

Cross-product Gender Analysis for Period 4

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

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Ethics: The activities, which led to the production of this manual, 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 panellists and from consumers participating in activities.

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ABSTRACT

This paper presents the draft Gender output for Period 4 of the RTBfoods project. The first part of the report includes findings related to three gender focused research questions on seven products and lessons learned in the research. The second part of the report presents the adapted G+ tool to assess RTBfoods WP1 Food Product Profiles for their benefit or potential harm for women, along with some initial findings and lessons learned. The draft report was submitted to PMU on 26 March 2022. The report is authored by the Gender Working Group [named authors TBC in Period 5].

NOTE: this is report is a draft and will be finalised in Period 5. At that time it is hoped that there will have been more systematic and documentation of the broader lessons learned of the RTBFoods gender work from collaborative learning, and that more of a strategic approach will be taken with the findings – such as focusing on what do people need to do differently because of the findings.

Key Words: gender; social difference; equality; food chain; food quality; preferences; breeding; roots, tubers and bananas

SUMMARY REPORT

This summary report presents the findings of the project's gender focused research questions. is summary of the 'Period 4 (P4) gender output' (output 1.1.2), a key deliverable of the RTBfoods project, Work Package (WP) 1.

The main objective of the RTBfoods project is to deploy Root, Tuber and Banana (RTB) varieties that meet user-preferred quality traits to increase the adoption and impact of improved RTB varieties in sub-Saharan Africa (SSA). WP1 addresses a gap in knowledge and provides an evidence-base on user (producer, processors and consumers), preferred agronomic and quality characteristics for focus food products in RTBfoods. These different interests culminate into food product profiles that can go some way in explaining the drivers of varietal acceptance.

At the same time that there is growing emphasis on processing and consumer preferences for breeding programmes, there has been a much-welcomed recognition of the important role that gender plays in these dynamics within the last five to ten years. [final report will bring in literature to situate work]. The gender research in WP1 is part of this tradition that aims to address gaps in knowledge related to gender and trait preferences but providing unique contribution through its use of food science methods in relation to food quality characteristics at different stages of food transformation and food value chains. It is hoped that this will provide contribution to these larger efforts contributing to shaping crop breeding to be more gender-responsive.

WP1 uses interdisciplinary methods and lines of inquiry (food science, gender and economics) to collect evidence on the gendered preferences of RTB product characteristics for different user groups in a five-step approach (Forsythe et al., 2020). The work programme includes gender-focused research questions for a cross-product gender analysis that draw on and interweave qualitative and quantitative data as part of the WP1 methodology and shaped to place-specific trends and team expertise. [analyse differences between approaches taken by teams, how addressed]

The "Gender Output" is a deliverable split over three years of the project, whereby the final report will be submitted at the end of Period 5, the final year of the project. This report is the product of a collaborative effort among partners and WP1 coordination team through the Gender Working Group (GWG). The group members consist of 18 social scientists from 11 institutes, who are committed to progressing the research agenda on gender-responsive breeding. The GWG has the aim of co-analysing and co-developing gender-focused research outputs in a participatory manner that emphasises group learning. The priorities for data analysis, based on data collected through WP1, are defined by the GWG at the start of the year. The GWG has created a rich network of exchange and collaborative work to break down north-south hierarchies, and we hope that the initiative may serve as an example to others take forward other initiatives related to more gender-transformative work in the sector.

There were limitations to the gender research in the RTBfoods project that will be captured and explored in project collaborative activities and documented in the final 'gender output' report for period 5, and some are captured in the lessons learned sections. Many of these limitations are not new and are mainly as a result of the tension in carving out space for gender-focused methods and questions in a highly interdisciplinary work. Other issues we grappled with were how to integrate other forms of social difference into our work, how can we create outputs equitably and collaboratively, to name a few.

This report for P4 is structured in two parts. Part I presents research findings that start to pull together data across countries to identify common or contrasting themes against our research questions. This includes data from three new products for this P4 output, in addition to the four from P3. Part II presents the approach for the gender assessment of the WP1 Gendered Food Product Profile.

NOTE: this is report is a draft and will be finalised in Period 5. At that time, it is hoped that there will have been more systematic and documentation of the broader lessons learned of the RTBFoods gender work from collaborative learning, and that more of a strategic approach will be taken with the findings – such as focusing on what do people need to do differently because of the findings.

FINDINGS FROM PART I

[need to update with findings from 3 new products – in main report]

Part I of this report presents the research findings for the gender roles along the crop and product food chain, gender differences in varietal preferences and quality characteristic preferences for the crop and product. The findings are based on Step 2, gendered food mapping, data, which includes key informant interviews, focus group discussions and individual interviews with men and women who produce, process and/or consume the crop/product in rural and peri-urban communities are sampled from high crop production areas. The respondents were rural small to medium-scale farmers, not, for example, enterprise businesses. This report includes new data from three additional products: boiled yam in Benin, boiled cassava in Uganda and boiled plantain in Cameroon. This joins the existing analysis from P3 on matooke and boiled sweet potato in Uganda, and gari-eba¹ and plantain in Nigeria.

To provide context for the studies, respondents were asked to rank the most important crops for their livelihoods. The findings were that the RTB crops under study were of vital importance rural people, confirming the importance of the RTBfoods investment in understanding user preferences to breeding. The crops of focus for the studies were featured first or second in importance in all studies. While this is unsurprising as the locations were selected as high-production areas; some interesting insights were gleaned. Firstly, women and men ranked the same crops as most and second most important, despite strong gender norms associated with the crops that may lead to a particular sex ranking the crop higher or lower. Secondly, there was greater variance between men and women's rankings for the third most important crop, and crops ranked lower than three. Interestingly, in Nigeria (South West -SW, South South - SS, South East -SE, and North Central -NC) there was greater variability in the crops ranked third in importance by sex and by state, and is where one can see the influence of gender roles on rankings (e.g. preference for melon among men, and beans for women). In Uganda, men and women agreed the top three most important crops but differences were found between regions and studies. Maize and sweetpotato feature in the sweetpotato study areas, and banana and coffee in the matooke study areas, whereas beans are significant in both studies.

What are the gender roles along the crop and product food chain?

Regarding gender roles along the crop and product food chain, our evidence confirms a high level of participation of women in most aspects of RTB production and especially in processing, sale and food preparation for the assessed food products in Uganda and Nigeria. In addition, however, using a gender analysis along the food chain did challenge pre-conceptions about standard gender roles along RTB value chains. For example, there are perceptions that plantain is a crop namely under the management of men; however, RTBfoods studies found significant involvement of women in plantain production on the plots that they managed as well in the SS. Similar complexity is also apparent down the food chain. For example, women and men also may trade different products, with men usually trading the raw material, such as plantain bunches, and women the processed product, such as Akpu in Nigeria. Regarding sweetpotato, women normally prepare boiled and steamed sweetpotato, but men prepare the product when working in a restaurant.

The precise tasks and crops that men and women undertake depend on how the farming system is organised. Our work establishes the types of farming systems with specific gender roles and their intersection with other factors of social difference and/or geographical location at the production end of the food chain, where the organisation of men and women's labour is complex and dependent on local norms and access to resources. Whether a plot is shared or kept separate from married men and women is an important consideration in what crops are planted and how. [need final analysis and complete example here and explaining the difficulty in this research]

This knowledge is important for a number of reasons. Firstly, it adds greater clarity and precision to gender relations in agricultural systems and can be much more informative for policy and practice compared with relying on outdated stereotypes. Secondly, the information is useful for breeding to understand the different lines of which differences in preferences may occur, in addition the importance of looking at the gendering of post-harvest activities to illicit more information related to

¹ In Nigeria *eba* is the dough like product made from gari. In Cameroon this *eba* product is called *tapioca* or *couscous de tapioca*

consumer demand. Thirdly, for gender researchers it shows the importance of asking specific questions about gender roles and exceptions to these roles and drawing out implications. [example to add]

Are there gender differences in varietal preferences for the crop and product?

The research examined differences in varietal preferences for the crop and product under study by comparing women's preferences to men, which agrees with a substantial body of evidence that finds gender differences in varietal preferences that often correspond to gender roles [check if evidence for all products]. However, our research also examines if co-habitating men and women planted the same varieties and if they had independence in decision making.

Gender differences in preferred varieties [shorten]

Men and women were asked to rank the crop varieties they used in order of preference and provide reasons behind their rankings. Aggregated rankings of the top three crop varieties by gender, the findings show that for most products, men and women prefer different varieties or they rank varieties differently (the top three varieties were examined to highlight differences and similarities among varieties that are considered among the best). Out of the studies on **plantain and gari/eba (Nigeria)**, and **sweetpotato and matooke (Uganda)**, men and women agreed on the top three most important varieties only for plantain [any sig results in longer list?].

Regarding **gari/eba (Nigeria)** in the SW and NC, individual interviews with men and women found that overall, they shared two of the top three varieties in common. The varieties not held in common did not feature even in the list of top ten cassava varieties of the opposite sex [requires T-tests]. There were also differences between ethnic groups of the most preferred varieties. Despite these differences, there was one variety that stood out as an overall popular variety among men, women and different ethnic groups ('*Father of the bride*').

The FGDs in a separate study on **gari/eba (Nigeria)** in the SE, found that the cassava variety ranked the highest by women was not mentioned as an important variety by men at all in the FGD ('*Imo best*'). However, men were reported to have minimal role in cassava production in this area and therefore may not have knowledge on the best cassava varieties. Women valued '*Imo best*' because "it saves hungry people" with its quick maturity, minimal weeds, ability to grow in low quality soil, and the high quality gari it yields. The top two varieties for men were not mentioned by women at all. Three of the six most preferred cassava varieties according to men and women's FGD were released varieties.

Regarding **sweetpotato (Uganda)**, men's FGDs and women's FGDs ranked two of the same varieties among their three highest ranking varieties. Interestingly, the variety not held was not mentioned by the opposite sex as a good variety at all. Women preferred '*Araka araka*' because of its early maturity, high yield and ease to peel; and men preferred '*Kiribamukwe*' because of its sweetness.

Similar to the findings on **plantain (Nigeria)**, men and women mention the same set of varieties as their preferred varieties for **banana (Uganda)** in individual interviews, which were also local varieties. However, there were gender differences in the varieties most preferred for making **matooke** in Nakaseke district, where only one variety was similarly ranked by men and women among the top three preferred varieties. One variety had significantly higher ranking among men than women. [is this the only significant finding?] Interestingly, the varieties not held in common by men and women were described in similar ways: medium-big bunch; produces good, soft, tasty food; quick maturity; high demand/marketable and produce big fingers. In Mbarara district, men and women ranked the same varieties as their top three varieties.

Varieties grown by married men and women

In selected studies, respondents were asked if the varieties they farmed with the same as their spouse. Of the three studies that included the question, two studies, **plantain and gari/eba (Nigeria)** (the latter in Imo state), found no differences in the varieties that men and women grow. However, for **sweetpotato (Uganda)**, only about half of the women (30 women) grew the same sweetpotato varieties as their spouse, which may be related to the cooking qualities of sweetpotato that vary more

significantly compared to other RTB crops such as plantain [check with Sarah]. [did any of the other studies ask this question so we can include?]

Independence in varietal choice

In selected studies, men and women were asked to indicate their level of independence on decisions regarding which variety to plant, from 1 to 4 (1=no independence, 2=a little independence to suggest ideas but decision is taken by someone, 3=mostly independent but need to consult someone, and 4=complete independence). Of the three studies that asked the question (plantain and gari/eba in Nigeria and matooke in Uganda), all reported similar findings for men and women between 3 and 4. [did any of the other studies ask this question so we can include?]

Regarding **plantain (Nigeria)**, women scored their level of independence slightly lower than men (3.1 compared to 3.4), and qualitative evidence suggests that the decision on what variety to plant was taken jointly by men and women, but that often they did not know the variety they had. With **cassava (Nigeria)** in SW and NC, there was the largest 'gap in independence' between men and women: the average score for women was 3 and 4 for men, indicating high authority and independence among men and the need for consultation for women. For **sweetpotato (Uganda)**, there is no difference in the level of independence between men and women, which was just over 3, indicating the need for married men and women to consult on this decision. The same finding was found with **banana (Uganda)**, where women and men have the same level of independence, 3.5. Similar to the production of other crops, these results suggest that most households engage in joint decision-making. [T-tests are needed to substantiate differences].

[importance and add qualitative]

Sources of planting material [to add the reasons behind trends]

Men and women were asked where they obtain their planting material from, and there were considerable differences. With regard to **plantain (Nigeria)**, men and women both primarily obtained material from other farmers (34% for both, respectively). However, more women obtained material from neighbours (23% compared to 13% for men), and more men obtained material from other communities (21% compared to 11% for women) [T-tests]. Only four people (3 men, 1 women) received material from an institute/organisation, such as extension services. Interestingly, a few women purchased material, but this was not mentioned by men.

With regard to **cassava stem (Nigeria)** in the SW and NC, the most common source of material for women were other farmers/neighbours (56%), followed by family (17%), and their husband (13%). Men sourced equally from other farmers/neighbours and agricultural extension (19%, respectively), followed by family (49%). In contrast, only 7% of women stated that extension services were a source. Many of the farmers reported they prefer local varieties for their characteristics, particularly women potentially due to their reliable product quality characteristics, but there were problems around access and timeliness of released varieties.

Women mostly sourced **sweetpotato (Uganda)** materials from neighbours (50%) followed by NGOs (30%) and multipliers (20%). On the other hand, the primary source of planting materials for men was NGOs (50%) followed by neighbours (33%). While the sample size of men in the individual interviews was small, qualitative evidence supports this. Men were found to have greater mobility, and in Kamwenge, also purchased materials from multipliers. This may reflect challenges for women in accessing of released material and references of women for local material. [can we show gender differences in local/released varieties?]

Regarding **banana (Uganda)**, close to three quarters of farmers sourced their banana planting material from their own farm, which was similar for women and men (75% and 76%, respectively). A small percentage reported that received planting material from Government initiated programs, and more slightly men than women, such as from NAADS (2% for women and 3% for men), and NARO (0% for women and 2% for men).

These results show the need of evidenced strategies to disseminate released varieties to women in addition to improving released products to better meet the demand for specific product characteristics for women and men [expand on implications for breeders]

Are there gender differences in quality characteristic preferences for the crop and the product?

Men and women were asked to rank the RTB quality characteristics in order of importance for the crop and product at different stages of processing. In looking at the aggregated rankings of the top five characteristics for a specific category by gender, the type and extent of gender differences in preferences for quality characteristics differ by product (the top five quality characteristics were examined to highlight differences and similarities among those characteristics considered among the most important). Some food products have no gender differences or slightly different rankings, while others are more pronounced, depending on the aspect that is being examined – whether it is about the crop in general, the crop as intended to be used for the product, the crop during processing, and the final product.

For example, the **matooke (Uganda)** and **plantain (Nigeria)** studies show the same top five characteristics among men and women, for making the product and for the crop in general, respectively. Short cooking time for matooke (Uganda) was mentioned as important by both men and women. However, for **sweetpotato (Uganda)** at the final product stage, men's FGD mentioned dries and splits easily, while women's FGD mentioned sweet, caramel sweetpotato aroma. This means that men and women might either have similar or differing preferences for each crop and product depending on the context. And these preferences are very likely tied to the different products that can be made from the crop and if there are clear divisions in gender roles with regards to their processing, preparation or processing.

While the similarities in preferences in some contexts this may strengthen the case for integrating the top-5 characteristics into breeding profiles, in other contexts, especially for the fresh product, often confirm quite the characteristics that breeders are already working on, it stresses the need to take into account the characteristics that rank lower as they could be crucial for adoption of varieties – and importantly, this is where there is greater variance in the desired quality characteristics of men and women: specifically, when examining the longer list of desired quality characteristics, men and women cited different characteristics and women often cited many more characteristics and richer description, compared to men.

For example, with **boiled sweet potato (Uganda)**, men did not mention sweet taste (raw), appearance (during processing), which came in women's top five characteristics (in individual interviews and FGDs). For **gari/eba (Nigeria)** in Imo state, women mentioned 11 characteristics and men 4 in FGDs: white sap, dry roots (hard to break), heaviness, sour taste, mature, fresh skin, healthy root, bright peel, wet peel were only mentioned by women and dark brown and many roots only mentioned by men. **[Important point]**

There are several reasons why characteristics might have not ranked higher, including that they are often assumed to be included, as people usually do not grow or process crops with unsuitable quality, and therefore people might stress characteristic such as high yield and assume the at most times excellent quality of the varieties that they are already using.

Another finding was that when respondents were asked in individual interviews the most preferred characteristics of the crop in relation to the final food products, the gender differences in preferences and the importance of these preferences become less apparent for some products including **plantain and gari/eba (Nigeria) and matooke (Uganda)**. Regarding plantain, although women and men may look out for different characteristics in the raw product partly depending on the end use (processing/sales, etc), men and women have similar quality criteria for end/food products.

In many cases the differences in ranking or citation of the characteristics correspond to gender roles. This was found particularly regarding tasks that are laborious and tedious – such as peeling and weeding. Farmers interviewed in the **matooke and boiled sweetpotato studies (Uganda)** attached greater importance on ease of peeling, which was cited more frequently by women and associated with their role in preparing matooke and boiled sweetpotato, respectively. Branching stems mentioned only by women, both labour reducing for women (peeling and weeding respectively, and only mentioned by women among women for cassava in the **gari/eba study (Nigeria)**. Similar findings were found regarding characteristics important for marketability. For plantain and banana products, finger and bunch size are important characteristics for income – the larger the more profit. In the **plantain study (Nigeria)** men rank bunch size higher than women (**but women also rank long**

fingers number 1?); however, bunch size was more important to women in SS compared to women in Osun state, where women in the former area are more involved with marketing. Regarding **matooke (Uganda)**, men had higher citation of long fingers compared to women. Regarding cassava in the **gari/eba study (Nigeria)** high starch mentioned by men only, which may be related to men in the SW selling cassava to starch factories.

Some differences in preferences between men and women likely related to different types of livelihood strategies men and women use, which is particularly visible in contexts with separate farming systems. In this context, early maturing was ranked higher among women for cassava in the **gari/eba and plantain studies (Nigeria)**, which are likely related to precariousness of land situation for women, need to harvest for food and income more quickly.

Part I Lessons gleaned so far on methodology

[this needs more work and more input – hopefully more from lessons learned session and GWG]

The research found that consultation with women and men is vital to understand demand at each stage in the food chain. Gender differences in the type, prioritisation and number of quality characteristics for different stages of food product transformation was a key trend across the products. There were also regional differences in quality characteristic preferences for some products, and methods in processing. Therefore, these two key factors of social differentiation across food chains are important to analyse when developing crop and food product profiles.

Our experience was that we need more nuance in gathering data on gender roles. Inquires often resulted in the establishing the norm, instead of the actual practices or perhaps exceptions to the norm, which arise in particular scenarios. This would provide better gender data, but also the potential for understanding circumstances when gender taboos are socially permitted to be adapted. This is also important for crop breeding, as ‘market research’ to identify preferences among a particular user and a specific gender, may reinforce gender norms that prevent equitable share in labour, for example.

By focusing on specific tasks within ‘production’, ‘processing’ and ‘selling’ can help add specificity, but at the same time can risk showing too much detail that the implications are lost. It is important that the implications of the data we are collecting are drawn out explicitly. At the same time, while data may not be relevant to, for example, developing breeding profiles *per se*, data may be helpful in informing product dissemination, or adding knowledge the broader discipline in research and practice more generally.

Detailed accounts of gender roles will help inform sampling frameworks to obtain more in-depth, ‘expert’ opinions (e.g. if processors are mainly women it is likely unnecessary to sample large numbers of men, but may be interesting to seek out an interview with some men who defy the norm for qualitative insights into how, why and under what circumstances their work has come about). Focusing on why certain people are involved in the work they are doing, how it is changing or not, and the role of power in organising gender roles and tasks, would help to add meaning to this information and should be emphasised more in research going forward.

Interviewing women and men is crucial at the raw, during processing and final cooked-product stages to obtain a long list and rich description of preferences for quality characteristics, despite the difficulty to uncover tacit knowledge about preferences. However, at the same time respondents had difficulty responding to very specific questions for each stage and there was often confusion in responses and interviewers about what stage they were referring to.

Some research teams felt that comparing the *importance* of characteristics across stages was not very useful as people will always give higher importance to the characteristic mentioned in relation to a stage that is closer to the final stage, or respondents felt unable to rank characteristics that were all important. It was more about causal relationships between characteristics in different steps that made much more sense to talk about with respondents, and linking them to their importance in their livelihoods. However, asking respondents to identify and rank characteristics, even if they feel they cannot, is interesting in and of itself of who holds what knowledge, and how attributes are valued.

We will also need to consider when gender-disaggregated data is most useful. Simply comparing responses between men and women is not sufficient for a gender analysis, nor will it lead to informing strategic decisions in breeding programmes that will truly be effective for men and women or lead to gleaning the best information if they are not experts in the domain of inquiry. For example, men may have limited detailed knowledge about processing related quality characteristics for gari. Therefore, processing demonstrations (step 3), could focus on 'expert processors' (with women *de facto*) and offer a more suitable environment for discussions on precise quality characteristics of the crop and food product. Men could then be consulted about characteristics relating to the crop that correspond to the work they do and then that data could be compared (with farmers and processors) if there are any clashes between the characteristics that men and women want.

The methods for Step 2 could draw on an intersectional perspective – to move beyond gender and region. Gender dynamics and decision making, uncovering the context of which causal linkages are situated, between characteristics, products, and reasons for their value and by who, and these systems are gendered, are interesting gender-responsive research questions that would improve scholarship in this area. It is this work that may help focus on issues that will help us breed better crops from an equity perspective. [This needs work and more thinking – emphasises the usefulness of qualitative inquiry and grounded theory approaches].

[What RQ worked and what didn't?]

FINDINGS FROM PART II

Part II presents the G+ RTBfoods Food Product Profile (G+ FPP) assessment tool, initial findings from the tool, and lessons learned from its use to date. The G+ FPP assessment has drawn heavily on the Gender in Breeding Initiative's (GiB) ground-breaking tool, the G+ Product Profile Tool, developed in the CGIAR RTB programme to assess the gender impact of RTB plant traits. This tool offers a validation check to reflect on key gender issues in agricultural food systems, and to prevent harm and promote positive impact.

As WP1 research has been gender responsive, our findings of important crop and food product characteristics will reflect the priorities and interests of men and women. However, the G+ FPP assessment enables a process for interdisciplinary breeding teams to prioritise characteristics based on relative importance for women, or other social groups, in addition to providing 'red flags' for potentially harmful characteristics. Importantly, the characteristics will undergo further biophysical analysis (WP2) and translated into traits for consideration in RTB breeder profiles.

The aim of the G+ FPP is to assess the potential gender impact for RTB crop and food product related characteristics (or expressed as traits if established) to inform what is included and prioritised in the final version of the WP1 Food Product Profile. This validation check can identify specific benefits and/or red flags that were overlooked and might therefore alter the final version of the product profile. The relative value of characteristics must also be assessed and inform prioritisation of characteristics in the WP1 FPP as all characteristics cannot be pursued by food scientists or breeders. The results from the G+ FPP assessment are expected to inform RTB breeding processes through the final WP1 Food Product Profile (FPP). This is an evidence-based list of prioritised crop and product quality characteristics.

