	II Q29	II Q29	II Q30			
	To look at	yellow colour	visual assessment; yellow, golden yellow	1.soft texture 2.nice smell 3. good taste 4. yellow colour 5. smooth mouthfeel *simple ranking	5. pale yellow 3. easily separates	pale yellow - visual assessment easily separates – not compact, does not mash properly after steaming, easily separates when being served		
	To touch	soft texture	on eating –feel in the mouth, smooth on fingers, easy to cut,		1.hard texture	visual assessment, by touching, feels hard during eating, does not feel soft when using spoon/fork to eat		
	To smell	good smell	inhaling under the nose/ by smelling, smells like it's been cooked in banana leaves		bad smell	does not have steamed matooke smell, determined by inhaling under the nose/ by smelling		
	To taste	good taste	good taste when eating		2.poor/flat taste	flat taste like water		
	Texture in mouth	smooth mouthfeel	smooth in the mouth during eating,		4. watery	doesn't satisfy/fill the stomach, too soft, has high water content after mashing		

*for steamed mashed matooke, please note that characteristics for 2 and 3 are similar as "raw final product" is not applicable…3 has been rephrased to 'Characteristics of final raw material'

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