Initial findings from the G+ FPP assessment

The G+ FPP assessment was completed for three profiles and has resulted in several interesting findings. The fufu FPP in South Nigeria prioritised many important characteristics that reduce women's drudgery (peeling time, retrainability) and potentially increase their financial benefit (soft, heavy, white and smooth product). The FPP for Boiled yam in Benin also had a completed gender assessment. Here we see the issue of certain characteristics having both positive and negative benefits for women, and therefore trade-offs need to be made based on agreement of the multidisciplinary panel. This occurs with weight of the tuber, for example. The texture stability of the boiled yam was considered to have the most positive benefit for women. The FPP for boiled plantain

in Cameroon found that easiness to peel, mature plantain and plantain fruits brought the most positive benefit to women. Whereas big fingers and big fruits had slight negative benefit for women.

Part II Initial lessons from the G+ FPP assessment

Firstly, it was necessary for GWG members to encourage colleagues to use the RTBfoods WP1 gender assessment, adapted from the G+ tool. The reticence was due to the need to deliver the product profiles quickly and efficiently. However, the GWG felt that it was important to the delivery of the RTBfood project overall, not only WP1, that the assessment was undertaken. Gender equity and positively supporting the livelihoods of women and men in root, tuber and banana (RTB) value chains are core objectives of RTBfoods Work Package 1 (WP1) and are essential to meeting the overall project objective. Developing (RTB) varieties requires keen attention to the preferences of its users, in addition to meeting fundamental development objectives and strengthening resilience of agricultural systems.

A second lesson is related to the issue around the diversity of female actors in the RTB product value chains. While women are a heterogeneous consumer segment, in many contexts they have specific preferences for RTB characteristics relating to their gender roles in production, processing, food preparation and consumption (RTBfoods Gender Output, 2021). However, it has only been recently that the diverse needs of women, who often occupy multiple roles along a food chain, have been actively considered in breeding on a systematic basis. It is in this framing that the gender work in WP1 has been designed. Our work in P5 with the results from the assessment, aims to address the priorities and needs of women that stem from their gendered status. However, it is notable that there may be some differences in how the assessment is completed based on a women's position in the value chain. For example, a score may be allocated differently for a female processor compared to a farmer or a trader. And it would be too time consuming to have separate assessments for each node of the value chain. Therefore, users of the assessment tool must look consider women in different positions of the value chain when completing the assessment and acknowledge any differences in the justification.

A third lesson is around the problem of how the tool manages trade-offs. Interestingly, this is a research question that was identified in the early stages of the project as being relevant. However, the responses from the GWG were that there were limited examples of trade-offs for particular characteristics playing a significant role in gender differences in preferences. However, through the use of the tool these differences become more apparent – an easy example is 'big bunches' for matooke or boiled plantain. This is where the tool cannot provide an answer – it is up to the team to make an informed decision about how the characteristic is prioritised, in the context of the project and breeding objectives.

Overall, gender analysis of the food product profile is crucial. This is because often some of the most valuable information is in the context of the research, and that a good analysis of the context will enable gender specialists to make an assessment of what important priorities for breeding programmes, given the needs of women, men, different ethnic, wealth and regional preferences. In addition, surprising findings that challenge stereotypes are everywhere, particularly when analysing results intersectionality, showing the importance and the contribution of the RTBfoods work.

1 INTRODUCTION

This report is part of the deliverables for the RTBfoods project, Work Package (WP) 1. The main objective of the RTBfoods project is to deploy Root, tuber and banana (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 (food product profiles); (2) Link these food 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 users (producer, processor and consumer) preferred characteristics for the focus food products 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. Users' varietal choices are informed by the preferences they have for certain characteristics of the crop 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, for example producers might prefer high yielding or disease-resistant crop varieties. These different interests culminate into trait packages that can help explain the drivers of varietal acceptance.

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.). Breeding programmes have historically focused on production related characteristics with perhaps less emphasis on and post-harvest and consumer preferences. Furthermore, there is little known about how gender relations and norms influence and result in preferred characteristics, along with varietal uses. WP1 aims to address these gaps in knowledge under the RTBfoods project, which is expected contribute to shaping crop breeding to be more responsive to user needs along the food chain.

The WP1 approach used 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 the factors that influence these preferences, and how they may be prioritised differently (e.g. labour requirements and storability may be prioritised more for women, over yield characteristics). The delivery of the information is expected to support the capacity of RTB breeding programmes to be more demand-led. The approach is based on a five-step methodology (Forsythe et al., 2020) that has been adapted and employed by RTBfoods partners (include references to publications). The methodology includes the following activities:

- Step 1: State of Knowledge review
- 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
- Step 5: Building the Product Profile

Across WP1, there are six gender-focused research questions to be addressed in a cross-product gender analysis led by the Gender Working group. The questions are addressed with data primarily from Step 2 'gendered food mapping' of the methodology (Forsythe et al., 2020). The first three questions are addressed in this report, and the remaining three questions in period 4. The report is structured according to the research questions.

The six questions are:

1. **What are the gender roles along the product food chain?**
2. **How does the use of different crop varieties differ by gender, region and other factors of social difference?**

3. **How do quality characteristic preferences for a food product differ by gender, region and other factors of social difference?**
4. Who has benefit, control and decision-making power over the crop and product?
5. What are the multiple uses of crops and possible trade-offs between crop uses and who does it impact?
6. What are the gender-based constraints and opportunities in varietal development?

The purpose of this report is to provide information to help inform breeding programmes of the gender dynamics and preferences for RTB characteristics, in addition to providing social scientists with a greater understanding of social relations within particular contexts. This again requires a fine balance between the generalisable and specificity.

1.1 Methodology

There are four activities under Step 2 that took place in eight rural communities where people grow, process and consume the crop. These are:

- Key informant group interviews (KII) with community leadership.
- Sex-disaggregated Focus Group Discussions (FGD) with people who produce, process and consume the product. The FGDs specifically provide information on products, gender roles and social segments, processing steps and equipment, characteristics and descriptors that can be probed further in IIs.
- Individual interviews (II) with community members who process the product (and produce the crop, if possible) in the community, conducted by a food scientist and gender specialist. The IIs provides 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. **[do we include this data for some questions, it will expand our work but will be useful!]**

A standard approach sampling structure and the sample size was provided, but there was variance between the research teams in what was logistically feasible and relevant. Where differences in the approach need caution when interpreted, this is highlighted in the text. **Information on regions and sample sizes is provided in the appendix – tbc.**

The following products and regions are covered for each of the products, but please note due to differences in data and approaches, there are some sections where all products are not covered. Differences in methodology are highlighted where relevant:

Table 1 RTB crops and products included in report draft

Product	Location
Fried plantain (dodo) and other plantain products	Osun (South West), Delta (South South) and Rivers (South South) states, Nigeria
Gari/Eba	Osun (South West) and Benue (North Central) states, Nigeria
	Abia and Imo states (South East), Nigeria
Sweetpotato	Kamwenge and Lira districts, Uganda
Matooke	Mbarara and Nakaseke districts, Uganda
Boiled cassava	Uganda (NRCRI)
Boiled plantain	Cameroon (CARBAP)
Boiled yam	Dassa and Dlidja districts, Benin

The objective is to update the report with the following products:

Gari/Tapioca	Littoral region, Cameroon
Pounded yam	Nigeria

2 IMPORTANCE OF THE CROPS

Revisions to consider:

- information is too general. Add qualitative data to add more interesting findings, food and income. Are there different responses from different people?

2.1 Introduction

This chapter provides context for the study by exploring the importance of the RTB crops and products under study from a gender perspective. The data and analysis presented in this section compare the aggregated rankings of the crops most important to communities from sex disaggregated FGDs. Important to note is that the communities were selected based on their high production of the crop and product and the individuals participating in the FGDs were producers, processors and/or consumers of the crop. The results in this section need to be interpreted with that in mind.

2.2 Crop rankings

In the plantain and gari/eba (Nigeria) studies, cassava and plantain were consistently ranked the most important crops in FGDs by gender and state (Table 1). Importantly, in Delta and Rivers states where communities were selected due to their involvement with plantain production, cassava still played a prominent role, and was ranked first or second. They crops ranked second and third were more varied. Out of the 12 FGDs, half rated maize in second place (three women and three men's FGDs, respectively). The crop ranked third was different in each state: rice in Benue, oil palm and sweetpotato in Osun, yam in Imo, and melon in Delta and Rivers states. Interestingly, vegetables were only mentioned in a women's FGDs in Imo state.

Table 2 Crop rankings by importance, Nigeria

State and gender	Benue – F	Benue – M	Osun – F	Osun – M	Imo – F	Imo – M	Osun – F	Osun – M	Delta – M	Delta – F	Rivers – F	Rivers – M
	Gari/eba study						Plantain products study					
1st	Cassa va	Cassav a	Cassa va	Cassa va	Cassava	Cassa va	Plantai n	Plantai n	Plantai n	Plantai n	Cassa va	Cassa va
2nd	Maize	Yam	Yam/maize	Maize	Maize	Maize /yam	Cassa va	Cassa va	Cassa va	Maize	Plantai n	Plantai n
3rd	Rice	Maize/rice	Oil palm/plantain / sweet potato	Yam / sweet potato	Yam / vegetables / cocoyam		Oil palm/maize	Oil palm	Melon	Cassa va	Yam	Melon

Legend: F-female, M-male

Note: each column shows the aggregated rankings of four FGDs in that state and for that gender.

The consistent rankings of the most important crops between men and women's FGDs to some extent contradict notions of certain crops being associated with a particular sex (Table 1). For example, cassava is often referred to as a women's crop in the FGDs; however, the table above show that men also rate cassava as their first or second most important crops. Even though yam is generally considered to be a man's crop culturally and related to gender roles with labour, yam ranks equally high among women (e.g. Korieh, 2007 & 2010). In the longer list of important crops mentioned in the FGDs (beyond the top three crops), women's FGDs included a wider variety of crops compared to men. For example, in the plantain study in the Delta and Rivers states, kolanut, cashew, groundnut, melon, vegetables and pineapple were all noted as important for women and were not mentioned by men.

Cassava, plantain, yam and maize were all mentioned as important food and cash crops, and versatility in the food products that could be derived from it. Unique reasons for why these crops were important in the FGDs were:

- **Cassava:** year-round, tolerant of different weather conditions, it is easy to grow.
- **Plantain:** year-round, generates a high market value with little labour input (contrary to gari or other cassava products), medicinal qualities, shade crop for cacao (Osun state).
- **Yam:** significant cultural value, especially in Delta and Rivers States.
- **Maize:** quick revenue due to its ability to fruit quickly (3 to 4 months), and therefore often mentioned as an important crop for short term settlers.

[add qualitative]

In the study carried out in **Cameroon**, maize was the most important crop regardless of the regions or genders, followed by plantain or cassava and finally beans. Plantain was most important to men, while women mostly prefer maize. Cassava was found to be the second most important crop in both sexes. In the Littoral region, cassava was the prime crop followed by plantain, while maize and beans were respectively first and second most important crops in the West region.

Table X: Important crops in rural communities (FGD Q5.1)

Crop importance	Global	Men	Women	West region	Littoral region
1 st	Maize	Plantain	Maize	Maize	Cassava
2 nd	Plantain/Cassava	Maize/Cassava	Beans/Cassava	Beans	Plantain
3 rd	Beans	Cocoyam	Plantain	Plantain	Cocoyam
4 th	Cocoyam	Beans	Yam/Beans	Cocoyam	Maize
5 th	Yam	Cocoa/Yam	Cocoyam	Cassava	Cocoa/Oil palm

The importance of plantain, for instance, goes beyond its use as a cash crop or a food crop, as mentioned by a respondent in the locality of *Bouba*:

“As far as plantain is concerned, we eat it at home because it is a meal which is meant for men. It gives us the strength to work either on the farm or elsewhere (laughs)”. Male respondent, FGD – Bouba

Women from five communities did not rank plantain as an important crop (i.e. in their top 3 crops). In these communities, plantain was either ranked fourth or fifth, this was because plantain is considered as man’s crop, especially in the west region since women need permission from their husbands before touching this crop.

“Plantain will be ranked fourth because it is man’s crop. Women should ask permission from their husbands before cutting it on the farm, even if they want to prepare it.” Female respondent, FGD – Balessing

Besides, women in Kombe (Littoral region) said they have other crops like cocoyam that are also important.

“Plantain will be ranked fifth because it is man’s crop and we have crops like cocoyam that are also important to us.” Female respondent.” FGD – Kombe

Regarding the boiled yam study (Benin), **needs write up.**

Table 3 Crop rankings by importance, Benin (FGDs)

Rank	Women	Men	Dassa	Djidja
1 st	Maize	Maize	Maize	Maize
2 nd	Yam	Cassava	Yam	Yam
3 rd	Cassava	Yam	Cassava	Cassava
4 th	Soya	Groundnuts	Groundnuts	Soya
5 th	Groundnuts	Soya	Soya	Groundnuts

In the **sweetpotato and matooke (Uganda)** studies, the most important crops were beans, sweetpotato, cassava/maize, and banana, beans and coffee, respectively (Table 2). There was even greater consistency in crop rankings between men and women's FGDs compared to Nigeria, as the top three most important crops were the same. While there was not much variation in the crops mentioned by region, there were differences in the ranking. For example, while respondents in Kamwenge ranked maize first, in Lira, beans were ranked first. Also, sweetpotato was ranked the second ranking most important crop in Kamwenge but the third for Lira. In addition, groundnuts and coffee were only mentioned in Kamwenge. Coffee was the only non-food crop mentioned in all of the studies.

Table 4 Crop rankings by importance, Uganda

Crop importance	Women	Men	Kamwenge	Lira	Women	Men	Mbarara	Nakaseke
	Boiled sweetpotato study				Matooke study			
1 st	Beans	Beans	Maize	Beans	Banana	Banana	Banana	Banana
2 nd	Sweetpotato	Sweetpotato	Sweetpotato	Cassava	Beans	Coffee	Beans	Coffee
3 rd	Cassava	Cassava & Maize	Beans	Sweetpotato	Coffee	Beans	Coffee	Beans

Note: each column shows the aggregated rankings of four FGDs in that state and for that gender.

In the **sweetpotato (Uganda)** study, all crops were prioritised for their value as food. Respondents indicated that the crops were important for food security (combating hunger/ hunger crops), nutritive value, the variety of dishes made from them and their taste. For example, in a men's FGD, sweetpotato was said to be "delicious and much better than cassava since some cassava varieties are hard to cook", while another one FGD said "*Its sweetness means that it can sometimes be eaten without sauce and this is important for the children*". These findings are similar to the findings from Nigeria except that nutrition of the crops were not raised. Sweetpotato, however, was perceived to have no economic value compared to the other priority crops that provided income for school fees and loan security, such as with maize.

Interestingly, in the longer list of important crops in the **sweetpotato (Uganda)** study, few were mentioned as important due to agronomic characteristics, only for maize, coffee and groundnuts. Coffee was prioritised for being a perennial crop while maize and groundnuts were said to be easy to grow. Maize, beans and cassava were valued for their social roles. A women's FGD in Kamwenge said that beans helped the wife stay in a marriage because if there was not food, she would leave [check], while a men's FGD in the same district felt maize played the same role "*if there's no food in the home the wife will leave*".

Regarding the **matooke (Uganda)** study, the top three crops were also the same in each location and between men and women. However, there were varied reasons among the crops for their importance. Banana was consistently mentioned as an important crop for food and income, coffee as an important cash crop, and beans, an important food and cash crop. Banana and beans are considered important for men and women, while coffee was associated with men's income in the majority of FGDs.

“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 district, Uganda).

“Coffee most important to the man. He buys family needs, pays tuition and buys other items of food” (Men’s FGD, Kacucu village, Mbarara district, Uganda).

From focus group discussions for **boiled cassava (Uganda)**, the important crops for men were, maize, cassava and beans respectively. Women on the other hand respectively ranked cassava, beans and maize as important crops. Beans were commonly grown to provide stew. According to men in Apac, maize was indeed their important crop as they narrated; “maize is a major crop for men because we mostly grow it for sale. Maize cultivation requires a lot of energy and it requires costly inputs which women may not afford”. In addition men in Luweero grew maize for sale in order to get their childrens’ school fees.

Cassava was an important crop for women because they used it to feed their families. Women in Luweero narrated; “cassava takes a short time to get ready so we use it to prepare a fast meal. Cassava is resistant to drought so it is grown for food security”. Additionally, women in Apac narrated; “cassava is a main staple and can serve a large family. It is good for children to eat it as a snack”. Interestingly, some crops such as sim sim and ground nuts were mentioned as important by women only.

2.3 Emerging themes

[add boiled cassava Uganda, Benin boiled yam]

- The communities sampled were selected based on their high production of the RTB crop under study, which is reflected in the results (e.g. sweetpotato features prominently in the boiled sweetpotato study and cassava in the garri studies). This may be the reasons for differences between the most important crops within and between countries.
- In Nigeria, cassava and plantain were clearly the most important crops, while in Uganda beans featured in both the boiled sweetpotato and matooke studies and differed by maize or sweetpotato in the sweetpotato areas, and banana and coffee in the matooke study.
- In Cameroon there were gender differences in the crop most preferred: Plantain was most important to men, while women mostly prefer maize. Maize was most important in the West region, while in the Littoral region cassava was the most important crop.
- There was a significant degree of agreement between the crops that men and women ranked highly, despite differences in corresponding gender roles, and the reasons why they are considered important. This may challenge agriculture research and policy narratives that associate crops with a particular gender. ‘Men’s crop’ and ‘women’s crops’ are terms often used to signify the importance of the crop for a particular sex, or their role within a certain aspect of the food chain, but are rarely clear cut and can therefore be stigmatising and misleading, rendering invisible power relations and inequalities that are at the base of gender analysis. However, the findings from Nigeria and Cameroon show greater variability between men and women in their preferred crops, which correspond to gender roles. [and others? this needs more work]
- Reasons for their importance namely related to the crop and products role in food security and income generation at different times of the year. There were also a number of social roles related to the production, processing and trading the crop (e.g. yam festivals, production groups).

3 WHAT ARE THE GENDER ROLES ALONG THE PRODUCT FOOD CHAIN?

Revisions to consider:

- could adapt to typologies

3.1 Introduction

This chapter explores gender roles, based on gender norms, along the food chain of the crop and products studied. Differences in gender roles by region and other nodes of social difference, such as locality, ethnicity, age, is also examined. The chapter relies primarily on FGD data, and II to a lesser extent. The chapter is divided by different nodes of the food chain from production to consumption, with greater detail under production due to the level of complexity of gender roles at that node.

3.2 Gendering of farming systems

This section provides an overview of the farming systems in the study areas and how they are gendered. It examines the type of farming system, whether married men and women farm on the same plots or separate, differences in production practices and farm tasks. An overview of gender roles within the food chain among the products is provided below.

Table 5 Overview of gender roles in farming systems according to FGDs [to be revised]

	Share d plots	Separat e plots	Hire labour	Gendered practices/ tasks		
	Not crop specific					
Nigeria – SW (plantain products & gari/eba study)	Non-indigen	Indigen	Among indigen men and women	Indigen women and indigen men monocrop	non-indgines	intercrop,
Nigeria – SS (plantain products study)	Non-indigen	Indigen	Among wealthy	Indigen women and indigen men monocrop	non-indgines	intercrop,
Nigeria – SE (gari/eba study)	Majority of HH + non-indigens	Minority of HH	Among indigen men	Indigen women and indigen men monocrop	non-indgines	intercrop,
Nigeria – NC (gari/eba study)	Majority of HH + non-indigens	Minority of HH	Among indigen men	Indigen women and indigen men monocrop	non-indgines	intercrop,
Cameroon – Littoral region (boiled plantain study)	Majority of HH	1 community	Non-indigen men	- Indigen women monocrop and intercrop; - indigen men monocrop and intercrop; - non-indigen men monocrop		
Cameroon – West region (boiled plantain study)	Majority of HH	Uncommon	Non-indigen men	- Indigen women monocrop and intercrop; - indigen men monocrop and intercrop; - non-indigen men monocrop		
Boiled yam - Benin	Majority of HH	Uncommon		-		
Kamwenge districts Uganda (sweetpotato study)*	Minority of hh	Majority of household	Uncommon	Intercrop (mainly women), wealthy monocrop		

Lira district, Uganda (sweetpotato study)	Majority of hh	1 community	Uncommon	Intercrop (mainly women), wealthy monocrop
Mbarara districts Uganda (matooke study)	Majority of hh	Minority of hh	Uncommon	Intercrop (mainly women), wealthy monocrop
Nakaseke district, Uganda (matooke study)	Majority of hh	Minority of hh	Uncommon	Intercrop (mainly women), wealthy monocrop

hh: households

* some contradiction in responses between men and women's FGDs

In **Nigeria**, gender roles in farming systems vary by interrelated sets of demographic factors including ethnicity/migration status, the gendered organisation of household farm plots (separate or shared plots between married men and women), and region. These factors can be loosely grouped into typologies based on region and ethnicity/migration status.² In the RTBfoods study areas of SW and SS Nigeria, married men and women who are indigenous to the area, called 'indigenes', typically farmed on separate plots, regardless of if the household is polygamous or not. Non-indigenes, who include temporary and long-term settlers, are ethnic minorities and are typically people from the Idoma and Iggede tribes of Benue state and several ethnic groups from Togo and Benin republic. In contrast, married men and women in the SE and NC Nigeria tended to farm on shared plots [indigenes or non indigenes], although a minority practiced separate farming and/or women may have a separate household garden close to the house [check]. However, while men and women farmed separately, they often performed tasks on each other's farms, such as women weeding their husbands plot(s), and men help their wife or wives in applying chemicals.

"Indigenes make ridges for their cassava, practice sole cropping or inter cropping with maize and not all indigenes plant with their wives, while immigrants (Idoma or Iggede) make heaps for their cassava, intercrop their cassava e.g. with pepper and plant with their wives" (women's FGD, location, Nigeria).

Farming practices in the **West and Littoral regions of Cameroon** are almost similar from the cropping system perspective. In fact, individuals either practice inter-cropping or mono-cropping. Men always put plantains in their farms alongside other perennial crops. These plantains, regardless of the regions are always associated with short-cycle crops such as maize, beans, vegetables, etc. Those who practice these farming activities are members of the households especially parents and children. Moreover, in a community of this region, married men work with their wives, while unmarried men work with their male friends called "combi". Generally, farming in these regions is usually on shared plots. Depending on the regions, the percentage of farming surfaces allocated to men or women varies. In the West region, surfaces occupied by women are 2 to 3 times (75%-80%) larger than those occupied by men (25%-30%). This trend is reversed in the Littoral region.

In Djidja and Dassa districts in Benin [to be completed]

In the study areas in **Uganda**, Kamwenge, Lira, Mbarara and Nakaseke, only married men and women in the former, Kamwenge, tended to farm on separate plots, while shared plots were the norm in the other locations. However, interestingly in Kamwenge, responses between men and women differ. With regards to plot ownership, women reported that their community mostly have separate plots, while men reported the reverse. For example, a women's FGD in Kamwenge estimated that 80% of households had separate plots and 20% shared plots; the men estimated 20% separate. Another women's FGD in Kamwenge said 70% of households farmed on separate plots and men said all shared, except polygamous households. In Lira, communities said they mainly

² These findings confirm and expand on typologies identified by Forsythe (2018) in SW Nigeria.

farmed on shared plots. Interestingly however, one participant in Lira mentioned that men do not farm:

“But the men here don’t dig [lots of laughter]. If the man has another job, he will leave you and the children to do all the farm work.” “There are categories of men: there are men who wake up and just go to town. The second category – the man goes to offer labour for cash” (women’s FGD, Lira, Uganda).

There are different interpretations of why married men and women share or separate their farms, ranging from land and resources constraints, the need for women to have greater independence and control over their farms, or the need to have plots that reflect different strategies to achieve household-level goals (Forsythe, 2018; [add refs]). [any more qualitative showing the latter strategy]

“We don’t farm with our husband in this community because men have big size of farmland and they may not want to cultivate with us. Women cannot maintain (financially, and labour inputs) such big size of farmland with men” (Women’s FGD, Wasinmi, Osun State, SW region).

“When you get married, you come to a man’s home and from then you have to listen and obey to what he says. You can’t decide on your own, you can’t farm on your own, so you have to do everything jointly” (women’s FGD, Lira, Uganda).

FGDs in the two countries identified several differences between men and women’s plots, in terms of size, inputs, crops cultivated, planting techniques, and crop management practices, which varied by factors such as region, ethnicity, and wealth, depending on the context. Differences are related to an interplay of gender norms and limited resources (poverty).

“Women cultivate using hoes, make heaps through labourers and plant cassava, rice, vegetable crops and groundnut. While men cultivate using tractors or labourers to make ridges for cassava, rice and heaps for yam and maize this is used for family upkeep” (women’s FGD, Koti Shangevya, Benue state, NC region).

“Plot size is the major difference between men and women plots because men have the capacity to maintain large farm size through hiring labour while women have no such support” (women’s FGD Aba Gbooro, Elefon, Osun state, SW region).

“Here, the woman’s plot is tighter than that of the man because she sows a little bit of everything” (women’s FGD, Bamendjing community, Cameroon)

“Men’s plots are shabby and monocropped and women’s plots are clean and intercropped” (paraphrased) (women’s FGD, district Uganda).

There were also differences in some of the crops men and women grew. Cassava was grown by men and women, despite perceptions of the crop as a women’s crop. However, it was not the norm of men in the SE to grow cassava, but yam instead. Yam has many cultural associations with men throughout West Africa, including the restriction of yam production to men, except for certain varieties of yam such as water yam. Plantain production is often associated with men in Nigeria, however the study found that in the SS it is also common for women to produce plantain, contrary to the SW and SE regions [check]. There were examples in both countries where certain crops, particularly those that are low market value and/or labour required were considered ‘women’s crops’, such as beans and sweetpotato. More qualitative evidence here?

“Women are more into bean production because men can only invest little energy and the demand of beans is high, so men believe it is women crop” (women’s FGD Al-Okete, Benue State, NC region).

There were also differences in the way men and women planted, namely between monocropping and intercropping long and short cycle crops, respectively. In both countries the former was practiced by men in wealthier households. The latter was practiced by women and migrants/ethnic minorities/mobile communities to meet immediate food and income needs, and due to limited land and/or precarious land tenure (as demonstrated in the quotes below). This means that crops and

varieties with long gestation, such as some varieties of plantain that take over a year to produce, would not be preferable or viable to all farmers.

“When men are preparing a yam farm, the women will pre-sprout vegetables before the land is ready for yam planting. We harvest the vegetables at four months after the planting of yam. Cassava stakes will be inserted by the sides, and in eight months the yam will be harvested leaving only the cassava. This is how we plant with the men” (women’s FGD Wasinmi, Osun state, SW region).

“Women practice intercropping more but normally it is an agreement between men and women” (men’s FGD, Mbarara, Uganda).

“Intercropping bananas with coffee or beans are done because land is not enough. There is no option and its usually subsistence. Men and women agree but women do it more” (men’s FGD, Mbarara, Uganda).

Typically, women in **Nigeria**, intercropped long and short cycle crops on their plots (if land is not rented), by usually planting cassava or maize in heaps and planting vegetable crops around the heaps. Indigen men on the other hand, mostly monocropped cassava and yam, and planted in ridges as opposed to heaps and did not grow vegetables or legumes. In **Uganda**, farming practices included monocropping, intercropping, making mounds, planting, spraying and harvesting. However, these practices in sweetpotato cultivation differed by gender and region. **[add description, and banana?]**

Box 1: Planting practices, gender and migration status in Nigeria

Differences in planting in either heaps (mounds) or ridges highlights interesting factors in decision making by gender and ethnicity. The latter practice is considered by male farmers to be quicker, easier and recommended by extension services; however, planting in heaps is practiced for better yield. This reveals an important point that is often felt that men are more concerned with yield, as this demonstrates that greater labour investment is tolerated among women (their own or hired) to have increase yield. Planting in heaps is mostly used for yam cultivation, which in a way explains the practices of the non-indigenes from the Idoma and Iggede tribe in Benue state where there is abundance of yam production. In this context, planting in heaps and the corresponding yield increase is a matter of prestige and pride.

“Indigenes make ridges for their cassava, practice sole cropping or inter cropping with maize and not all indigenes plant with their wives, while immigrants (Idoma or Iggede) make heaps for their cassava, intercrop their cassava with pepper and plant with their wives” (women’s FGD, Nyam, Benue State, NC region).

At the same time, there were reports among the regions that women and non-indigenes in the southern regions and NC state were adopting the practice of planting in ridges. The quote below illustrates the change among women in one community in the SE, and hints at the challenge that women may have in adopting this practice because of limitations – in this case land that has stumps, which is related to insufficient land clearing or access to poorer land compared to men.

“In the past, most women do not plant on ridges before but in mounds. But currently, the women have started planting on ridges, which most men do. The ridges done by women usually are very short at about 2m long – this might be as a result of stumps” (men’s FGD, Umundugba Isu, Imo state, SE region).

Interestingly, in the Delta and Rivers states there were examples of the reverse occurring. Where the indigen population were adopting the practice of planting cassava and yam in large heaps as practiced by long-term settlers, particularly the Igbo.

Farm tasks were gendered in both countries, even in cases where married men and women farmed separately. Generally, in **Nigeria**, the tasks that men were responsible for were perceived to be more

physically strenuous, such as land clearing and digging, and preparing the land in ridges and heaps for cassava and yam, and digging holes for plantain. Tasks typically associated with women's responsibility were repetitive and time-consuming tasks such as planting, weeding, and regular crop maintenance. Harvesting was often done by both genders, but typically associated with men.

"Men are more focused on making heaps for cassava and yam. Women are the ones to plant it (the cassava and yam) and other grain seeds, because men believe women are more patient in bending down for long (time)" (women's FGD, Al-Okete, Benue State, NC region).

"Men do more physically heavy work such as clear farm, make ridges and harvest" (women's FGD, Ago-Owu, Osun State, SW region).

"Women plant and also weed with their husband, assist in harvest, process the tubers and sell" (women's FGD, Oyan, Osun State, SW region).

In **Cameroon** a clear gender of division of labour was identified for plantain. Men's tasks involve deciding on the activity (conceive the project?), cut existent trees, create the plantation, choose the suckers (planting material), clear the farm, plant the suckers, stake the plantains, follow them up and eventually harvest, women on the other hand are only allowed to harvest the plantains and require permission. However, women can grow banana, beans, maize, and tubers such as cassava, yam, cocoyam, etc. on their plots. In some cases, women and men work collaborative on their farms, however, men will undertake work consider more 'heavy' such as clearing, tree staking, etc. In some communities, farm works are organized in groups or associations that help one another.

"Men create the plantation, they conceive the project and they choose the piece of land. It is man who has the land because the woman came for marriage. The woman can only be the owner if the husband is dead. Here, we do group associations, it is like a tontine, you work with me today, tomorrow I work with you and so on" (men's FGD, Song-Mayo, Cameroon)

In **Benin**, the gender division of labour was explained differently according to location. It was expressed that in several communities that women were primarily responsible for 'market gardening' and men had more involvement with the production of yam and cassava. However, in other communities all agricultural tasks were shared. Still in another community, men and women produced the same crops and undertook similar work, but that women's production was on a smaller scale. There were also a number of differences by ethnic group. In one community, the Fon were described as the main yam producers. [check]

In **Uganda**, the typical gender division of labour for sweetpotato production was similar to Nigeria. Men were responsible for land preparation, pest and weed control and in Lira, oxploughing (preparing the field) However, men and women together would make mounds and plant. Women's roles included weeding, mulching and harvesting (maintenance). There were variations among the communities, for example in some area's men made mounds and women planted, or any family member would harvest. A women's FGD stated that only women piecemeal harvest as men do not know how. They noted that when they attempted to do so they would harvest the whole mound and would thus need to be 'supervised'. In Kamwenge, Western Uganda; men shared that the person who harvests depends on what the crop will be used for (explain).

"Some people here don't weed." "Who are these people?" "The men (laughter)... Their waists get tired quickly" (women's FGD, Lira, Uganda).

"This depends on the purpose/need e.g. either for home consumption or for sale. Usually, women harvest crops meant for food while men handle crops for the market" (women's FGD, Kamwenge, Uganda).

For **boiled cassava (Uganda)**, The common practice in Apac and Luweero districts was that households manage and cultivate one garden. Indeed, approximately 70% of the households combined plots and 30% separate. Men grew crops for sale yet, women grew them for home consumption. It is key to note that there are differences in cassava production gender roles by location. For example in Apac, both men and women participate in all cassava

production roles apart from harvesting. “Men do not harvest cassava, they will only harvest if the woman is sick” narrated men in Apac. On the other hand, weeding was a woman’s role in Luweero.

Men and women in Apac and Luweero were engaged in both mono cropping and intercropping. However, mono cropping was linked to gender roles and the size of land available to the household which was associated to the wealth of the house hold (Table 2). Accordingly, men and women who are wealthy own large pieces of land and thus do mono cropping.

Men are responsible for financial providence to the house hold. Thus, men practise mono cropping because they target the market. Women on the other hand intercrop because in addition to having limited access to land, they had to grow crops like beans or groundnuts which are aimed at providing stew. Furthermore, in Luwero the decision to intercrop or mono crop depended on the season as women narrate; “when cassava is planted in November or December, it is mono cropped because other crops cannot withstand the dry spell of December-February. In case it is planted during in March, it is intercropped with beans”.

Table 2. Overview of gender roles in farming systems according to FGDs

	Shared plots	Separate plots	Hire labour	Gendered practices/ tasks
Boiled cassava	Majority of the households	Minority of the households	Not common practise	Mono cropping mainly done by wealthy men and women. It is commonplace for both men and women to intercrop

[write up boiled cassava]

3.3 Processing and preparation

[processing and consumption need more work, seem quite general. what do you have that would make it more interesting]

This section focuses on gender roles in processing and preparation of the products from the raw material, namely at the household level for home consumption and sale (for some products). It explores gender roles in processing activities, women’s access to equipment, and challenges in processing.

Similar to plantain, **cassava (Nigeria)** can also be processed into a wide range of products, and this is often performed by women. Processing cassava unfortunately is a laborious process, particularly as it must be processed withing 48 hours of harvesting as a rule, and certain aspects of processing can be harmful (e.g. exposure to smoke inhalation when roasting gari). The most common cassava products in the SW (Osun) and Benue (NC) were gari, akpu/fufu and cassava chips/flour called elubo, which were all processed mainly by women. In the SE region of Nigeria, the most important cassava products are gari, followed by fufu and tapioca. Most of the products are for home consumption while about one-third the products are sold. Women and children are mainly involved in peeling cassava but men can assist as it is considered household activity.

For cassava processed into **gari/eba (Nigeria)**, both men and women are able to describe the different processing steps. Typical steps include harvesting, peeling, washing, grating, packing in sack, pressing, sieving, toasting, sieving, spreading for aeration cooling to avoid heat in the gari granules. Activities such as peeling, washing, adding of palm oil (**only in xxx states**), sieving and toasting are mainly done by women (sometimes hired) while pressing is done by men (adult and young). Activities that both men and women do are harvesting and packing of roots to processing site or home. Particularly in the SW peeled cassava is taken to processing centres to be grated and dewatered, which is usually done by the adult men or male youth. In contrast, in the SE region men will move from house to house with a mobile grate “*men grate the cassava because they own the engine*”.

Regarding **plantain in Nigeria**, the crop is processed into a wide range of products. Roasted plantain, boiled plantain and dodo are the most commonly consumed. In Osun State, plantain flour

that is used for making amala plays an important role in people's diet, while plantain porridge and beans with plantain are more common across Delta and Rivers State. Plantain pepper soup is commonly found in Rivers State. The broad way in which the products are prepared is similar; however, methods depend on individual preference, as a woman explains: "the processing depends on individual preferences, some people like dodo well fried until it becomes soft, while others prefer it when still firm". This can also be seen for other plantain products. Some people boil or roast plantain with peel, while others peel plantain before cooking. Similarly, there are variations in the amount of salt and types of other ingredients added, especially for products as plantain porridge, pepper soup and plantain with beans.

All FGD participants state that women are mostly involved in the processing of plantain, both for home consumption and for sale. However, there were some exceptions or local dynamics to this norm. FGD in some communities relate certain activities to stages in women's lifecycle, for example, that only elderly women make pudding, or that only young women process and sell plantain products. In two communities in Osun, men and women's FGD stated that husbands help process if needed. Children and labourers may help with the flour processing if the quantity of plantain is much.

"Pudding is mostly prepared by elderly women, while chips are mostly made by young women" (men's FGD, Isele Uku, **STATE**, Nigeria).

"The women in the house process but we men help them once in a while when the women are too busy" (men's FGD, Akola Alaerebere, Osun East, Osun state, Nigeria).

In **Cameroon**, **plantain** pulps can be boiled either with its peels or without them. The choice of the cooking mode depends on each and everyone. However, some women claimed to gain time when cooking with its peels. Cooking plantain generally (without its peels) requires a series of steps among which the most recurrent are peeling, washing and boiling. These steps vary according to respondents with women giving more detailed information on the whole process. Moreover, irrespective of the gender, cooking plantain depends on the stage of ripeness, and eventually on the mode of cooking, i.e. with or without peel. Thus, green plantains (unripe pulps) require more water and will last longer during boiling than plantain with yellow peel color (half-ripe or ripe pulps), provided the fire intensity is same (high). Likewise, plantains that are cooked with peel also last longer on fire than those cooked without peel. Women are usually involved in the boiling step, with their daughters doing all the other steps (peeling, washing, etc.). Men were found to carry out all the preparation steps when they were the ones cooking.

"Some plantains can be cooked for up to three hours, especially if there is not enough fire under the pot" (women's FGD, Bamendjing, Cameroon)

[Benin]

Regarding **boiled sweetpotato (Uganda)**, the product can be prepared by steaming or boiling. In Lira, the preparation steps for boiling sweetpotato mentioned by men and women were very similar. There were limited variations reported in the preparation method as reported by men in FGDs. The variations focused on the way the sweetpotato was covered prior to boiling. While the common practice was using another saucepan to cover the pot, the variation mentioned was the use of a banana leaf where available, or a plastic sheet (kaveera). In Kamwenge, sweetpotato was mostly prepared by steaming. The variation reported was some household did not peel the sweetpotato. Another variation reported was mixing sweetpotato with beans during boiling (commonly known as *Katogo*).

Regardless of method and in any region, the work of preparing boiled sweetpotato is solely done by women and girls. However, men were able to report on the processing steps in detail. Other sweetpotato products, such as dried chips, found in Lira, were also prepared only by women and girls. In one community in Lira, this was accounted to food preparation being a women's responsibility, as elaborated below:

“Women do the entire process. This is because it is their responsibility, and they can do it better. In the absence of women, men or older girl children can prepare it” (men’s FGD, Lira, Uganda).

In **Uganda**, the common products processed from **cassava** were; boiled cassava, alcohol, pancakes, cassava flour, mashed cassava, fried cassava chips, dried cassava chips and stem cuttings. Both the men and women process boiled cassava and alcohol from cassava roots. Men preferred to process mashed cassava and boiled cassava whereas women preferred to process pancakes and cassava flour from cassava. In Apac, boiled cassava was the most important product derived from cassava closely followed by alcohol and pancakes. In Luweero however, cassava flour was the most important product closely followed by boiled cassava and cassava leaves.

With regard to processing boiled cassava, there was variation by location and within location. Accordingly, in Apac peeled cassava roots were sliced into long cubes and immersed in water to boil until when they were ready. In addition, in Apac there was variation in processing of boiled cassava roots notably; peeled cassava roots were sliced into small short cubes prior to boiling. Thereafter, boiled cassava pieces were mashed to form a thick paste traditionally called Mogo myeno. On the other hand, in Luweero peeled cassava roots were sliced in long cubes, wrapped in banana leaves and steamed.

Results from Luweero and Apac showed that processing cassava roots into boiled cassava was a responsibility of women and female children. Men narrated that “If one prepares boiled cassava when the woman is around. The following day he is taken before the council of elders and is beaten”. In addition, boiled cassava in Apac and Luweero is majorly sold by women in communities. Indeed a man in the FGD clarified that “we don’t want to be seen selling cassava. It is women who cook so it is their duty to sell boiled cassava.” However women in the FGD in Apac highlighted that bachelors and boys have recently begun to engage in processing of boiled cassava. This indicates a gradual change in the gender roles related to processing boiled cassava product in Apac.

Equipment and women’s access

For household level processing of **plantain (Nigeria)**, the necessary equipment includes pots, knives, mortar and pestle, sieve, spoons, stove, wire gash, plates, frying pan, bows and sacks or slabs to dry plantain. Table 4 below shows the average score of access for these different pieces of equipment. Overall, all equipment is owned by the women processing.

Table 6 Mean score of access (1-4*) to equipment or utensils required for processing the product by sex, Nigeria

Equipment processing (SE and SS)	Mean level of access for women (1-4*) n= 62	Equipment <u>gari</u> processing (SE region)	Mean level of access for women (1-4*) n=33
Pots	1	Knives	1
Knives	1	Toasting pot	5
Mortar & pestle	1	Stirrer	1
Sieve	1	Local oven	1
Spoons	1	Firewood	1
Stove	1	Frying stick	1
Wire gash	1	Basin	1
Plates	1	Wheelbarrow	5
Frying pan	1	Grating machine	3
Bowls	1	Dewatering machine	1
Sacks or slabs for drying plantain	1		1

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

According to the **gari/eba (Nigeria)** in the SE, the processing equipment required includes knives, stirrer, oven, firewood, frying stick, basin, wheelbarrow, grating machine and dewatering machines. Table 5 highlights that while women own the majority of equipment they use for processing gari, there are key pieces that they do not own and as a result, need to rent services from other person (usually men) for grating. [\[what is 'other' for toasting and wheelbarrow?\] More?](#)

Similar to the findings from the FGDs, all interviewees explained to have outright ownership over all utensils used to prepare different **plantain products (Nigeria)**. Respondents explain that the utensils are basic, inexpensive household items that any household should have “the resources for processing plantain are readily available, not at all expensive”. A woman in Abua, Rivers West, links this also to stage in a women’s lifecycle and expectations of ownership of these tools: “a matured woman must have all these things like pots, knives, and frying pan”. Four respondents explain own all resources required, but that they may borrow a utensil from family members or neighbours in case of need. Only one young woman in Ossissa, Delta North, explains “I do not have fry pan but I borrow it from my mother and return it after use. I am planning to buy a big one when school opens”. The only resource not owned by all households is a milling machine. Only four respondents (three women and one men) in Osun (where plantain flour is a common product) explain to own a milling machine, which they rent out.

[\[put Cameroon after Plantain\]](#)

In **Cameroon**, cooking of plantain demands usual kitchen tools such as pot, basin, knives and source of energy (firewood, charcoal, gas stove, etc.). These tools are owned by the householders, and they don’t experience any constraints in having access to them. Boiled plantain is an accompaniment to a variety of food complements (sauces, vegetables, meats, beans, etc.) and as such is frequently cooked at home. For this reason, all the respondents said they don’t experience any challenge with its preparation.

Table X. Mean score of access (1-4*) to equipment or utensils required for boiling plantain by sex, Cameroon

Equipment <u>boiled plantain</u> (Cameroon)	Mean level of access for women (1-4*) n= 40	Equipment <u>boiled plantain</u> (Cameroon)	Mean level of access for men (1-4*) n= 38
Knives	1.0	Knives	1.0
Basins	1.0	Basins	1.0
Cooking pots	1.0	Cooking pots	1.0
Fire source (firewood, charcoal, etc.)	1.0	Fire source (firewood, charcoal, etc.)	1.0

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

[\[Benin?\]](#)

The equipment required for **boiled sweetpotato (Uganda)** are knives, a basin, banana leaves and firewood or charcoal. Generally, all utensils and basic tools required for processing boiled or steamed sweetpotato such as knives, basin and saucepan were easy to access and were owned outrightly by women (Table 6). However, firewood or charcoal as energy resource was the exception. Women indicated that they used firewood/charcoal but wouldn’t take it with them in case of a divorce. [More?](#)

Table 7 Mean score of access (1-4*) to equipment or utensils required for processing the product, Uganda

Equipment <u>sweetpotato processing</u> (Uganda)	Mean level of access for women (1-4*) n= 60	Equipment <u>matooke processing</u>	Mean level of access for women (1-4*) n= 59
Knives	1.1	banana leaves	1.0
Basin/Sufuria	1.1	banana leaf stalk	1.0
Banana Leaves	1.0	Water	1.0

Firewood/Charcoal	2.5	Saucepan	1.0
		Firewood	1.0
		Panga	1.0
		banana fibres	1.0
		banana leaves	1.0
		banana leaf stalk	1.0

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

The steps of steamed then mashed **matooke (Uganda)** are consistent between the sample areas, and the accounts of the process of men and women's FGDs. This includes: harvesting, cut a fully-grown banana bunch(es), de-hand -remove hands from bunch, remove fingers from clusters, peel and wash fingers, 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, prepare leaves – carefully slice off the midribs, tie fingers in banana leaves and place in a cooking pot on top of fibres with enough water to steam, steam for an hour (depending on firewood). Mash bananas with the palm of your hand, simmer for longer.

Women and girls are responsible for the preparation process. There is no difference across all communities and sex. Both men and women FGDs could describe the matooke cooking process in detail. Materials needed for matooke processing are firewood, water, saucepan, banana leaves, banana leaf stalk (mizingonya), banana fibres, knife, basket (kibbo), peduncle, matches, obuwuwo (Old yellow banana leaves) and panga. Most of the items were owned outright by women (Table 6).

Processing challenges

[we could do much more here, on levels of exertion and time, also issues around firewood, health etc. perhaps we use our field observations too, + qualitative. This is an area that the project as a whole wants to focus on so let's provide the data to direct this and maximise our impact]

Challenges reported among processors of **gari (Nigeria)** in SW and NC included unhealthy processing environment (causing finger cuts, slippery ground, eye problems, body pains) (21.2%, n=52); delayed grating/pressing (21.2%); insufficient labour and use of labour-intensive/time consuming tools (13.5%); strenuous/drudgery activities (5.8%); and borrowing processing tools (7.7%). **What about Imo?**

There were relatively few challenges reported by processors and traders in processing and sale of **plantain products (Nigeria)**. Close to half of the respondents (49.7%, n=62) stated that they did not experience challenges. Among those who reported challenges, they were related to lack of ingredients for the making of plantain products (5.2%) such as wrapping leaves and firewood. Others experience challenges related to the processing itself, such as burning (8.6%), staining of hands and cloths by plantain juice (8.6%), and slicing which is considered tiring and/or time consuming (3.4%). Another major challenge in plantain processing, especially in Osun State, is the fact that plantain cannot be dried during the rainy season (8.6%).

In **Cameroon**, no processing challenges during **plantain boiling** were observed in the various communities as highlighted by the quote below:

"No, there are no challenges. Boiled plantain is a meal like many others." (Female respondent, II – Bafounda, Cameroon)

This could mainly be because the equipment used for plantain boiling are all household tools, hence the main challenge one would face can oriented towards the cooking time. Besides, the fact that plantain can be boiled with or without its peels makes its processing (into boiled plantain) easy, provided all the equipment are available.

[Benin?]

For boiled **sweetpotato in Uganda**, the most cited challenge was associated with access to firewood as the main source of energy (11%, n=60), long distance to collect firewood (4%), expense of firewood (3%) and not having enough saucepans (2%). By region, the main challenge in Kamwenge was long distance to collect firewood whereas in Lira the main problem was scarcity of firewood.

Processing challenges were not asked for matooke [check].

3.4 Marketing

[this section also needs more work, we are missing a lot of data. Can also include proportion sold (citations and fgd); Qual and quant, focused on who sells the product; table of citations – who sells; some products missing from decision making questions]

In this section, we examine gender roles in marketing the crop and product. It covers three areas in particular: who sells the crop and/or product, who makes the decision about selling, and who controls the income from the product.

Selling the crop and product

For **gari/eba (Nigeria)** in SW and NC....

to include... movement of roots from farm to processing centres and to rural and urban markets as products and finally to tables, gradually increases its value in terms of price. More profit is also generated along each value addition stage to final consumption, the case of gari as eba at home or in restaurants and events.

For **gari/eba (Nigeria)** in SE....

For **plantain and plantain products (Nigeria)**, regarding plantain it is women, particularly younger women as mentioned in one region. [what about raw?]

In **Cameroon**, **plantain** bunches are generally sold by men since it is considered as a man's crop. In fact, men are responsible for the follow-up of plantains in their farms and as such have the right to sell the fruits of the harvest. Women on the other hand can be seen selling plantains for one of the following reasons: i) they own the farm, ii) the husband is physically absent (invalidity, sickness or death), iii) the husband gave the permission to act.

"It is my farm, whenever I see a bunch that comes out if we don't have it at home, I cut, and I put in the house. If there is plantain at home, I go and sell it" (Female respondent, Penka-Michel, Cameroon)

Boiled plantain and other plantain-related meals or products (plantain porridge, fried plantains, pounded plantains, plantain fritters, etc.) are exclusively sold by women in restaurants or at the level of roadsides.

In Benin for both rural and urban yam value chains, yam retailers and boiled yam retailers are mainly women. Producers and off-farm traders are mainly men, and yam wholesales tend to be majorly women.

In the Dassa region in **Benin**, most traders are women both in the sale of boiled yams and fresh yams. Men are then a minority in the markets selling fresh yam and non-existent in the sale of boiled yam, exclusively dedicated to women. As for fresh yam, the majority of men leave their yam stock to their wives for sale to the markets. Most of them (men) are selling at field side judging that women are in essence more apt to act commercially and more efficiently than them at the market. The main ethnic groups involved in the sale of fresh yams and boiled yams in this commune are: Idaatcha natives and their majority Mahi neighbors in certain local cities such as ADINHINLIDJI. While the sale of boiled yam is done locally in some of the villages surveyed (Lema, Kpékouté, Adinhinlidji); it is not done in others like IGOHO. Similarly, apart from edge-field sales, which are exceptionally rare, there is only one local market for the sale of fresh yam (Dassa-Centre). But the neighboring city

market of Glazoué is another outlet for fresh yam for these actors of Dassa. Very few traders of fresh or boiled yam are also producers but many are wives of producers or resellers. Regarding the proportion of yam sold in different households, it varies according to the ethnic groups and the initial production objectives of the households, their expenses as well as the unforeseen ones related to the production. However, it is noted that the largest proportion (about 65% / 70% of the harvest) is sold in fresh form to travelers or resellers, most of whom go to the cities of Bohicon and Cotonou. Likewise, boiled yam is more sold in rural and peri-urban areas than in urban areas where yam products (crushed yams, chopped potatoes, stew and fried yams) are more widely traded.

In Dassa district, **Benin**, boiled yams are more made and consumed mainly in households, mainly inhabited by the Mahi who are the main consumers of boiled yam in the region, and in the market of DASSA CENTER, in schools, in some strategic places not far from the workers (carpenters, welders, etc.), hospitals and police stations that have not brought meals from home. Thus, they buy from the boiled yam traders to satisfy their hunger of the day. Boiled yams are prepared in households most of the time for domestic consumption or prepared at the point of sale to reassure buyers of the quality of the product.

Likewise at DJIDJA, it is also consumed in the households, in the markets places and in some places not far from the workers, children and women who are the main buyers of the boiled yams (schools, hospitals, police stations and road builders). Yams are also widely consumed by Ibos (Nigerian ethnic groups living in peri-urban and urban areas to sell motorbike mechanical parts, and who represent a large part of consumers of boiled yam). As in Dassa, boiled yam is prepared in households and most of the time it is intended for domestic consumption or for sale. Here it is also prepared at the point of sale to reassure buyers of the quality of the product.

Regarding **sweetpotato (Uganda)**, exploration on marketing of the various sweetpotato products revealed the women were largely responsible. Regarding the sale of fresh sweetpotato roots, all respondents mentioned women as the primary sellers as illustrated by the following quotes:

“Women sell fresh roots whenever there is surplus. This is because women handle the family budget” (men’s FGD, Obato, Lira II, Uganda).

“Women are responsible for the home and are in best position to gauge when/how much to sell and when/how much to retain roots for home consumption” (women’s FGD, Kyakanyemera II, Kamwenge III, Uganda).

For boiled/steamed sweetpotato, there were contrary responses between men and women about if the product was even sold or not. Male respondents across all regions reported that the processed product is not sold in their community, while most women shared that boiled sweetpotatoes were sold in their community by women. These women sold the roots in restaurants, schools; including boarding schools and health centres within the community.

Regarding the sale of sweetpotato vines, there were varied responses among the FDGs concerning the persons responsible for selling vines. However, from half of the male FGDs, it was obtained that women sold the vines. Men accounted this to women being responsible for the home and the income being used to cater for household requirements. Respondents from one focus group in Kamwenge shared:

“Woman (she is charged with most domestic operations so she can sell and keep the money for herself since it is very little)” (men’s FGD, Kyakanyemera I, Kamwenge III)

The men argued that they did not have time to sell vines since they had too much other work to do. Besides that, some of the respondents said that men and women that shared the responsibility do so because they want to raise or supplement on the family income. Men from Lira III reported that vines were not sold and were used for animal feeds and manure.

Matooke (Uganda) is not sold. **banana?**

For **boiled cassava (Uganda), Dynamics in marketing of fresh cassava roots and boiled cassava**. In Apac, there was a decrease in the sale of boiled cassava because most households produced their own cassava and therefore did not have to buy. A decline in trade of fresh roots was attributed to reduced yields associated with diseases such as CBSD and CMD which mainly affect the local variety (Bao) which is predominantly grown in this area. It is key to note that boiled cassava is mainly bought by women, travellers and students eat it as a snack. Key informants in Apac narrate; “Boiled cassava is preferred because it is bulky and it satisfies. It is cheap, easy to process and fills the stomach at a low price”.

In Luweero, the key informants gave divergent views with one reporting a decline in trade of fresh roots linked to low yields while another indicated an increase due to greater access to villages where traders bought cassava roots cheaply. Another indicated that cassava trade had remained more or less the same over a five year period since it was not a priority cash crop compared to say coffee which was grown on a large scale. Furthermore, traders highlighted that boiled cassava is mostly bought for consumption in the urban areas because men and women in the urban areas can afford to buy food.

For boiled cassava (Uganda), Quantities of fresh cassava roots and boiled cassava sold - It is noteworthy that Apac recorded the highest sales of fresh cassava roots compared to Luweero. Accordingly, quantities of fresh cassava sold by traders in Kampala, Apac, and Luweero regions ranged from 0.13 to 2.5 tonnes; 0.05 to 3.9 tonnes and 0.065 to 3.12 tonnes, respectively per day. In all districts, the traders recorded that there were higher sales of fresh cassava roots during the festive and rainy seasons. It is common place to make joint decisions regarding sale of fresh cassava roots in Luweero and Apac districts Table 3.

Decisions on selling the crop and product [to be completed]

Table 7 highlights different decision making norms across the regions and products, and also differences in the perceptions of who decides decision making between men and women. For **plantain (Nigeria)**, decision making regarding the sale and consumption showed variance between sex of the respondent and region. Overall, a larger proportion of respondents said that men made decisions on the sale and consumption of plantain, except for Rivers state (59%). Men played the strongest role in Osun (57%). A slightly larger proportion of women stated that they made the decisions, while a slightly higher proportion of men said they made the decisions, husband and wife, and their children made the decisions. The **gari/eba (Nigeria)** study in SW and NC Nigeria showed similar trends: a higher proportion of respondents in SW and NC stated that men made decisions on the sale and consumption of gari/eba, 50% and 44%, respectively. However, a larger proportion of women stated that they made the decisions (46%), similarly with men that they made the decisions (32%). There were lower proportion of men and women reporting that they undertook joint decision making compared to plantain in Osun, Delta and Rivers states.

Table 8 Percentage of people who make decisions on sales and consumption of plantain by sex and region, Nigeria

People who make decisions	Plantain study					Gari/Eba study			
	% of women citing n=57	% of men citing n=52	% of people in Osun n=37	% of people in Delta n=34	% of people in Rivers n=39	% of women citing n= 52	% of men citing n=22	% of people in SW n=32	% of people in NC n=32
Men	40	50	57	38	38	40	32	50	44
Women	33	31	14	24	59	46	18	19	38

Husband & wife	25	27	22	32	23	6	14	9	9
Children/ youth*	14	19	8	15	26	14	27		

Note: responses for 3% and under were excluded (widow and business partner).

* youth for gari was female youth

Interestingly, the qualitative analysis shows much more interaction and joint decision making for **cassava (Nigeria)** compared to the quantitative information above. Most of the time, joint decisions are made between the husband and wife regarding the use of cassava. At times, husbands 'give their wives permission' to decide on the quantity and what products to process for home consumption and sales. Considerations before decisions are made include: product demand, availability of person to process or sell, and prior information on the quantity of food left in the house. Health considerations in food choices of any household member (particularly the male household head) also influence decisions made on the type and quantity of cassava products to consume and sell.

The quotes below show that in some cases, men and women separate their harvest by what is for home consumption, sale, and for what products, and that they will have different levels of control over that product.

"Most (of the) time during harvest, we select the best ones (plantain) for home consumption. I select the ones that are good for my products and my husband selects the ones that he wants to use. We bring the rest to the market. Most times we don't keep more than three bunches, no matter how many bunches we harvest" (women's FGD, Patara, Nigeria).

*"It depends on the demand for the products at the time of harvest, 50% of harvested root is consumed in the household. I decide the product to make for selling as I am the producer of cassava while my wife decides the product to be consumed at home. My wife knows the food needed at home because she is in charge of the kitchen. At times I follow my wife advice on products to make for sale because she knows the product on demand better than me since she is the one that sells the products" (men's FGD **Tyomu, state** Nigeria).*

*"I discuss with my wife and we conclude to make product with high turnover and high demand at the time we harvested our cassava" (men's **FGD II Nyam STATE** Nigeria).*

In other cases, decision making was separated among men and women according to the use of the product, as the quote below shows that women decide what to sell.

"I and my husband decide on the product (akpu) for home consumption while I make decision on products (gari, akpu) to sell. I follow my husband's decision when we disagree on products to make for home consumption" (women's FGD II Koti shangev-ya, Nigeria).

Household size and the need for food and money for an household member will also influence the type and quantity of cassava products that will be processed for sale and consumption

*"I usually process gari for easy turnover of money because it's the most demanded among the products and the sales are fast" (women's FGD II, Orile-owu, **location**).*

integrate into text

Table 9 Mean score of independence in decisions about use in Nigeria

Decision	Mean score of independence 1-4*
	Plantain n= Gari n=

	Women	Men	Women	Men
Use of crop	3.1	2.9	3.3	3.6
Marketing	3.2	3.2	3.5	3.4

*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

Decisions regarding **boiled plantain in Cameroon** at home are most of the times taken by women, since they are the ones in charge of cooking. This is confirmed by data which revealed that more than 80% of the responses are in favor of women taking most of the decisions.

Table X Percentage of people who make decisions on boiled plantain by gender and region, Cameroon

People who make decisions (N=78)	Genders		Regions	
	% of women citing (N=40)	% of men citing (N=38)	% of region citing (N=39)	% of Littoral region citing (N=39)
Men	2.56 (2)	12.82 (10)	6.41 (5)	8.97 (7)
Women	47.44 (37)	35.9 (28)	42.31 (33)	41.03 (32)
Children	1.28 (1)	0 (0)	1.28 (1)	0 (0)

In the West region, children take decisions at times, especially when they are sick even though this situation is rare as it accounts for only 1% of the responses:

"The children take decisions as they want to eat what they see in other people's houses". Female respondent, Bafounda

Some women said they take decisions, but usually cook what their husband wants:

"Myself, but if my husband wants something special I do it." Female respondent, Penka-Michel

Table X: Mean score of independence in decisions about crop use and marketing in Cameroon

Decision	Mean score independence 1-4*			
	Women	Men	West region	Littoral region
Use of crop	3.6	1.7	2.4	2.9
Marketing	2.6	3.7	3.5	2.7

*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

The use of plantain at household level is woman's decisions. According to the data presented in **Table X**, they have complete independence (3.6) than men (1.7) who can only suggest ideas. In the Littoral region, they are most independent but need to consult someone, while in the West region, decisions are taken by some other person. Men and people from the West region are responsible or are completely independent for the sale of plantains, while women and people from the Littoral region need to consult someone even though they are most independent.

Men take these decisions because they do majority of the work on the plantain and besides, they feel it is their right to sell the bunch since they are the head of the family and as such must provide for their family:

"I'm the one taking decision about selling and eating, even the bamboo that I use to stake a trunk, she needs my permission before touching it. It's very important to me". Male respondent, Bafounda.

"I am the one taking decision about plantain. I say "this one, don't sell it, keep it we will do chips (fried unripe plantain) with it for children so that they can go to school with it. We'll save money for bread in the morning". *Male respondent, Bouba.*

Husband and wife also take decisions jointly regarding the sale of plantain. The reason behind is mostly because they both care for their family:

"Both of us are concerned for the use of the crop. When I go into our farm and I see a mature bunch, I cut. When he sees a mature bunch, he cuts also. My husband cannot decide to sell plantain when his children have nothing to eat. So, when I cut a bunch in our farm, it is for consumption at home". *Female respondent, Sokelle.*

At times, the wife sells the plantain, and brings the money before her husband, and they see how they can manage it.

"I decide myself if I want to fry, I fry, if I want to boil, I boil. When I come back with the money of the sale of plantain, I show him. If there are women problems to solve, I keep the money, if there are men problems to solve, I give him the money. Women's problems concern cooking allowance, while men's problems are his meetings and going in bars. When there are no problems, we share equally. To take care of myself, I manage with other crops like cassava". *Female respondent, Sokelle.*

The sole case where children decide on the fate of plantain is when the parents are no more physically fit to manage the sale of plantain:

"Since the moment my dad had an accident, I am the person in charge of his farm. My sister harvests, sells, and gives me the money so that we can share". *Female respondent, Sokelle.*

At times, disagreements arise related to the use of plantain at household levels. Some women claimed that issues related to the use of plantains usually arise, as they may want to cook the plantain while their husbands might want to sell it. These women have to be tactical to let their husbands leave the bunch either by being polite or by rendering the bunch unsellable:

"If it happens that the husband wants to sell the plantains to buy his beer in the bar, I tell him that please I am going to cook this plantain for our kids (while removing fruits from the bunch, thereby reducing its market value). When the bunch is unhanded, he can no longer sell it. If I speak in a rude manner it will not be good, I have to be polite."

Female respondent, FGD - Penka-Michel

In the West region, married women are aware of the fact that they don't have the right to touch a plantain bunch in their husbands' farms. Some men even added that such issues are frequent in polygamous union:

"Women do not touch plantain in the farm, if they do, they will not sleep well" *Male respondent, FGD - Bafounda.*

"Man manages everything, he is the only cock and he manages the sale and profit from plantain. Here man is the master of plantain." *Female respondent, FGD – Bafounda*

"No, I think such problems occur in polygamous family, I have just one wife and we understand each other. If you are a responsible man, your wife will respect you. It depends on households. If you sell plantain to drink beer, there will be problems." *Male respondent, FGD – Bamendjing.*

In the Littoral region, the trend is reversed as husband and wives work hand in hand to the point of sharing the profits of the sales:

"We do the cutting of bunches together, my wife can sell the plantains, when she comes back, we do some accounting, I give her a part to manage the house." *Male respondent, FGD – Song-mayo.*

"It is the woman who sells the plantain, and decides on how the crops should be cooked, it is an honor for her because we want to save our households." *Male respondent, FGD – Sokelle*

Benin?

For **sweetpotato (Uganda)**, decisions on vines were mainly made by women according to most respondents (Table 9). Women cited women as the lead decision makers, followed by joint decisions (men and women together), and lastly men. In contrast, men indicated that men were the lead decision makers regarding vines, followed by women and joint decisions, equally. More so in In Kamwenge district, men were said to not make decisions alone, whereas in Lira, men and joint decision making were cited as being at par. Regarding the sale of sweetpotato roots, female respondents mentioned women as the main decision makers followed by joint decision making, and lastly men alone. However, men from Lira mentioned, “*men do not have time and patience to wait for customers all day unlike the women*” and “*men are busy with other work*” as the reasons why men are not involved in selling sweetpotato. The women from Lira revealed that it is the poor people who sell fresh roots: “The rich do not sell because there’s no money in sweetpotato”. Women from Lira said that even though women commonly sell fresh roots, men will sell when the volumes are large. Regarding other products, it was mentioned that women were responsible for selling dried sweetpotato chips, peels and flour.

Table 10 Decision making on sweetpotato vines and roots

People who make decisions	Sweetpotato vines				Sweetpotato roots			
	% of women citing N=60	% of men citing N=12	% of Kamwen ge citing N=32	% of Lira citing N=40	% of women citing N=60	% of men citing N=12	% of Kamwen ge citing N=32	% of Lira citing N=40
Men	1.7	16.7	0	7.5	5	8.3	9.4	2.5
Women	31.7	8.3	43.8	15	28.3	8.3	59.4	0
Men and Women	8.3	8.3	9.4	7.5	6.7	8.3	15.6	0

Control over the income from the RTB product [to be completed]

Similarly, to decision making regarding the marketing of RTB crops and products, control over the income from sale is equally, if not more, complex. Household practices regulate who controls profits from particular crops or products and tend to reflect broader, but localised norms, in the region.

integrate into text

Decisions regarding the use of cassava and plantain in Nigeria

Table 11 Mean score of independence in decisions about use in Nigeria

Decision	Mean score of independence 1-4*			
	Plantain SW + SS n=		Gari/eba SW+NC n=	
	Women	Men	Women	Men
Use of profits from sale	3.2	3.2	3.2	3.5
Use of profits from sale of alternative product	3.3	2.4	2.9	3.6

*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

Table X: Mean score of independence in decisions about profit use in Cameroon

Decision	Mean score independence 1-4*			
	Women	Men	West region	Littoral region

Use of profit from sale of boiled plantain	0.6	0.0	0.1	0.5
Use of profit from sale of alternative product	0.0	0.0	0.0	0.0

*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

It should be noted that, even when women sell boiled plantain, they have no independence regarding the use of profit from the sale of boiled plantain. No alternative products were sold by women in the various communities.

Benin?

boiled cassava

Table 3. Who makes decisions on the proportion of cassava to sell

People who make decisions on the proportion to sell	% of women citing N=24	% of men citing N=18	% of Apac citing N=28	% Luweero citing N=14
Men	12.5	27.8	21.4	14.3
Women	29.2	16.7	14.3	42.9
Men and women	50.0	50.0	53.6	42.9
Women and children				
Children				
Everyone	8.3	5.6	10.7	0.0

Qualitative evidence says..

Regarding **plantain (Nigeria)** in SE and SS, while there is little difference in the independence in decision making regarding the marketing of plantain itself, men have more control over the use of profits from sales of plantain than women overall. Many women explain that when they sell the plantain, they bring the profit back to their husbands, sometimes after purchasing some household items in the market. The use of profit from sales of fresh plantain bunches is mostly related to ownership over the plantain (who has cultivated them). A woman respondent indicated the following: *"We only sell fresh bunches. I sell them at the market. Even when my sons want to sell their plantain, I help them to take it to the market for them. If it is from my farm, the money is for me. If it is from my son's farm, I give them their money"* (community reference).

Upon processing of plantain, the ownership over the profit may change from the producer to the processor. A man in Umeh, Delta South, explains: *"Before my wife goes to the market, I will tell her what to do with the proceeds from the fresh bunches. But for the profit made from ekpa (processed product), she does whatever she likes with it"*. [question: unclear. Is this a particular variety of plantain (many plantain varieties start with Ekpa. E.g. Ekpa Oluaka (one buch), Ekpa Ejima (two to three bunches. Or is here referred to Cocoyam which is also called Ekpa or Ekpang.?)

Many women bring back the profit of fresh plantain to their husbands and they jointly discuss how to use it. A woman respondent stated the following *"After sales, I deliver the money to my husband and we plan together on what to use the money for"*. Although some men explain that they have outright ownership over the profit, most men explain they sit together with their wife to deliberate on how to use the money.

Findings from the studies in **Nigeria** show that a more 'systems' approach to understanding decision making and control over income is needed, as it can differ between products, crop and whose land the crop has been cultivated in. [tbc]

*"My husband and I discuss whenever he is financially down (lacking money) because I always assist him on his farm while I also operate my farm. So, whenever he needs money, he encourages us to have joint harvest and we share the profit" (women's FGD II, Orile-owu, **STATE**, Nigeria).*

*"I make decisions on how the crop is processed in different products and what quantity is reserved for consumption, but I always remit money to my husband after sales (if the cassava is from his land). But on my portion of land he doesn't question me. I usually process 50% gari for sale, we consume 25% of the gari at home and use the other 25% for Akpu for consumption" (women's FGD, II Tyomu, **STATE**, Nigeria).*

*"The profit from cassava is for my wife, the profit from melon is for both of us. The money from plantain is for me, because plantain is serious business" (male FGD, **community reference**).*

3.5 Consumption

[incomplete. Could include data on How often consumed – intersected with wealth, region, gender and other factors e.g. northern Uganda different less food diversity]

could we add data from the question on taboos and consumption restrictions here?]

Consumption of products [remember the gender analysis]

Regarding **gari/eba (Nigeria)** in SW and NC, gari is a common staple food and consumed daily, and can be consumed at all meals. No differences by gender, age and ethnicity or other social segments were found; however, certain illnesses prevent people from consuming gari due to its high level of starch and sugars. Key informants stated that children often preferred rice and noodles and other foods to gari, but they were often attracted to eat gari when they see meat in the soup. Furthermore, despite some perceptions that gari was consumed by people who are poor, the study found that gari was consumed among the wealthy as well; however, they are likely to not consume it as often. This goes a long way to show the economic importance of gari in families.

*"Even the rich people eat this gari because that was what was used to train us. The adults consume more of these food products. Children of this time do not eat these gari like the adults. They eat it at least once in a day. They prefer rice, noodles and other foods. If a child doesn't want to eat gari, if he or she sees the kind of the meat in the food he or she will be attracted to eat it irrespective of the number of times eaten" (**respondent**).*

*"It is consumed regularly and daily. A lot of people use it as their breakfast, lunch and dinner in different product level (regardless of gender, age, and ethnicity). It is applicable to everybody in the community. Apart from the few elites that have more than enough to choose from" (**respondent**).*

Most of the ingredients mentioned to be consumed with gari are inexpensive and readily available. The fast-cooking time or preparation method of gari to eba and boiled or roasted plantain make it more appealing to men and women that are quite busy or on the move. For instance, labourers-mostly migrants prefer to consume eba often or daily as a food source of energy for more work. Therefore, socio-demographic factors are quite important in determining trait preferences in smallholder livelihood settings where many migrants and their households depend on a high proportion of the produce for home consumption.

Gari in Imo

Plantain – add detail on consumption

With regard to the use of **plantain (Nigeria)**, women often indicate that they either decide what to cook for the family or cook whatever their husband wants. A woman in Agoloma explains “*my husband decides what to eat at home. He will tell me what he will like to eat. Whatever he likes, we follow. If he does not eat we will not have appetite either*”. Other women explain “*most time I decide about what to consume. When there are differences, I prepare what the husband wants*”. Whereas women indicate to often follow their husband’s choice in terms of food products to prepare, men often indicate “*this is my wife’s area. I can make a suggestion but whatever she prepares, I will eat*”. Other men consider making food choices part of the duties of the head of the household and explain “*I am the head of the household and so I take the decision on what to eat*”. [add regions].

As for **boiled plantain in Cameroon**, the quantity of harvest destined to consumption varied according to gender and region (**Table X**). Plantain is mostly eaten boiled in majority of the households, with quantities allowed for consumption ranging between 10 and 40% in both regions and for both genders. This suggests that the sell plantain more than they consume.

Some of the reasons why more of the harvest is sold are either related to the availability of other food crops at home, the need to buy things or solve particular problems, or the price variation at the level of the market:

“Plantain produces according to the temperature, in the dry season, bunches are thin with small fingers, meanwhile in the rainy season bunches are big with big fingers. Plantain is sold throughout the year and the price varies depending on the size of the bunches.” Male respondent, II – Balessing

“No, it depends on my problems. Sometimes I can sell all, at times I store some. We don’t eat plantain like maize because it is hard. It is maize that we eat here at all time.” Female respondent, II – Bamendjing

“We consume other crops when we have to buy things at home, we then sell the plantains to do so.” Male respondent, II – Penka-Michel

“When we have other crops at home that can be consumed, we can sell even 95 percent of our harvest.” Female respondent, II – Bafounda

“When there is abundance of other crops at home, we sell our whole harvest.” Female respondent, II – Song-mayo

Table X Quantity of plantain harvest used for home consumption by gender and region, Cameroon

% Proportion	Women N=40	Men N=38	West region N=39	Littoral region N=39
<10%	01	02	00	03
10%	13	13	17	09
15%	00	02	01	01
20%	12	16	16	12
30%	07	03	03	07
40%	03	02	02	03
NR*	04	00	00	04

*NR=No response

The frequency of consumption of plantains in the various communities are varied. In the West region, plantain is eaten only during events like funerals, marriage and dowry. This plantain is often eaten as *Kondrè*, in porridge, pounded, boiled, roasted or fried. Children like eating fried ripe plantains and can request it up to twice a week. Since it is not their main crop, corn is consumed more often in this region. Similarly, in the Littoral region, plantain is also eaten during ceremonies in the form of *Kondrè*, boiled with vegetables, fried ripe and unripe. Boiled plantain can be eaten at least twice a week for some or twice a month for others.

Benin – needs to be written up

- Most of those buyers (households, workers, producers, market customers, policemen, hospital customers) appreciate the quality of the boiled yam according to the prepared variety (eg : the boiled yam of the Laboko variety more than it made with Gnidou)
- Boiled yam whether it is yellow or white so that it is appreciated, it must be presentable, friable, softened in the mouth, sweet (half sweet-half salty), not hard and not bitter and especially hot
- It must be friable to facilitate the pleasure of chewing food and digestion (especially for children who do not know much about varieties)
- Customers prefer when the bulk of boiled yam heaps on sale presented by the saleswoman in their plate is big; so that to be fast satiated.

Buyers (households, workers, customers of the market), appreciate the quality of the boiled yam according to the prepared variety (ex: the boiled yam of the Laboko variety is more appreciated than that made with Moroko variety) and the boiled yam must be presentable, friable, soft, not hard and not bitter.

For sweetpotato (Uganda), according to Table 11, men and women indicated that they consume between 47% and 49% of a harvest. This implies that they consumed a little less than they sold. At the regional level, respondents in Kamwenge indicated that they consumed 47% of the harvest while those in Lira consumed close to half.

Table 12 Quantity of sweetpotato harvest used for home consumption by sex and region

	Women N=	Men N=	Kamwenge N=	Lira N=
Range (kg)	4,499	6,997	4,499	6,997
Mean (kg)	356	1872	648	590
% of harvest	47	49	46	50.3

The main form of consumption for sweetpotato was boiled/steamed according to both women (97%) and men (92%). The women also reported consuming fried, dried and roasted sweetpotato. By region, boiled sweetpotato was the main consumption form in Kamwenge (94%) and Lira (95%). In both regions, fried sweetpotato was mentioned in Kamwenge while dried roots were mentioned in Lira.

Women in Lira mentioned that they consumed boiled sweetpotato with relish/sauces such as beans, vegetables and simsim. Men mentioned similar sauces and included groundnut and simsim paste, fish and honey. With the exception of one FGD in Lira, women mentioned a narrower variety of relishes/accompaniments to boiled sweetpotato compared to men. Additionally, with the exception of two FGDs in Lira, women did not mention any animal products among the relishes they consume sweetpotato with. Men mentioned animal product accompaniments including fish, beef, pork and milk in more cases than women did. In general, men were more expansive in explaining what boiled sweetpotato was consumed with.

Despite the importance of green leafy vegetables as an accompanying sauce with sweetpotato in both regions, the specific types of vegetables differed by region. While respondents from Kamwenge mentioned dodo (amaranth) and cabbage, those from Lira mentioned a wider variety of vegetables including malakwang, bo, and alayor. Respondents from Lira also mentioned sim-sim and shea butter nut, honey, fish and a wider range of legumes such as peas, pigeon pea, which were not mentioned in Kamwenge. In contrast, milk, a dairy product, was only mentioned in Kamwenge.

According to the Key Informants in Lira, while nearly all the farmers in the study communities grew sweetpotato, frequency of consumption varied from three to four times a week because farmers also grew other types of food which they included in their diets. In Kamwenge, the frequency of

consumption for boiled sweetpotato was not mentioned. However, KIs noted that sweetpotato based processed products like chapatti and mandazi were growing in popularity, with all categories of people noted to consume chapatti at least once a week.

Matooke

3.6 Emerging themes

this section needs more work but the contributions here are excellent and pushing the analysis forward!

[add boiled cassava Uganda, Benin boiled yam]

- Establishing an overview picture of gender roles along RTB product food chains is challenging given local complexity and dynamics, and a balance needs to be struck between generalisation and the conveyance of a norm, and exceptions to the norm that can be informative and useful.
- Gender, stage in the lifecycle, immigration status, family construction or household size, and region were all found to be factors that influence differences in food chain and likely influence, varietal choices and crop characteristic preferences. Presenting breeders with the most common typologies will give better to understand these emerging differentials in farming practices and labour use especially with regards to which type of varieties within the existing portfolio of varieties that people use would be the most impactful and which traits to focus on to make a valuable contribution with regards to the existing portfolio of varieties (e.g. limited canopy formation and/or leaf retention that demands more weeding labour and/or herbicide application in cassava)
- The diverse gender insights do not suggest that breeders will have to focus on each locality or social segment but this diversity can identify crosscutting traits that can be of major importance to make a difference in relation to not only food security and marketed crops but also to a more balanced and integrated improvement of livelihoods of rural communities.
- There is a clear difference between gender issues in Nigeria and Uganda. While in Nigeria men and women were reported to undertake joint decision making or there was clear separation of areas of authority within the farming system, there is seemingly more tension and disagreement between men and women in Uganda (in the sweetpotato study)—specifically as women state they cultivate independently while men state they are doing so jointly. This may reflect the desire for men to assert their involvement or authority in decision making while in reality it is decreasing as men were likely to take on paid labour work and neglect their farm work. Such notions are most absent in Nigeria where the strong competitiveness caused by a large population pressure and presence of many economic activities seems to foster a more balanced and thus efficient cooperation between men and women. [what does the Nigerian teams think about this?] This illustrates that in Uganda the women are crucial to be approached for insight in proper sustainable food secure farming practices as they seem more dedicated. This again can provide important information to breeders on what kind of crops to focus on and what kind of traits have to be prioritised for improvement.
- At the rural level, which these studies were focused, processing labour is conducted by women and with rudimentary equipment. Exceptions to own this equipment at particular stages of the lifecycle were evident in Nigeria. There are exceptions to this rule, where often family labour, including men and boys, will help with particular processing steps. However, the norm is that this is the work of women, but in some cases at particular points in women's lifecycle e.g. not pregnant). Where equipment is required at particular steps in processing, it is usually owned and managed by men in which women will pay for use of the equipment.
- The results from cassava, sweet potato and plantain show the major importance of these crops for food security through household consumption. This is crucial to note as breeding

tends to focus on qualities and traits related to market value chains rendering invisible the 'household consumption' and social function 'value chain'. E.g. recent research shows (Wossen et al 2017) that almost half of the total cassava production in Nigeria is used for home consumption, free gifts and in kind payment within farming communities which is supported by FAO data (...). Living up to needs within this household consumption 'value chain', will be crucial to increase the adoption of modern RTB food crops.

- Marketing RTB products is often done by women; however, selling raw material, particularly in large amounts, was often done by men. Certain products are sold by women at a particular stage in their lifecycle, such as women who are considered 'young' or 'old'. **implications.**
- The Ugandan Sweetpotato case has provided us with important power relations between the genders in which the behaviour of men seems to impinge upon the stability of the household. Similar issues were however also found in southern (SS region) Nigeria where women also complain about men's limited contribution to farming work and involvement in drinking, although in many cases men contribute significantly to the household income through non farming work often inaccessible to women. **[I think this needs to be brought out more in the text. it is a very important point but we need to illustrate]**

4 ARE THERE GENDER DIFFERENCES IN VARIETAL USE AND PREFERENCES?

Revisions to consider:

- least preferred varieties omitted – what is the case for including it here?
- move plantain products together to contrast?
- bring more qualitative information here to explore why men and women have different preferences.
- try to go beyond top 3 varieties in text to get an idea of the most important varieties, is it necessary to look at the top ten? It may be too much for comparative analysis.

4.1 Introduction

This section examines gender differences in preferences and importance of RTB varieties, by the type of variety (local landraces or released varieties) and products. The second sub-section examines the varieties grown by men and women. The final sub-section in this chapter presents discussion of household decision making regarding varietal choice.

4.2 Preferred varieties and their importance

This section examines differences in varietal preferences by sex and if those the preferred varieties are local landraces or released varieties. The overall picture shows interesting results (Table 12).

Table 13 Overview of varietal preferences in order of importance for RTB products by sex

Crop, product and location	Women	Men	Summary
Plantain products – Osun state (SW), Nigeria (II, n=38)	Agbagba (L*) Koloko (L*) Agbagba dudu (L*)	Agbagba (L*) Koloko (L*) Agbagba dudu (L*)	No difference
Plantain products – Delta state (SS), Nigeria (II, n=38)	Main plantain (L*) Beribe (main plantain?) (L) Ogede une/Ogede-Jioko (L)	Main plantain (L*) Beribe (main plantain?) (L*) Ogede une/Ogede-Jioko (L*)	No difference

Crop, product and location	Women	Men	Summary
Plantain products – Rivers state (SS), Nigeria (II, n=41)	Main plantain (okrima) (L*) Agric/improved variety (L*) Mpiele (L*)	Main plantain (okrima) (L*) Agric/improved variety (L*) Mpiele (L*)	No difference
Gari, Osun (SW) and Benue (NC) states, Nigeria (II, n=100)	Oko-lyawo (L) IITA (R) Akpu (L)	Oko-lyawo (L) Akpu (L) Danwari (N)	IITA not mentioned by men in top ten, Danwari not mentioned by women in top ten. Bnarda (I), Akpu (L) and Cotonou in Benue NC and Oko-lyawo (L), Arubielu (L) and Idileruwa in Osun SW. There were also ethnic differences : Yoruba (majority) Oko-lyawo (L), Arubielu (L) and Idileruwa ; Tiv (majority) Bnarda (I), Akpu (L) and Cotonou and among Idoma (minority) : Agric (I), Nwato and Oko-lyawo (L).
Gari, Imo state SE, Nigeria (FGD, 4 women, 4 men)	Imo best (N) Daberechi (L), Nwanyiocha (L) and Durungwo (L) (same rank)	Daberechi (L) and Durungwo (L) Nwageri (N) and Agric (R)	Imo best was not mentioned by men, Nwanyiocha was mentioned by men but not ranked as high. Nwageri and Agric were not mentioned by women
Boiled Plantain – Cameroon (II, N=78)	Big plantain bunch with big fingers (L) Ebang (L) Ebanga (L)	Ebanga (L) Big Ebanga (L) Ebang (L)	Varieties named with their local names in dialect varied across the regions. The order of varieties varied for both men and women.
Boiled Plantain – Cameroon (FGD, 4 men, 4 women)	<i>Kendon netôh</i> (L) Big Ebanga (L) Ebang (L)	Ebang (L) Batard (L) Big Ebanga (L)	Varieties named with their local names in dialect varied across the regions. The order of varieties varied for both men and women.
No gender disseg data Benin			
Sweetpotato, Uganda (FGD, 6 women and 6 men)	Okonynedo (L) Naspot 8 (R) Araka araka (L) mostly grown in Lira.	Naspot 8 (R) Kiribamukwe (L) Okonynedo (L)	Women preferred Araka araka and men Okonyndo. In Kamwenge, Naspot 8 (N), Vitta (I) and Kiribamukwe (L). In Lira, Okonynedo (L), Araka araka (L) and Naspot 8 (N) Data was not disaggregated by gender and region.
Matooke, Nakaseke Uganda (II, n=53)	Nakitembe (L) Nshakala (L) Mpologoma (L)	Nakitembe (L) Kisansa (L) Mbwazirume (L)	Mpologoma and Nshakala by women, and Kisansa and Nbwazirume by men. Data was not disaggregated by gender and region.
Matooke, Mbarara, Uganda (II, n=63)	Nakitembe (L) Kibuzi (L) Enyeru (L)	Kibuzi (L) Enyeru (L) Nakitembe (L)/ Mbwazirume (L)	Same varieties but ranked differently, however Mbwazirume tied third in importance for men. More men (33%) mentioned Mbwazirume compared to only 4% of women (P = 0.007).

Legend: local (L), newly released (N), released variety (R)

* suspected local varieties

Regarding the three most important varietal preferences for **gari/eba (Nigeria)** in SW (Osun) and NC (Benue), II with men and women found two of three varieties in agreement between men and women. IITA was ranked in the top three by women but not included in men's top ten, and likewise, Danwari was a variety mentioned by men but not women - even in their top ten. There were also ethnic differences. Yoruba (majority), Tiv (majority) and Idoma (minority) all had different three varieties ranked as their top three most preferred, except Oko-lyawo variety that was ranked highly by Yoruba and Idoma. Oko-lyawo was the most widely grown and is widely spread across the two regions. Oko-lyawo ranked first among men, women, and Yoruba ethnicity. This was expected because the variety was named in Yoruba language meaning "husband of the bride". The variety was also said to make the best gari, and was grown because of its stem type which suppresses weeds and sprouts quickly, has multiple uses, produces a white gari, is early maturing and has long in-soil storability. Two out of the four varieties in the top three varieties mentioned by men and women were released varieties.

For **gari/eba (Nigeria)** in Imo state (SE), there were gender differences in the preferred varieties, along with different preferences between each community. Imo best was not mentioned a variety ranked by men in at all. However, according to FGDs with women, this variety was important because it "saves hungry people" due to its quick maturity (six months). The stem and the roots branches very well, which was thought to reduce weeding and grows well in all types of soil. Women's FGD also said that the variety was the cause for the price in gari falling, due to its high yield and quick maturity (and thus over-supply) [check]. Nwanyiocha was ranked high by women (3rd) and it was mentioned by men but not ranked as high (4th). Women's FGDs stated that this variety was "best for gari and eba" because the yield is high, it produces a product with the best white colour and it rises well. Nwageri and Agric were two varieties not mentioned by women at all. Nwageri is considered by men's FGD as the first cassava variety, and that it produces many roots. Reasons for men preferring Agric were not provided. Three of the six varieties as the top varieties for gari according to men and women's FGD are released varieties.

For **plantain (Nigeria)**, men and women ranked the same varieties as their preferred varieties according to individual interviews. Across the study area, main plantain (agbagba in Osun), a False Horn type, was by far the most preferred. Across the states, preferred varieties are landraces, while only few hybrid or released plantain varieties were mentioned, particularly in Delta and Rivers States.

Although men and women preferred similar varieties, the reasons for selecting these varieties were different between men and women. Women focused more on big bunches and big fingers, and men more on market demand and market price (though this is closely related to size so the difference is more related to the practices involved in where women are more precise in indicating those characteristics that men lump together in the concept of market demand and market price).

The top three plantain varieties mentioned in each state were characterised by bunch morphology (big bunch and big fingers), where the most preferred variety is a compromise between relatively big bunch size while maintaining a large finger size. Big fingers were also preferred in dishes where plantain is used as whole fruits or large slices such as boli and dodo, respectively. The size of a plantain bunch was one of the most important aspects for its marketability. Due to their lower market value, smaller plantain fingers were used in products where the size of individual plantain fingers is of lesser importance, such as flour in Osun or porridge in Delta and Rivers. Released varieties ranked high among men and women for their big bunches, big fingers and attractive look. However, they were less preferred because they spoil easily, soften when cooked, have big stones inside (possibly linked to the presence of seeds typical of tetraploid hybrids) and they were not as tasty as local varieties. Consequently, the use of released varieties is sometimes limited to products like flour, chips, porridge and boli. This was also the case for cooking banana, which is both liked and dis-liked for its low sugar content between the regions in Nigeria, and use for specific products like flour, pounded and fried. The similarity between men and women's responses is interesting, as it shows that in this context men are knowledgeable of the quality characteristics important for the products, despite the work being predominately performed by women.

Differences in colour, taste and texture between identified varieties are less pronounced; hence, most plantain varieties are similar in terms of use for different products. However, there were some cases where preferences were vaguely linked to specific varieties, notably sugar content and pulp colour. For example, key informants in Ago-Owu (Osun) mentioned that, '*...people prefer olomoyoyo because it is sweeter than other varieties. It can be boiled and used for dodo (fried plantain). The other varieties are used for flour because it has low sugar content*'. Customers prefer plantain with brown pulp. Women in Ago-Owu, Osun explain, "*There is little difference in how we use the plantain with brown and white pulp. We use both for pounding, although the white one does not get as smooth as the brown one. It is also lighter in weight, it does not rise/swell in the pan.*" Customers also prefer brown pulp according to FGDs. [what is needed in the previous three paragraphs is if there are gender differences and similarities between the reasons why the varieties are preferred]

Regarding **boiled plantain in Cameroon**, plantain cultivars that give the highest quality of boiled plantain differed by region, with varied cultivar preferences for women and men between FGD and Individual Interviews. The cultivar "Ebanga", also known as "big plantain bunch with big fingers" as described by women, is considered best following the individual interviews.

This cultivar is characterized by its lax bunch (one in which one can easily place a hand between the hands of the fruit) with 8 to 10 hands and fruits as long as 31 cm. The "Kendon netôh" liked in the West region and by women from FGD also has lax bunch, composed of 4 to 6 hands, and big fruits of 28 to 30 cm long. In the Littoral region, and for men in FGD "Ebanga" was the favourite. This cultivar, has also a lax bunch as Ebanga, but with shorter fingers (25 cm) and a reduced number of hands (7 – 9). The names given to these cultivars may differ among ethnic groups and families. Hence, the designation of a cultivar by its description such as "big plantain bunch with big fingers", connotes that the population is, at least sometimes, not aware of the name of plantain cultivars they put on-farm.

Irrespective of the gender or region, plantain with big bunches are liked by the population since the prime reason behind the growing of these plantain varieties is for sale. However, some remain attached to their traditions by growing only what their ancestors left:

"These varieties are grown for sale and for consumption. I mostly sell Big Ebanga than others". Male respondent, FGD Kombe.

"We grow these varieties because they are the ones that our ancestors left, so we grow them because they are present here." Female respondent, FGD, Song-mayo.

For **sweetpotato (Uganda)**, there were differences in the varieties men and women preferred and in the ranking of varieties. Women mostly prefer local varieties and these took the first and third position (Okonynedo and Araka araka, respectively). Both these varieties were mostly grown in Lira district. For men, the best variety was a released varieties i.e. Naspot 8. Naspot 8 (released variety) was also ranked to be the second-best variety by women, while Okonynedo was ranked as the third most preferred variety by men. In Kamwenge district, the most preferred variety was Kyinzali, which some respondents mentioned was an orange fleshed species but a local land race. Some respondents also use the same name to refer to any orange fleshed variety – both improved and local. The second most preferred variety (OFSP) has similar clarity issues to 'Kyinzali' given that respondents categorized all orange-fleshed clones as OFSP. Of the four varieties ranked in the top three by men and women's FGDs, three were released varieties. This is the highest number of released varieties featuring in the top three compared to the other products. Interestingly, the varieties men and women ranked highly that were dissimilar did not feature at all in the list of good varieties for the crop and product.

There were various reasons for these preferences. Women's FGDs said that the local variety Okonynedo, is preferred because it is high yielding, early maturing and has good taste. All the men's FGDs said high yield and early maturity as major reasons for preferring this variety. Men also preferred Okonynedo because it was sweet, and also because it did not rot easily. This variety was only grown in Lira. Naspot 8 was mostly liked by of its high yield as cited by women and men in both districts. The variety was also noted to be nutritious mostly by respondents in Lira. Men also preferred it because of its early maturity and big size roots. Women on the other hand additionally preferred its good taste. In Lira, the local variety Arak arak was preferred mostly because of its early maturity, high yield and ease to peel. In Kamwenge, Kiribamukwe – a local variety was preferred because of

its sweetness; and was mentioned to be sweeter than OFSP varieties. [do these preferences reflect roles?]

It makes sense to move matooke under plantain to compare and contrast, but in keeping with the order of other sections I have put it here. to discuss if move.

Findings for **cooking banana (Uganda)** show regional and gender differences. Although men and women mention the same set of varieties (all local landraces), there are differences in the preferred banana varieties for making **matooke**, which contrast with the findings on **plantain (Nigeria)**. In Nakaseke, Mpologoma and Nshakala were ranked higher in the individual interviews by women, and Kisansa and Nbwazirume by men. [this wasn't discussed in the report, is this because differences were not significant?] Whereas in Mbarara, men and women rank the same varieties in the top three but in a slightly different order. However, more men (33%) mentioned Mbwazirume compared to only 4% of women ($P = 0.007$). There are slight differences in the cultivars grown in the two districts and the rankings, for example, Mpologoma is only prevalent in Nakaseke, whilst Enyeru seems to be more prevalent in Mbarara.

Interestingly, the varieties men and women ranked highly that were dissimilar were described in similar ways: medium-big bunch; produces good, soft, tasty food; quick maturity; high demand/marketable and produce big fingers; however, responses were not disaggregated by gender. Similar to the findings in plantain in Nigeria, both men and women farmers in both districts in Uganda prefer landraces.

4.3 Differences in varieties grown between spouses

Revisions to consider:

- link/ combine with analysis of reasons of varietal preferences between men and women and sources of planting material
- Response not recorded in Gari report Osun (SW) and Benue (SE).

In the II, respondents were asked if they grew the same varieties as their spouse. In contexts where men and women grow on separate plots, the responses may shed light additional light on the preferences of men and women and the value they place on those qualities.

Gari/eba (Nigeria) in SW and NC

Regarding **gari/eba (Nigeria)** in Imo state (SE), 31 out of 33 women interviewed plant the same varieties as their husband. One woman grew different varieties, and three women reported that their husbands were not interested in farming: *"My husband does not grow Cassava. He is not interested in farming."*

Regarding **plantain (Nigeria)**, where the most preferred varieties of plantain were the same between men and women, but for different reasons, it is unsurprising that men and women grew the same varieties on their plots. It is also difficult to differentiate varieties at sucker stage. A men's FGD in Ogudu, Osun East (SW), explain "we farm separately from our wives. We grow the same varieties [as] we exchange the planting material."

Regarding **boiled plantain (Cameroon)**, plantains are grown by men, and women have an idea on the varieties grown when they grow the crop with their husbands. Hence, no information on plantain varieties grown by women are available.

With **sweetpotato (Uganda)**, only about half of the women (30 women) grew the same sweetpotato varieties as their spouse, meaning that the varieties that men and women grow differ. In respect to region, a higher percentage of respondents from Lira (62.5%) than Kamwenge (56.3%) grow the same varieties as their spouses. This is likely because there are a higher number of shared plots in Lira compared to Kamwenge, and therefore more opportunity to plant different varieties. These findings may be related to the cooking qualities of sweetpotato that vary more significantly compared to other RTB crops such as plantain.

With **matooke (Uganda)**, most banana was grown on shared plots and considered to be under the management and decision making of men. Therefore, women did not have varieties to grown on their own. [check – was this question asked, I assumed the reason here?]

4.4 Independence in decision making regarding varieties

to consider

- disaggregating by region (plantain data maybe not)
- suggested that the independence scores be look at for all decisions together (e.g. what to plant, how much to sell) and you can see the difference between types of decisions (or maybe have both?)
- need n and t-tests
- can we change the question in the future to get better answers?

In the II, respondents were asked to rank their level of independence in making decisions regarding variety of crop to plant. Overall, across the crops, products, regions and countries, men and women generally had relative independence in decision making regarding the variety of crop to plant. However, it is also important to keep in mind the different typologies of farming systems – specifically if men and women share the space in which they plant or if it is separate. Interestingly, in both shared and separate farming systems, women and men report similar levels of independence: ‘mostly independent but need to consult someone’ (3 out of 4, with 4 being completely independent).

Table 14 Mean score of independence (1-4*)in decision about what variety of crop to plant

Crop	Women	Men
Cassava SW + NC, Nigeria (n=74)	3.0	4.0
Cassava SE, Nigeria	Not available	
Plantain, Nigeria (n=118)	3.1	3.4
Plantain, Cameroon (n=78)	2.2	3.8
Banana, Uganda (n=123)	3.5	3.5
Sweetpotato, Uganda (n=)	Not available	

*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=mostly independent but need to consult someone, and 4=complete independence.

The mean level of independence on the decision of which variety to plant was the largest for cassava (Nigeria) in SW and NC (3 for women and 4 for men) [T-tests are needed]. This shows that men consider themselves to have total authority regarding decisions, whereas women feel that must consult another person.

Gari/eba?

Regarding **plantain production (Nigeria)**, women scored their level of independence slightly lower than men (3.12 compared to 3.43); however, T-tests will need to be conducted to substantiate differences. In plantain production in Nigeria, many men and women do most of the farming and decision making together. The decision on which plantain varieties is planted is not always a conscious one, as varieties of plantain cannot be distinguished at sucker stage. Only if farmers multiply suckers from their own field, they make a conscious decision to multiply the varieties that are most preferred.

Regarding **plantain production in Cameroon**, the variety of plantain to plant, men have complete independence (3.8) unlike women (2.2) on the variety of plantain to plant. In both regions however, respondents need to consult someone before taking decisions on the variety of plantain to plant (West=3.3; Littoral=2.6).

With **sweetpotato (Uganda)**, there were no differences in the level of independence between men and women, while there is a small difference between the two regions. At a regional level, respondents in Kamwenge scored above 3 in the categories of decisions about variety of crop to plant and use of profits from sale of alternative products. At this level they were independent but needed to consult a spouse before making a decision. [check for data to include in table and other region].

Interestingly in **banana production (Uganda)**, women and men had similar levels of independence regarding the variety of crop to plant (3.5 as compared to 3.5, respectively), with little variation between the districts. Similar to the production of other crops, these results suggest that most households engage in joint decision-making.

4.5 Source of planting material

To consider

- recoding responses to have one table?
- include challenges in sourcing – but some overlap with preferences section.
- are the varieties sourced released or local

This section examines the source(s) of RTB planting material for men and women farmers. The question was open-ended.

Table 15: Source of planting material* for plantain and cassava in Nigeria [recode friends?]

Source of planting material	% of women n=62	% of men n=62	% of women n=52	% of men n=22
	Plantain varieties, SS and SW		Cassava varieties, NC and SW	
Other farmers/ neighbours	33.9	33.9	55.7	18.9
Friends	4.8	6.5	0.0**	0.0**
ADP	0.0	0.0	6.7	18.9
NGO	0.0	0.0	0.0	6.8
Family	14.5	12.9	16.8	48.6
Husband	1.6	0.0	12.8	0.0
Other communities	11.3	21.0	1.3	0.0
Replanted from field	0.0	0.0	6.7	6.8
Market	4.8	0.0	0.0	0.0
Institute	1.6	4.8	0.0	0.0

* This was an open question not multiple answer from a pre-determined list; therefore 0 indicates that it was not raised as a response, not that the respondent stated 'no'.

** friends included with other farmers and neighbours

With regard to sources of **cassava stem (Nigeria) in the SW and NC**, the most common source for women and men is from other farmers/neighbours and family.

Men in SW, SE and NC all had higher rates of sourcing stem from ADP, particularly in Imo state (89%, compared to only 11% for women). Other sources of planting materials for men were relatives and government. Women had additionally sourced planting materials from their spouse in both regions, while the men access material elsewhere and not from their spouse. Two women mentioned having sourced stems from another country.

The factors that are limiting the use of released cassava varieties were that they do not possess the characteristics preferred by different value chain actors and are better suited to a more industrial setting cultivating large plots. Some characteristics of released varieties that limited their use were related to agronomic and final product (gari) characteristics such as big root size, low gari yield and

light weight of gari in the yellow cassava. Considering in-soil storability of roots after maturity, and stems' storability, most local varieties were preferred:

"The stem cuttings of improved varieties dry up quickly after harvest so it cannot be stored for long period after harvesting. The local varieties can be kept for 1-2 months after harvest under shade" (men's KII, Oyan, STATE, Nigeria).

"Our local variety was better than the improved one given to us, though the variety called IITA seems to be good in terms of root numbers, big size but has much water and cannot be stored in the ground beyond 2 years. So, we keep all our local varieties, but we will try the new varieties if given to us" (women's KII, Ago-owu. STATE, Nigeria).

Apart from characteristics related limitations, the lack of, or late availability of ICV planting materials from govt-ADPs due to distance, further reduced use of ICVs. Hence, some farmers depended on their relatives that stay in town for current agricultural information on improved varieties.

"Limited or no link between the community and agricultural extension officers; we hardly see extension staff in our community for about ten years now, most extension officers have retired and new one's are not employed to replace them" (men's KII, Koti-shangev-ya, STATE, Nigeria).

With regard to **plantain (Nigeria)**, men and women were both found to primarily obtain suckers from other farmers (34% for both, respectively). Women sourced more suckers from their neighbours (23% compared to 13% for men), whereas men sourced more from other communities (21% compared to 11% for women). Reasons for going to other communities to source suckers were related to lack of availability or perceptions of the better quality of planting material in other communities. A man in Umeh, Delta South, made the following statement *"We do buy from people in the community but since last year's flood, we have been buying from other Isoko communities (we buy at 100 Naira per sucker)"*. Only four people (3 men and 1 women) indicated they received suckers from an institute or organisation, such as the state-run extension services. It is also interesting to see that few women bought plantain suckers on the market, while men did not mention market as a source.

Regarding boiled plantain in Cameroon, the planting material (plantain suckers) is most of the times gotten from the previous farm, irrespective of the gender or the region. The second source of planting material is through their purchase, where more than 35% of women purchase their planting material against 21 % for men. About 50% of farmers from the Littoral region purchase their planting material. Only 2.6 % of men from the West region get their suckers from extension agents.

Regarding the factors limiting the use of improved varieties, farmers of the West region said the lack for plantain cultivation, while others claimed that these improved varieties are not resistant to winds (they do not hold, i.e. they are not firm on the ground). In the Littoral region, for instance, a key informant said it was important to know the different varieties and receive training on them before their use. Moreover, the attributes of the improved varieties must be known and compared to the local ones, and they should be climate tolerable. Another challenge in this region could be the soil the fertility, which in a community like Kombe could be a major problem to its intensive cultivation.

Table X: Source of plantain planting material, Cameroon

Source of planting material*	% of women n=40	% of men n=38	% of West region farmers n=39	% of Littoral region farmers n=39
Purchased	37.5	21.1	10.3	48.7
Gift	5.0	7.9	2.6	10.3
My farm	72.5	86.8	89.7	69.2
Extension agent	0.0	2.6	2.6	0.0

*Individuals had more than one source

Women mostly sourced **sweetpotato (Uganda)** materials from neighbours (50%) followed by NGOs (30%) and multipliers (20%) (Table 15). On the other hand, the primary source of planting materials for men was NGOs (50%) followed by neighbours (33%). Studies have shown that men are usually more mobile than women hence their ability to source vines from outside the community. In Kamwenge, the primary source of planting materials were multipliers while in Lira neighbours were the major source of planting material. This could further point to higher diffusion of improved materials in Kamwenge.

Table 16 Source of sweetpotato planting material, Uganda

Source of planting material	% of women citing N=60	% of men citing N=12	% of Kamwenge farmers citing N=32	% of Lira farmers citing N=40
Own farm	11.7	0.0	18.8	2.5
NGO	36.7	50	15.6	27.5
Multiplier	23.3	8.3	43.8	2.5
Fellow farmers, neighbours, friends	51.7	33.3	31.3	62.5
Government	3.3	8.3	3.1	5.0
Buy from farmers	3.3	0.0	3.1	2.5
Farmer groups	5.0	0.0	6.3	2.5
Local leaders	1.7	0.0	0.0	2.5
Family	1.7	0.0	0.0	2.5

In Kamwenge, men in FGDs noted that it was men who mostly bought vines from multipliers. This is not reflected in this table and can be attributed to the low number of men Individual respondents. However, the implication is that women may not be able to access improved varieties at the same rate as men or may not want to use these varieties.

In the **matooke (Uganda)** study, close to three quarters of farmers indicated that they sourced banana planting material from their own farm, which was similar for women and men (75% and 76%, respectively) (Table 16). A small percentage reported that received planting material from Government initiated programs, and more men than women, such as from NAADS (2% for women and 3 for men), and NARO (0% for women and 2% for men). Five (out of eight) of the key informants indicated that the communities did not have access to or were not growing released 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.

Table 17 Source of banana planting material, Uganda

Source of planting material	% of women n=55	% of men n=61	% of Kamwenge farmers n=63	% of Lira farmers n=53
National Agricultural Advisory Services (NAADS) (free)	1.8	3.3	1.6	3.8
National Agriculture Research Organisation (NARO) (free)	-	1.6	-	1.9
Neighbour/ fellow (free)	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

4.6 Emerging themes

- A finding across countries and products was the preference for local varieties over released varieties in most (but not all) circumstances, particularly among women. This finding may be an interesting way to interpret low numbers of women accessing released material – that they prefer to use local over these varieties and it is not all necessarily the result of barriers to access.
- In some regions men and women are better informed about the specific characteristics that are important to the other sex, and could be seen as a measure for how concerned/involved the different sexes are with each others circumstances, working conditions and preferences.
- In Cameroon, the scientific names of plantain varieties are not well known by the population and therefore there could be a role for community sensitisation on this point.
- It seems that certain varieties possessed the characteristics required for certain products, and for sweetpotato, this was the reason why women additional varieties compared to men. Also, women in this study were more likely to reject varieties based on characteristics that gave a poor food product quality or poor processing attributes.

5 ARE THERE GENDER DIFFERENCES IN RELATION TO THE IMPORTANT CHARACTERISTICS OF THE CROP & FOOD PRODUCT?

To consider:

- use this section to present similar data between products, using qualitative data and refer to quantitative data in IJFST publications (which show few gender differences)

5.1 Introduction

This chapter examines men and women's preferences for quality characteristics that are considered important for selected RTB crops and food products. For this exercise, people in rural communities, who were often producers, processors and consumer of the product, were asked about the quality characteristics they desired of the crop (in general, with not specific end-product as references, and at each stage of processing the final product. There are roughly four areas to acquire preferences for quality characteristics. These are quality characteristics of: raw material to be used for the product, raw material during processing, intermediate product and final product (ready to consume). These categories are not applicable to all products as they have different processing steps. For example, the gari/eba profile has a number of processing steps and gari as an intermediate stage has different quality characteristics compared to eba at a final product stage. In contrast, boiled sweet potato and matooke have fewer steps. Furthermore, for the respondents and the interviewers, the distinction between stages (such as the raw material and the raw material during processing) were not always clear and therefore some characteristics were cited for the incorrect 'stage'. As a result, each stage will not be covered for each product. The table below provides an overview of the data available on each of the products.

Table 18 Quality characteristics data available for each stage of product development [check]

	Crop (in general)	Raw material for product	During processing	Inter. product	Final product
Gari/Eba (Nigeria) SW + NC	Qual + Quan	No			
Gari/Eba (Nigeria) SE	Qual				
Plantain (Nigeria)	Qual + Quan	N/A	N/A	N/A	N/A
Boiled plantain (Cameroon)	Qual + Quan	Qual + Quan	Qual	N/A	Qual + Quan
Boiled sweetpotato (Uganda)	Qual + Quan	Qual + Quan	Qual	N/A	Qual + Quan
Matooke (Uganda)		Quan		N/A	

5.2 Fresh crop (in general/all products)

This section presents the findings related to the preferred quality characteristics of the fresh RTB crop, in general and not specific to the product. It provides analysis of the characteristics ranked in the top five by men and women, then compares the number of characteristics cited by men and women and what was not mentioned by the opposite sex. An overview of the findings is presented in Table 18 below and study specific findings in **Appendix X**.

Table 19 Preferred quality characteristics for the RTB crop (in general) by sex

Product	Top 5 crop characteristics (in order of importance, aggregated rankings)			Longer list of important characteristics reported	
	Women	Men	Differences in top 5 ranking	Number reported (women/men)	Differences in characteristics mentioned by men and women
Gari/eba SW and NC Nigeria (II, n=74)	Big long root Heavy root Many roots Less water, <u>Early maturity/</u> <u>not rotten</u>	Big long roots Not rotten Heavy root Many roots Less water/ <u>branched</u> <u>stems</u>	- Branching is mentioned 6th for women - Not mentioned by men: multiple sprouting.	21/22	<u>Not mentioned by men:</u> multiple sprouting <u>Not mentioned by women:</u> long stems, straight stems
Gari/eba (Nigeria), in Osun (SW) and Benue (NC) states FGD	<u>Neat appearance</u> <u>Early maturity</u> <u>Compatibility with the soil</u> <u>Stems must form branches</u> Less water	Many roots Big heavy roots Not rotten Less water <u>Strong stem</u>	4 out of 5 characteristics ranked in the top five by men and women were ranked differently.	9/8	<u>Not mentioned by men:</u> Neat appearance, compatibility with the soil, Stems must form branches; Quick peeling using knife; Soft skin of cassava root; No fibre; Fresh leaves. <u>Not mentioned by women:</u> Many roots, Big heavy roots, Not rotten, Strong stem; High starch content; Multipurpose use
Gari/eba imo state FGDs	Big roots, <u>white sap, dry roots (hard to break),</u> <u>heaviness,</u> <u>white root,</u> <u>sour taste,</u> <u>mature, fresh skin, healthy root, bright peel, wet peel</u>	Big roots, <u>dark brown,</u> <u>many roots,</u> white	Unranked. 2 characteristics held in common	11/4	<u>Not mentioned by men:</u> white sap, dry roots (hard to break), heaviness, sour taste, mature, fresh skin, healthy root, bright peel, wet peel. <u>Not mentioned by women:</u> dark brown, many roots. *FGD also highlight different characteristics compared to II: neat appearance, compatibility with soil.
Plantain SW and SS Nigeria (II, n=118)	Finger size Peel colour Tip colour Pulp colour <u>Maturity</u>	Finger size Pel colour <u>Bunch size</u> Pulp colour Tip colour	- Bunch size ranked 6th for women maturity ranked 6th for men.	22/20	<u>Not mentioned by men:</u> bunch firmness, germination, sap flow, starch content, sucker quality. <u>Not mentioned by women:</u> fruiting, number of hands and wax.
Boiled plantain, Cameroon (II, n=78)	- Mature plantain - Big fingers	- Dark green color of plantain - Big fingers	3 shared, 2 with different rankings	25/23	<u>Not mentioned by women</u> - Brown color of interior; - Dry leaves; - Fresh peel; - Rough peel

Product	Top 5 crop characteristics (in order of importance, aggregated rankings)			Longer list of important characteristics reported	
	Women	Men	Differences in top 5 ranking	Number reported (women/men)	Differences in characteristics mentioned by men and women
	- Dark green color of plantain <u>- Hard fingers</u> <u>Orange color of interior</u>	- Presence of a ripe finger - Yellow color of interior Mature plantain			<u>Not mentioned by men</u> - Absence of black spots; - Khaki color of interior; - Long fingers; - Smooth peel; - Solid peduncle of bunch; Thin peel
Sweet potato, Uganda (II, n= 72 * only 12 men)	Big size root Firm root Smooth skin <u>Sweet</u> Good smell	Big size root Smooth skin Firm root Good smell <u>Good</u> <u>colour/no damage</u>	Women ranked sweet tasting higher, and men a good colour /no damage	11/9	Long list quite similar except colour was reported less by women 3.8 women and more by men 9.5. <u>Not mentioned by men:</u> No fibre and not watery
Sweet potato, Uganda FGDs	Big size roots <u>Hardness/firmness</u> High yield Sweet taste <u>Sappy root</u> <u>Smooth skin</u>	<u>Early maturity</u> Sweet taste Big size roots High yield <u>Disease resistance</u>	3 shared, 3 different with different rankings	6/5	<u>Not mentioned by women:</u> early maturity and disease resistance <u>Not mentioned by men:</u> hardness/firmness of the root, sappy root and smoothness of the skin.
Matooke, Uganda	N/A for crop in general				

Note: underline indicates differences with the opposite sex.

Regarding the **gari/eba (Nigeria)** study, in Osun (SW) and Benue (NC) states. There was only one difference in the top five characteristic for cassava, which was due to difference in ranking. Early maturity was ranked 5th by women and 7th by men. Interestingly, men ranked ease of peel 6th and women 9th. In FGDs women mentioned quick peeling, however, as a priority. The branching ability was ranked sixth for women and fifth for men, which is a characteristic associated with high yield, good canopy cover, and reduces the frequency of weeding, which is a task mainly undertaken by women. Importantly, the preference for this characteristic sets it apart the food product profile for a cassava variety required for large scale mechanized farming, for which branching is a limited factor due to restricted movement during weeding and mechanised harvesting, compared to smaller and medium scale farming that use manual labour predominantly. Regarding the longer list of characteristics, women and men also cited a similar number, 21 and 22, respectively. However, men did not mention multiple sprouting, women did not mention long stems and straight stems. Interestingly, yield tied for a rank of ten for men, while it did not appear in the top ten for women.

There are more notable differences in preferences among men and women from the FGDs, where they were asked the important cassava characteristics “as a woman/man, based on what you do”. Four out of five of the highest ranked characteristics differed. Also, the women’s FGDs mentioned different characteristics than those gleaned from the individual interviews, including neat appearance, ranked 1st by women, and compatibility with soil (‘poor soils’ was an issue found in in the FGDs in Benue state), ranked 3rd by women. The women’s FGD also mentioned early maturity and branching as in the IIs. Men’s FGD gave the highest priority to ‘many roots’, ‘big heavy roots’ and ‘not rotten, as in the II.

The quotes below provide some examples of how the preferred characteristics for cassava were described in individual interviews. Notable is the link between the characteristics and the reason why

the characteristic is preferred (e.g. branching = reduces weeds, early maturity and profit), which emphasises the importance of qualitative analysis for richer findings

“Short maturity period (6 months), long roots (1m), produce high product yield after processing, stem has to branch with good ground cover that smoulders weeds, the root shape has to be good (conical cylindrical), and the stem has to be big, strong and healthy” (women’s individual interview, Al-okete, STATE, Nigeria).

“1. Early bulking is of great profit for farmers and I will have early harvest and plant another crop, 2. Young mature sticks grow faster than too young or too old sticks, 3. Fast growth; the quick growth improves root formation, 4. Fairly close node; all cassava nodes stick get closer as age sets in” (women’s individual interview, Oyan, STATE, Nigeria).

Regarding **cassava (Nigeria)** in Imo state (SE), the FGDs revealed differences in the type and number of quality characteristics considered important for men and women. Two characteristics were shared: big roots and white roots. However, women mentioned: white sap, dry roots (hard to break), heaviness, sour taste, mature, fresh skin, healthy root, bright peel, wet peel. Men mentioned dark brown and many roots, which women did not. The difference is likely associated with gender roles relating to cassava production in the SE context, where men focus on yam production and women on cassava, therefore women would raise more characteristics in this light (see earlier section on gender roles).

In the case of **plantain (Nigeria)**, there was only one difference in the characteristics ranked in individual interviews among the top five, and this was only a difference in ranking and not that they were not mentioned by the opposite sex. Maturity was ranked 5th for women but ranked 6th for men. Bunch size was ranked 3rd by men and 6th for women. Quality characteristics that women gave slightly higher rankings to are maturity, peel appearance and bunch firmness. Men cited bunch size more often, and is likely related to their role in selling plantain, where market value is determined by the size of the bunch. [check if in publication, add qualitative] [check there are two tables for raw material in plantain report]. For the longer list of characteristics, women cited 22 and men 22. Characteristics only mentioned by women and not by men were 5: bunch firmness, germination, sap flow, starch content, sucker quality. Characteristics not mentioned by women were 3: fruiting, number of hands and wax.

Regarding **plantain in Cameroon**, women cited “mature plantain” 1st, while men focused on the “dark green colour of plantain”. This characteristic is ranked 3rd by women. In either groups, “big fingers” was ranked 2nd. The longer list characteristics revealed 25 characteristics for women against 23 for men. Characteristics mentioned only by men include: Absence of black spots; Khaki color of interior; Long fingers; Smooth peel; Solid peduncle of bunch; Thin peel. Women on the other hand did not mention characteristics such as: Brown color of interior; Dry leaves; Fresh peel; Rough peel

For **sweetpotato (Uganda)**, II were conducted with men and women, however the sample size was small for men (12 and 60, respectively). With this in mind we find one difference in the characteristics ranked in the top five. Women ranked sweet tasting more important and men a good colour/no damage. In the longer list of characteristics, women mentioned 11 and men 9, however, the list was similar except that men mentioned colour more often than women. Men did not mention no fibre or not watery as important characteristics, which are processing characteristics and as mentioned by women, are likely to reflect their roles in processing sweet potato. Overall, preferences are inclined towards post-harvest (big size roots), sensory (sweet taste) and agronomic (high yield) characteristics among men and women.

FGDs in the sweetpotato study, similar to the gari/eba study in Nigeria, found additional characteristics and greater gender differences. Men and women’s FGDs had three shared characteristics and three different in the top five characteristics: Women both ranked big size, sweet taste and high yield. However, women mentioned hardness/firmness, sappy root and smooth skin while men did not and men mentioned early maturity and disease resistance, which women did not.

any ideas why? The full list of characteristics shows the importance of the full spectrum of characteristics as a package: agronomic (early maturity, high yield), post-harvest (big size roots) and sensory (sweet taste, hardness/firmness of the root).

5.3 Quality characteristic preferences for product

Gari/eba (Nigeria) in Osun (SW) and Benue (NC)

Some of the main crop characteristics that were cited as good for the intermediate and final products of gari/eba were similar across gender and region, and included: big, many and heavy roots, white flesh, less water. Given that there are distinct gender roles with regards to processing gari/eba (see section x), mainly that processing and selling was primarily undertaken by women and girls, it reveals a high level of awareness among men of the important characteristics required for processing and consumer demand [check]. However, there were differences according to FGDs. Regarding the raw cassava, men's FGD mentioned heavy roots that are not rotten and are white when peeled, while the women's FGD mentioned big roots with no fibre, soft and easy to peel, long lasting in good or bad weather, early maturing and mealy (Table 19). For gari, men preferred high starch with no fibre while the women highlighted gari should be white, with a nice smell and should also swell. [check paragraph]

Table 20 Preferred quality characteristics for cassava products, SW and NC Nigeria (FGDs)

Product	Men's FGD	Women's FGD	Region SW	Region NC
Root	Heavy, less water, not rotten, white when peeled, big, long, many roots, strong stem	Big, heavy, no fibre, soft or easy to peel flesh cover, stays long in good or bad weather, weed tolerant, not rotten, early maturity, early sprouting, mealy, less water	Not rotten, early maturity, early sprouting, mealy, less water, big, heavy, white	Heavy, big, white, not rotten, soft skin, stays long in good or bad weather, weed tolerant,
Gari	High starch, white, high gari yield, no fibre	White, neat, smell nice, swelling	High yield /quantity	High yield/quantity

Is there any other data? should we include PP here?

According to the interpretation document for gari/eba in this region (a summary analysis that helps create the product profile), there were several characteristics that were mentioned only by men (four) and women (9 (see table below). The characteristics only mentioned by women clearly indicate greater detail on sensory characteristics of the final product that would help meet consumer demand. There were also a number of sensory characteristics that had high frequencies for women compared to men, often times twice as many citations for women), which included: aroma, brightness of gari, dry gari, heavy gari, good taste, swelling gari, sour gari, smoothness of eba. In addition, there were a number of characteristics only mentioned in certain states, revealing regional preferences.

Table 21 Summary of quality characteristics preferences only mentioned by men or women, Osun or Benue state (Interpretation document analysis)

Mentioned only women	Mentioned only men
<i>Positive characteristics</i> Heavy roots/mash Easy peeling (smooth and fast by knives, easy removal of outer skin) Fresh aroma/taste Sour aroma/taste Good appearance Easily dissolving (of gari in water, during eba preparation)	Moderate water (prefer to supply factories, factories check for dry matter content by measuring weight of the root in water versus weight of the root in air) although women also mention heavy root and low water which refers to the same. Smooth root (refers to preference of absence of irregular shapes with notches, which facilitates easier peeling, and easier loading/arrangement of roots in trucks for transportation)

Mentioned only women	Mentioned only men
<i>Negative characteristics</i> Burnt odour (after roasting of gari) Too mature root (gives gari with high fibre, processors prefer young mature roots to give quality gari) Curved roots (roots with rough edges and constriction)	Less peel (refers to the mass/surface ratio of the root) Longer gari storability
Mentioned in Benue, NC region	Mentioned on in Osun, SW region
Yellow gari/eba Swelling gari Fresh taste and aroma Smoothness of eba Longer gari storability	No pulp discolouration Sour aroma and taste Bright white/cream gari Dry gari

Gari/eba (Nigeria) in Imo state (SE)

Regarding gari/eba (Nigeria) in Imo state (SE), the prioritised list of quality characteristics at each stage of product development reveal differences between men and women, according to FGDs. Firstly, as shown in Table 21, women cite a larger range of characteristics compared to men, which is likely related to women's role and experience in processing and selling cassava, and specifically for gari and eba. The characteristics not mentioned by men are sensory characteristics, relating to aroma, texture and feel in the hands. [check].

Table 22 Quality characteristics for gari/eba in Imo State, SE Nigeria (FGDs)

Quality characteristics	Women	Men
Raw material during processing	Easy to peel, hard peel, less water, <u>smooth, no brown colour from peel, well grated mash, wet peels.</u>	Strong root, easy to peel, less moisture content, hard peel.
Intermediate product – gari	Attractive colour – white or yellow, not floating/ability to sink, sour, <u>no lumps, good smell like burnt clay, drawy, not sticky, no seeds.</u>	Clear, attractive colour – white or yellow, heaviness, and sour.
Final product – eba	Drawy, <u>mouldable, not sticky on the hands, smooth, attractive colour</u> , soft in the hand, not hard, not soft in the mouth, <u>neat</u> , without large grains	Not floating, not soft/too hard, clear colour, drawy no seeds or lumps.

Note: underline text indicates not mentioned by opposite sex

Plantain (Nigeria)

Any product data ?

Boiled plantain (Cameroon)

High-quality characteristics of boiled plantain are mainly related to its texture and appearance from a global point of view. Regardless of the regions and genders, the characteristic “Soft plantain” was the most important. Women added that their plantain should be “Attractive”, besides being soft. Other respondents rather insisted on the color of the boiled plantain which should either be “yellow” or “brown”.

Table X High quality characteristics of boiled plantain (frequency of citations) in Cameroon

Importance	Women	Men	West region	Littoral region
1	Soft plantain (66)	Soft plantain (69)	Soft plantain (66)	Soft plantain (69)
2	Attractive plantain (60)	Yellow-colored plantain (38)	Yellow-colored plantain (43)	Brown-colored plantain (63)
3	Brown-colored plantain (39)	Brown-colored plantain (32)	Attractive plantain (39)	Attractive plantain (48)

Importance	Women	Men	West region	Littoral region
4	Well-cooked plantain (38)	Well-cooked plantain (32)	Well-cooked plantain (29)	Well-cooked plantain (41)
5	Yellow-colored plantain (23)	Soft and tender plantain (27)	Big fingers plantain (22)	Soft and tender plantain (22)
6	Dark yellow-colored plantain (22)	Attractive plantain (23)	Sweet plantain (22)	Yellow-colored plantain (18)
7	Soft and tender plantain (16)	Golden-colored plantain (18)	Soft and tender plantain (21)	Mealy plantain (10)
8	Sweet plantain (15)	Big fingers plantain (16)	Tasteful plantain (18)	Big fingers plantain (7)
9	Big fingers plantain (13)	Tasteful plantain (16)	Golden-colored plantain (16)	Dark yellow-colored plantain (7)
10	Mealy plantain (12)	Attractive yellow color (16)	Dark yellow-colored plantain (15)	Tasteful plantain (7)

Boiled sweetpotato (Uganda)

In the case of **boiled sweetpotato (Uganda)**, overall, the most important characteristics in regard to sweetpotato at the stages of raw material, processing, and final product were related to size, appearance, texture, aroma/flavor and taste (see table below). A large size, good colour, smoothness of the root, presence or absence of physical or pest damage were among the top ranking good. The intensity of hardness (during processing and mealiness for consumption, were other top ranking characteristics. Women cited a number of important quality characteristics for the raw material and final product. The characteristics with the highest citation among women were big size, sweet taste, smooth skin, vitamin A and good texture, which represent a range of types of quality characteristics, from agronomic and sensory. Regarding the final product, women cite a number of characteristics in similar ways. Sweet taste was by far the most important. The data is not compared with men due to the small sample size, however is used here to show similarities with the FGDs.

Table 23 Percentage of citations of important characteristics for boiled sweetpotato

Characteristic	% women N=60	% men N=12	Characteristic	% women N=60	% men N=12
Raw material			Final product		
Big size	35	33.3	Sweet taste	13.3	8.3
Sweet taste	21.7	25	Mealy	6.7	0
Smooth skin	13.3	25	Hard	5	0
Vitamin A	11.7	0	Yellow or white colour	3.3	0
Good texture	13.3	0	Good smell	3.3	8.3
Not fibrous	5	8.3	Not watery	3.3	8.3
Good colour	5	8.3	Good appearance	1.7	0
Disease free	5	0	Cooks well	1.7	0
Easy to peel	3.3	0	Soft	0	8.3
No damage	3.3	16.7			
Not rotten	3.3	0			
Good smell	3.3	0			
Yellow flesh colour	3.3	0			
Hard root	1.7	16.7			
Good appearance	1.7	0			

The findings from the FGDs raise similar characteristics as the II, with some differences between men and women (Table 23). There are a higher number of characteristics cited among men for the raw material, but following that, men and women both provide a range of characteristics considered important at the processing and final product stages. Regarding the final product, men and women agree with mealiness and sweet taste, however men mention dries and splits easier and women cite

hard, sweet, caramel aroma. Interestingly, the expressions used in the FDGs differed from the II. For example, while in the II there were only a few descriptors used for the smell (these were later combined into good smell), specific descriptors such as sweetpotato smell, sweet smell and caramel smell (described as burnt) were prominent from the FDGs. Also, certain characteristics such as dries easily and splits easily were uniquely found in FGD data.

Table 24 Summary of quality characteristics of boiled sweetpotato by sex (FDGs)

Raw	Men's focus groups	Women's focus groups
1	Big size root	Big size root, hard peel
2	No pest damage, sappy, smooth skin/surface, yellow-orange color	
3		Sappy
Processing		
1	Sweet smell/good aroma/ sweetpotato smell/	Sappy
2	Sappy	Sweet smell/good aroma/sweetpotato smell
3	Easy to peel	Hard when peeling
Final product		
1	Mealy	Mealy
2	Dries easily, splits easily, sweet taste	Sweet taste
3		Hard, nice smell/sweetpotato aroma/ smell/sweet caramel aroma

Matooke (Uganda)

The **matooke (Uganda)** study, characteristics of cooking banana that would make good matooke are provided in the table below. There were no differences in the characteristics mentioned in the top five characteristics for cooking banana according to II, which included: mature bunch, big fingers, easy to peel, soft peel and soft pulp. In addition, both men and women mentioned 15 characteristics as being important. The only notable difference was that long fingers was ranked 6th for men and 14th for women.

Table 25 Characteristics of a good matooke crop (individual interview rankings by sex and region) in Uganda

Characteristics	Rankings				
	Women (n=64)	Men (n=59)	Mbarara (n=63)	Nakaseke (n=60)	ALL (n=123)
Mature bunch*	1	1	1	1	1
Big fingers	3	3	2	4	2
Easy to peel	2	5	4	2	3
Soft peel	4	4	5	3	4
Soft pulp	5	2	3	5	5
Straight fingers	8	7	7	6	6
Low amount of sap	6	8	6	11	7
No pop sound	7	8	8	6	8
Long fingers	14	6	12	6	9
Prefer specific varieties**	9	11	10	10	10
Smooth fingers	10	8	14	9	10
Round shaped fingers	10	13	9	14	12
Short cooking time	10	13	11	11	12
Not diseased	15	11	13	13	14
Spaced fingers/not compact	10	15	15	15	15

*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

Regarding quality characteristics that indicate that the crop has good processing ability into matooke are provided in the table below. Both men and women rate the quality characteristics (soft texture, good taste, yellow colour) higher than the agronomic ones (big bunch, big fingers). Small finger size was ranked as the number one attribute that is not desired by all respondents. Women ranked pulp colour higher than men and this could be because a yellow pulp is associated with good food. Women also ranked easy to peel and low amount of sap higher than men. These differences can be related to the different tasks that women perform in relation in preparing matooke for household consumption.

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

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

**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).

boiled cassava

Are there gender differences in varietal preferences for the crop and product?

There were no significant differences between men's and women's' preferences of varieties to be processed into boiled cassava. However, there were differences in varieties preferred for processing boiled cassava by location. Thus, Bao and, NAROCASS 1 were preferred in Apac while TME was preferred in Luweero. Nonetheless, Nase 14 was preferred in both locations.

Independence in varietal choice

Focus group discussions disaggregated by sex indicated that decisions regarding preferred cassava variety were majorly made jointly by the husband and wife in the household. This is in line with findings from quantitative data which indicated that most men and women made independent discussions, but with consultation. Disaggregation by location revealed that in Apac, such decisions were normally made by men while in Luweero they were mainly made by women. It suffices to note that it is not uncommon for men and women to have separate plots in Luweero district. Thus, women easily made independent decisions regarding cassava they grow on their separate plots.

Are there gender differences in quality characteristic preferences for the crop and the product?

Within a given district, the percentage of men who prefer some attributes was not significantly higher (P-value > 0.05) than that of women apart from in ground storage ability attribute for which men had significantly higher (P-value < 0.05) percentage than women in Luweero (Table 1) (Iragaba *et al.*, 2021). Men usually sold cassava in bulk (all crop) thus, they preferred varieties whose roots would stay fresh in the soil until a buyer who offered a good price arrived. On the other hand, authors document, significant differences by location in the preference of some attributes. For example, percentage of end users who preferred sweet/non-bitter roots, non-diseased roots, early maturity and in-ground storage ability was significantly different (P-value < 0.05) between Apac and Luweero. Accordingly, higher proportions of end-users in Apac than Luweero preferred non-bitter and disease free material.

Cassava was commonly processed into chips and flour in Apac so it was possible to have bitter landraces. It suffices to note that men and women continue to process bitter land races due to their inherent flour attributes (Nanyonjo *et al.*, 2021). Subsequently, men and women in Apac who consume the boiled cassava preferred non-bitter type of cassava. The percentage of women who preferred non-diseased cassava roots was significantly higher (P-value < 0.05) in Apac than in Luweero yet, that of women who preferred early maturing and drought-resistant varieties was significantly higher (Pvalue < 0.05) in Luweero than Apac (Table 1). Moreover, more men in Luweero preferred in-ground storability of roots than men in Apac. Men in Luweero usually sold fresh root cassava thus their preference for the attribute long in-ground storability yet, Cassava was also processed into cassava chips and flour in Apac.

Table 1: Agronomic and quality attributes of cassava along the food chain preferred by men and women who participated in the survey in Apac and Luweero

Attribute ^a	Apac district			Luweero district			District			Women			Men		
	M e n	W o m e n	P- v a l u e	M e n	W o m e n	P- v a l u e	A p a c	L u w e r o	P- v a l u e	A p a c	L u w e r o	P- v a l u e	A p a c	L u w e r o	P- v a l u e
High yield	6.	84.	ns	7.	73.	ns	75	72.	ns	84	73.	ns	66	70.	0.7
	6.	2		0.	9		.0	5		.2	9		.7	6	
	7			5											
Not bitter	1.	73.	ns	2.	47.	ns	72	50.	0.0 39*	73	47.	ns	71	52.	0.2
	4	7		9	8		.5	0		.7	8		.1	9	
	7			4											
Not diseased	1.	84.	ns	7.	43.	ns	77	45.	0.0 10*	84	43.	0.0 07**	71	47.	0.1
	4	2		1	5		.5	0		.2	5		.4	1	
	3			5											
Early maturing	3.	15.	ns	2.	60.	ns	25	57.	0.0 03**	15	60.	0.0 03**	33	52.	0.2
	3	8		9	9		.0	5		.8	9		.3	9	
	1			1											
Cooks soft	9.	36.	ns	1.	17.	ns	27	15.	ns	36	17.	ns	19	11.	0.5
	0	8		8	4		.5	0		.8	4		.0	8	
	1			1											
Drought resistant	9.		ns	7.	34.	ns	12	27.	ns	5.	34.	0.0 20*	19	17.	0.9
	0	5.3		6	8		.5	5		3	8		.0	6	

Attribute ^a	Apac district			Luwero district			District			Women			Men		
	M e n	W o m e n	P- v a l u e	M e n	W o m e n	P- v a l u e	A p a c	L u w e r o	P- v a l u e	A p a c	L u w e r o	P- v a l u e	A p a c	L u w e r o	P- v a l u e
In-ground storability	4.81	0.0	ns	4.11	13.0	0.042*	2.5	25.0	0.003*	0.0	13.0	ns	4.8	41.2	0.006**
Green and shiny leaves	4.31	15.8	ns	4.81	8.7	ns	15.0	10.0	ns	15.8	8.7	ns	14.3	11.8	0.819
Big and long roots	9.0	10.5	ns	9.8	0.0	ns	15.0	5.0	ns	10.5	0.0	ns	19.0	11.8	0.540
Not fibrous	9.5	5.3	ns	9.5	4.3	ns	7.5	5.0	ns	5.3	4.3	ns	9.5	5.9	0.679

ns= not significant, * = $P\text{-value} < 0.05$, ** = $P\text{-value} < 0.01$; ^a The preferences of men and women are expressed as percentages

5.4 Emerging themes

For many products there were minimal differences in the highest-ranking quality characteristics among men and women (top five). However, there were differences in the long list of important characteristics, often times women would cite a longer list of characteristics, particularly sensory characteristics, compared to men.

In many cases the characteristics women cited correspond with their role with that aspect of the food product, in particular regarding tasks that are laborious and tedious – such as peeling. Farmers interviewed in the **matooke and boiled sweetpotato studies (Uganda)** attached greater importance on ease of peeling, which was cited more frequently by women and associated with their role in preparing matooke and boiled sweetpotato, respectively. Regarding **plantain (Nigeria)**, however, ease of peeling for plantain was not frequently mentioned and when it was, it was raised more often by men than by women. This may be related to men preparing plantain in the field as snack and ‘hunger breaker’. Findings on **cassava (Nigeria)** in Osun and Benue state show only women’s FGDs cited quick to peel as an important characteristic. However, interestingly there were no gender differences in the II, which contradicts previous studies that find women mention the preference for roots that are easy to peel and suitability to make food products more often (Wossen et al. 2017; Teeken et al. 2018). This may be related to the emphasis on RTBfoods studies on end products. [Cameroon where easiness to peel is even ranked slightly higher by men than by women].

Branching stems mentioned only by women, both labour reducing for women (peeling and weeding respectively, and only mentioned by women among women for cassava in the **gari/eba study (Nigeria)**.

Another area of quality characteristic that show the connection between gender differences in preferences and gender roles is related to quality characteristics that are associated with marketing and profitability. For plantain and banana products, finger and bunch size are important characteristics for income – the larger the more profit. In the **plantain study (Nigeria)** men rank bunch size higher than women (but women also rank long fingers number 1?); however, bunch size was more important to women in SS compared to women in Osun state, where women in the former area are more involved with marketing. Regarding **matooke (Uganda)**, men had higher citation of long fingers compared to women. Regarding cassava in the **gari/eba study (Nigeria)** high starch

mentioned by men only, which in the SW can reflect that men mainly sell cassava to starch factories (Forsythe et al 2015 and 2016).³

Early maturing was ranked higher among women for cassava in the **gari/eba and plantain studies (Nigeria)**, which is likely related to precariousness of land situation for women, need to harvest for food and income more quickly.

6 CONCLUSION

TBC

7 WP1 G+ RTBfoods PRODUCT PROFILE ASSESSMENT

(adapted from G+ Product Profile Tool)

Background

Gender equity and positively supporting the livelihoods of women and men in root, tuber and banana (RTB) value chains are core objectives of RTBfoods Work Package 1 (WP1) and are essential to meeting the overall project objective. Developing (RTB) varieties requires keen attention to the preferences of its users, in addition to meeting fundamental development objectives and strengthening resilience of agricultural systems.

While women are a heterogeneous consumer segment, in many contexts they have specific preferences for RTB characteristics relating to their gender roles in production, processing, food preparation and consumption (RTBfoods Gender Output, 2021). However, it has only been recently that the diverse needs of women, who often occupy multiple roles along a food chain, have been actively considered in breeding on a systematic basis. It is in this framing that the gender work in WP1 has been designed. This work aims to address the priorities and needs of women that stem from their gendered status.

The results will inform RTB breeding processes through the final WP1 Food Product Profile (FPP). This is an evidence-based list of prioritised crop and product quality characteristics. The method for developing the WP1 FPP is provided in a separate guidance document (refer to RTBfoods WP1 Food Product Profile Guidance Document), and involves:

- 1) triangulation of findings from four methods (steps) to draw out the most important crop and food characteristics
- 2) convening a multidisciplinary 'design team' meeting to agree on the key characteristics required for the crop and product of focus
- 3) application of the G+ RTBfoods Product Profile assessment, and
- 4) finalise the WP1 Food Product Profile.

The G+ RTBfoods Product Profile assessment has drawn heavily on the Gender in Breeding Initiative's (GiB) ground-breaking tool, the [G+ Product Profile Tool](#), developed in the CGIAR RTB programme to assesses the gender impact of RTB plant traits. This tool offers a validation check to reflect on key gender issues in agricultural food systems, and to prevent harm and promote positive impact. As WP1 research has been gender responsive, our findings of important crop and food product characteristics will reflect the priorities and interests of men and women. However, the adaptation of the G+ tool will allow us to prioritise characteristics based on relative importance for

³ High starch also important for gari but it is not often that people mention starch in this context and instead use the term dry matter instead. Starch content and dry matter are linearly related.

women, or other social groups, in addition to providing 'red flags' for potentially harmful characteristics. Importantly, the characteristics will be undergo further biophysical analysis (WP2) and will be translated into traits for consideration in RTB breeder profiles (i.e., WP1 G+ RTBfoods Product Profile users are both food scientists AND breeders!).

Please see the appendices for explanatory notes.

Aim

The aim of the G+ Foods Product Profile tool is to assess the potential gender impact for RTB crop and food product related characteristics (or expressed as traits if established) to inform what is included and prioritised in the final version of the WP1 Food Product Profile.

This validation check can identify specific benefits and/or red flags that were overlooked and might therefore alter the final version of the product profile. The relative value of characteristics must also be assessed and inform prioritisation of characteristics in the WP1 FPP as all characteristics cannot be pursued by food scientists or breeders.

Box 1

What will the G+ Food Product Profile for crop and food quality characteristics assess?

1. Agronomic characteristics
2. Food processing characteristics: (e.g., cooking time, peelability)
3. Food product characteristics: sensory characteristics (e.g., texture – sticky, smooth; aroma, taste – sweet, bitter, sour; visual identifiers – fine, lumpy), starch context

Each characteristic should utilise parameters that are based on food science and/ or common usage.

Some product characteristics will be correlated with a heritable plant trait. For other characteristics this information is not yet known. Nonetheless, crop and product characteristics of identified in the RTBfoods WP1 studies should be included in the assessment.

Agronomic crop characteristics known or believed in common usage should be included, particularly those that affect food product quality: e.g., if sweetness is associated with late maturity, late-maturity (with defined parameters) should be assessed.

This version of the G+ Food Product Profile assumes that gender implications of plant traits not correlated with or commonly associated with changes in food quality would be assessed in the breeders' product profile.

Important points before you begin

The tool as it is written is focused on women. However, the tool can be applied to men or another social group, as deemed important for the context.

The tool should be completed by a social scientist trained in gender analysis, ideally in conversation with a food scientist and breeder.

Each response should be accompanied with justification based on specific evidence, largely from WP1 research, which includes published literature (Step 1, SOK). Additional primary research is not necessary.

Each response should consider different food chain actors (women producers, processors, traders, food preparers or consumers), and food uses (home consumption or sale), and alternative products and by-products.

Note that this adapted G+ tool does not refer to population percentages to determine the response to a question, as data is limited in many contexts. .

Instructions

This tool is divided into two parts: first, a positive valuation is undertaken ('Positive Benefit') and second, a negative valuation is undertaken ('Do no harm').

- Complete a draft WP1 Food Product Profile before undertaking this assessment (template for the WP1 FPP have been provided).
- Use this form in this document to undertake the assessment below for each characteristic included in the draft WP1 Food Product Profile for one product (excluding any variation of that product) that has a consumer group with a similar set of preferences.
- Select a response and associated score that is most appropriate and enter in column 3 in the G+ RTBfoods Product Profile template (page 4 of this document).
 - If there is not enough information, please tick this box and do not score. This means it may be risky to proceed with advancing this characteristic as its gender aspect is an unknown.
 - If the question is not applicable to that crop, product, or context, please tick this box and do not score.
- Provide the rationale for the score and reference to specific WP1 evidence in column 4 in the G+ RTBfoods Product Profile template (page 4 of this document). For example, 'focus group discussions in Step 2 Gendered Food Mapping'. If the evidence is insufficient, state that in the comments.
- Determine the 'summary score' for each Positive Benefit and Do No Harm sections, based on the scoring guidance provided later in this document/
- Enter the score in the two columns (H and I) in the **WP1 Food Product Profile template** (separate document, snapshot below).

	G	H	I	J	K
e	Priority 1. "must have" 2. Niche opportunity 3. <u>Added-value</u> 4. Winning trait	Gender impact scores (G+ tools)		Good, high equality varieties	Evidence
		<u>Do no harm</u> <u>Score</u>	<u>Positive</u> <u>benefits</u>		

8 G+ RTBFOODS PRODUCT PROFILE TEMPLATE

Questions to be asked of EACH characteristic in the draft WP1 Food Product Profile.

NOTE: Some questions have examples, provided in the appendix, indicated with *. For the final version we will use examples from RTBfoods.

CROP/FOOD CHARACTERISTIC		PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)		Name(s)	
		Institution(s)	
Location		Date	
1	2	3	4
Question	Response	Score	Justification: explanation for the score with cited evidence (WP1 evidence, or beyond)
POSITIVE BENEFITS			
DRUDGERY REDUCTION (+)* 1. Can the characteristic involve a beneficial decrease in <u>labour disproportionately performed</u> by women producers, processors, traders food preparers or consumers in the targeted customer segment? Includes crops/food for sale or home use and <u>unpaid labour</u> . (e.g., branching and its impact on weeding, rettability, cooking and sieving time)	+2	Decreases women's labour <u>considerably</u> , with benefits to women's health and welfare	
	+1	Decreases women's labour <u>moderately</u> , with benefits to women's health and welfare	
	0	No significant decrease in women's labour	
	NA	Not applicable	
	!!!	Warning signal: not enough information available to score	
INCREASE IN WOMEN'S PAID EMPLOYMENT (+)* 2. Can the characteristic maintain or increase women's formal or informal employment of women producers, processors, traders, food preparers or consumer's income in the targeted consumer segment?	+2	Increases or maintains women's employment with <u>considerable</u> gain in women's own income	
	+1	Increases or maintains women's employment with <u>moderate</u> gain in own income	
	0	No significant change on an income generation activity	
	NA	Not applicable	

CROP/FOOD CHARACTERISTIC		PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)		Name(s)	
		Institution(s)	
Location		Date	
Such as more demand for women's paid labour in production, processing, such as hired labour, off-farm work, or agro-enterprise.	!!!	Warning signal: not enough information available to score	
IMPROVEMENTS TO QUANTITY OF PRODUCTS UNDER WOMEN'S CONTROL (+)* 3. Can the characteristic positively impact on the quantity of any product related to the crop that would increase the income or home use of the crop/product by women producers, processors, traders, food preparers or consumers, in the targeted consumer segment? Products can include non-food item, and related to raw, intermediate and final products.	+2	Increase in the quantity of any product related to the crop under the control of women is considerably improved	
	+1	Increase of the quantity product or income from a product under the control of women is moderately improved	
	0	The quantity of no product or by-product under the control of women is affected	
	!!!	Warning signal: not enough information available to score	
	NA	Not applicable	
IMPROVEMENTS TO QUALITY OF PRODUCTS UNDER WOMEN'S CONTROL (+) 4. Can the characteristic positively impact on the quality of any product related to the crop that would increase the income or home use of the crop/product by women producers, processors, traders, food preparers or consumers, in the targeted consumer segment? Products can include non-food item, and related to raw, intermediate and final products.	+2	Increase in the quality of any product related to the crop under the control of women is considerably improved	
	+1	Increase of the quality product or income from a product under the control of women is moderately improved	
	0	The quality of no product or by-product under the control of women is affected	
	!!!	Warning signal: not enough information available to score	
	NA	Not applicable	

CROP/FOOD CHARACTERISTIC			PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)			Name(s)	
			Institution(s)	
Location			Date	
REDUCTION IN ESSENTIAL INPUTS NOT EASILY ACCESSIBLE FOR WOMEN (+) 5. Does the characteristic reduce the need of an essential input that is less accessible to/more important for women producers, processors, traders, food preparers or consumers, in the targeted consumer segment, compared to men? Including: Agricultural or processing related inputs (e.g. fertiliser, herbicides, water, water, fuel, storage, processing machinery, etc.	+2	Considerable reduction in the need for at least one essential input that is less accessible/more important for women		
	+1	Moderate reduction in the need for at least one essential input that is less accessible/more important for women		
	0	No prevailing gender inequality in access to or need for an essential input for women		
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
WOMEN'S POSITIVE VALUATION (+) 6. Do women producers, processors, traders, food preparers, or consumers in the target customer segment value the characteristic positively? Draw on qualitative, citations, rankings and CATA responses	+1	Yes		
	0	No		
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
MEN'S POSITIVE VALUATION (+)* 7. Do men producers, processors, traders, food preparers or consumers in the target customer segment value the characteristic positively? Draw on qualitative, citations, rankings and CATA responses	+1	Yes		
	0	No		
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
GENDER DIFFERENCES IN VALUATION (+)*	+1	Yes		
	0	No		

CROP/FOOD CHARACTERISTIC			PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)			Name(s)	
			Institution(s)	
Location			Date	
8. Do women producers, processors, traders, food preparers or consumers in the target customer segment value this characteristic more highly than men? Draw on qualitative, citations, rankings and CATA responses	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
DO NO HARM				
INCREASE IN DRUDGERY (-)* 9. Does the characteristic involve a harmful increase in <u>labour disproportionately performed</u> by women producers, processors, traders, food preparers or consumers in the target customer segment? Including food for sale or home use, and unpaid labour (e.g. minimal branching and increase in weeds, rettability, cooking and sieving time)	-2	Increases women's labour <u>considerably</u> , with benefits to women's health and welfare		
	-1	Increasing women's labour <u>moderately</u> , with benefits to women's health and welfare		
	0	No significant increase in women's labour	0	
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
DECREASE IN WOMEN'S EMPLOYMENT (-)* 10. Does the characteristic remove or reduce women's formal or informal employment for women producers, processors, traders, food preparers, or consumer's income in the targeted consumer segment? Such as less demand for women's paid labour in production, processing, such as hired labour, off-farm work, or agro-enterprise.	-2	Reduces or removes women's employment with <u>considerable</u> reduction in women's own income		
	-1	Reduces or removes women's employment with <u>moderate</u> reduction in women's own income		
	0	No change in women's income-generation activities		
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		

CROP/FOOD CHARACTERISTIC			PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)			Name(s)	
			Institution(s)	
Location			Date	
WOMEN'S USE OF INPUTS NOT EASILY ACCESSIBLE (-)* 11. Does the characteristic maintain or increase the need of an essential input that is less accessible to/more important for* women producers, processors, traders, food preparers or consumers, in the targeted consumer segment, compared to men? Including: Agricultural or processing related inputs (e.g., fertiliser, herbicides, water, water, fuel, storage, processing machinery, etc.	-2	Considerable increase in the need for at least one essential input that is less accessible/more important for women		
	-1	Moderate increase in the need for at least one essential input that is less accessible/more important for women		
	0	No prevailing gender inequality in access to or need for an essential input for women		
	!!!	Warning signal: not enough information available to score		
	NA	Not applicable		
NEGATIVELY IMPACT ON THE QUANTITY OF FOOD PRODUCTS UNDER WOMEN'S CONTROL (-) 12. Does the characteristic negatively impact on the quantity of <u>any product</u> related to the crop in a way that would decrease the income or home use of the crop/product by the majority of women producers, processors, traders, food preparers, or consumers, in the targeted consumer segment? Products can include non-food item, and related to raw, intermediate and final products.	-2	Negative impact on the quantity of any product from the crop, which would cause <u>serious harm</u> to women's income or home use of the product		
	-1	Negative impact on the quantity of any product from the crop, that would cause <u>moderate harm</u> to women's income or home use of the product		
	0	The quantity of no product or by-product under the control of women is affected		
	!!!	Warning signal: not enough information available to score		
	NA	Not available		

CROP/FOOD CHARACTERISTIC		PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)		Name(s)	
		Institution(s)	
Location		Date	
NEGATIVELY IMPACT ON THE QUALITY OF PRODUCTS UNDER WOMEN'S CONTROL (-) 13. Does the characteristic negatively impact on the quality of <u>any product</u> related to the crop in a way that would decrease the income or home use of the crop/product by the majority of women producers, processors, traders, preparers, or consumers, in the targeted consumer segment? Products can include non-food item, and related to raw, intermediate and final products.	-2	Negative impact on the quality of any product from the crop, which would cause <u>serious harm</u> to women's income or home use of the product	
	-1	Negative impact on the quality of any product from the crop, that would cause <u>moderate harm</u> to women's income or home use of the product	
	0	The quality of no product or by-product under the control of women is affected	
	!!!	Warning signal: not enough information available to score	
	NA	Not available	
WOMEN'S NEGATIVE VALUATION (-)* 14. Do the majority of women producers, processors, traders, food preparers or consumers in the target customer segment value the characteristic negatively? Draw on qualitative, citations, rankings and CATA responses	-1	Yes	
	0	No	
	!!!	Warning signal: not enough information available to score	
	NA	Not applicable	
MEN'S NEGATIVE VALUATION (-)* 15. Do the majority of men producers, processors, traders, food preparers or	-1	Yes	
	0	No	
	!!!	Warning signal: not enough information available to score	

CROP/FOOD CHARACTERISTIC			PRODUCT NAME	
Customer or market segment and characteristics (e.g. population, ethnicity, gender)			Name(s)	
			Institution(s)	
Location			Date	
consumers in the target customer segment value the characteristic negatively? Draw on qualitative, citations, rankings and CATA responses	NA	Not applicable		

Does this characteristic have any negative valuation for a product variation that is not captured in this profile, which may be harmful or contradict preferences of another group of people/consumer segment? *This may be processing-related characteristic, and not a heritable trait. Nevertheless, it can be captured here to record [question not part of the G+ tool scoring] E.g. white/yellow, sweet/sour, branchability of cassava large vs small canopy)*

Please describe the group (demographics, size), and the potential impact of the characteristic on the interests of this group, with evidence to support, or need for future research.

Does this characteristic involve a potential trade-off that needs to be considered with this assessment? E.g. non-watery cassava but easy to peel
[question not part of the G+ tool scoring]

Please describe the trade-off with evidence to support a particular preference or need for future research.

Part 2: scoring and providing recommendations for the WP1 Food Product Profile.

Please note that the score cannot be calculated. Please follow this decision-tree based on the guidance below.

Positive benefit

1. Read the responses from questions 1-5, under Positive Benefit.
 - a. if one item is scored +2, or two items +1, then this is an automatic REQUIRED characteristic. Enter +2 in the Positive Benefit column in the WP1 RTBfoods FPP template (column I). You have completed the section for this characteristic.
 - b. if only one item is score +1, continue.
 - c. if all items are scored 0, then the characteristic is NEUTRAL for the Positive Benefit.
2. Read responses from questions 6-7, under Positive Benefit.
 - a. if both responses are +1, then this is an automatic REQUIRED characteristic. Enter +2 in the Positive Benefit column in the WP1 RTBfoods FPP template (column I). You have completed the Positive Benefit section for this characteristic.
 - b. if the response to question 8 is +1, and there was one score of +1 in question 6-7, then this is REQUIRED (Essential or Must have). If there were only 0 scores in questions 6-7. Enter +1 in the Positive Benefit column in the WP1 RTBfoods FPP template (column I).
3. If all responses from 1-8, under Positive benefit are 0, the characteristic is NEUTRAL for Positive Benefit. Enter 0 in the Positive Benefit column in the WP1 RTBfoods FPP template (column I).

Do no harm

4. Read the responses from questions 9-13, under Do No Harm.
 - a. if one item is scored -2, or two items -1, then this is an automatic REJECT of the characteristic. Enter -2 in the do no harm column in the WP1 RTBfoods FPP template (column H). You have completed the do no harm section for this characteristic.
 - b. if only one item is score -1, continue.
 - c. if all items are scored 0, then the characteristic is NEUTRAL for do no harm.
5. Read responses from questions 14 and 15, under Do No Harm.
 - d. if both responses are -1, then this is an automatic REJECT of the characteristic. Enter -2 in the do no harm column in the WP1 RTBfoods FPP template (column H). You have completed the do no harm section for this characteristic.
 - e. if the response to question 14 is -1, and there was one score of -1 in question 1-4, then this is a REJECT. If there were only 0 scores in questions 9-13, then this is an AMEND or AVOID for this characteristic. Enter -1 in the do no harm column in the WP1 RTBfoods FPP template (column H).
6. If all responses from 9-13, under Do No Harm. are 0, the characteristic is NEUTRAL for do no harm. Enter 0 in the do no harm column in the WP1 RTBfoods FPP template (column H).
7. Ensure the final scores for the two parts are entered in the WP1 Food Product Profile table (H and I).

	G	H	I	J	K
Priority	Gender impact scores (G+ tools)		Good, high equality varieties		Evidence
1. "must have"	Do no harm Score		Positive benefits		
2. Niche opportunity					
3. Added-value					
4. Winning trait					

8. Make the following recommendations based on the assessment:

If REJECT: then the characteristic should not be pursued.

If AVOID or AMEND: the variety release must be accompanied by a guaranteed mitigation plan or action to remove this obstacle for a large portion.

If REQUIRED: it must be a priority characteristic for other work packages

- **Essential/'must have' characteristic:** it is essential for the variety to be used, from a gender perspective.
- **Winning characteristic:** it provides substantial economic or social benefit.

If NICE TO HAVE: it would be recommended for further work

Box 2: Interpreting the scores in a snapshot

In positive benefit section, characteristics that are supported with enough evidence about the benefit (e.g. two or more +2 or +1 scores), should be among the priority characteristics for WP2 and/or breeders.

The more frequent the positive scores in this section should mean the higher the priority in the WP1 FPP, these characteristics can be classified as either:

- **Essential/'must have' characteristic:** it is essential for the variety to be used.
- **Winning characteristic:** it provides substantial economic or social benefit.

If the impact cannot be foreseen because of serious lack of information such characteristic should probably not be prioritised by WP2, or other work packages. They should be included as characteristics requiring further research.

Characteristics that are supported with enough evidence about the harm (e.g. two or more -2 or -1 scores) should not be included in the WP1 FPP.

Explanatory notes

Characteristics definition: characteristics include agronomic, processing and product-related attributes and criteria that are required for a high quality crop and/or product. Characteristics of the crop are linked to the bio-physical characteristics of the crop variety (traits), agro-climatic conditions and/or processing techniques. Whereas characteristics of the product (specially referred to as quality characteristics) are linked to the bio-physical characteristics of the crop variety for processing the product, and the important processing steps necessary produce a good quality product. This tool assumes that gender implications of characteristics (not only plant traits) would be assessed in the product profile, that will be used by both food scientists and plant breeders.

1
2 **Adaptations made to the G+ Product Profile Tool (to be completed)**

3 The tool focuses on the intensity of potential consequences of the characteristic on people. The tool
4 was adapted to reflect 'general' impact on a group of people as opposed to the proportion of the
5 population, as it is not possible to estimate percentages from our data sources. We are also
6 interested in identifying potential issues for minority groups.

7 The adaptations also reflect that there may not be an existing gender inequality, but a need that
8 arises because women are more likely to perform a certain task and therefore have a specific need.
9 Therefore it is important that a situational analysis informs any future use of this tool to correspond
10 with change gender dynamics.

11

9 APPENDICES

9.1 Annex 1 Tables on crop characteristics (in general)

Table 27 Rankings of important plantain characteristics for processing in individual interviews by sex, Nigeria

	Female (N=62)	Male (N=56)	Total (N= 118)
finger size	48	42	90
peel colour	36	38	74
pulp colour	19	22	41
tip colour	20	20	40
bunch size	11	25	36
Maturity	14	9	23
Number of fingers	9	8	17
peel appearance	8	3	11
finger firmness	6	4	10
fruit angularity	5	5	10
good taste	4	3	7
Freshness	2	4	6
leaf colour	2	4	6
bunch firmness	3		3
peel thickness	2	1	3
Peeling	1	2	3
Psuedostem	2	1	3
male bud	1	1	2
Germination	1		1
sap flow	1		1
Starch content	1		1
sucker quality	1		1
Fruiting		1	1
number of hands		1	1
Wax		1	1

Table 28 Characteristics of a good cassava crop in individual interviews (% of respondents), SW + NC (Nigeria)

Important characteristics	Women N=52	(F)	Rank	Men N=22	Rank	Benue N=37	%	Osun N=37	%
big long root	65		1	73	1	73	62		
heavy root	46		2	50	3	49	46		
many roots	40		3	41	4	27	54		
less water	38		4	36	5	46	30		
early maturity	31		5	18	7	27	27		
not rotten	31		5	59	2	32	46		
white pulp	31		5	23	6	22	35		
branched stems	29		6	36	5	24	38		
no fibre	15		7	18	7	16	16		
vigorous stems	13		8	14	8	3	16		
easier to peel	10		9	23	6	19	8		
green healthy leaves	8		10	18	7	11	11		
multiple products	8		10	5		5	8		
supresses weed	8		10	14	8	19	0		
high product yield	6			5		3	5		

Important characteristics	Women N=52	(F) Rank	Men N=22	Rank	Benue N=37	%	Osun N=37	%
less fibre	6		5		3		8	
multiple sprouting	6		0		0		8	
underground storability	5		18	7	14		3	
early sprouting	4		5	10	0		8	
healthy stem	4		9	9	5		5	
high yield	4		5	10	5		3	
long stems	0		5	10	3		0	
straight stem	0		5	10	3		0	

Note: Order of characteristics is based on women's ranking (from most frequently mentioned to less frequently mentioned). The longer list of characteristics is available in the full report.

Table 29 Most important characteristics for cassava (crop in general) in order of preference in NC and SW Nigeria (FGDs)

Importance	Men's FGDs	Women's FGDs	NC region	SW region
1	Many roots	Neat appearance	Big roots	Many roots
2	Big heavy roots	Early maturity	Many roots	Big roots
3	Not rotten	Compatibility with the soil	Not rotten	Early maturity
4	Less water	Stems must form branches and reduce farmers' stress on maintenance	Strong stem, stem appearance, branching	Not rotten
5	Strong stem that is storable /spreading leaves	Less water	Early maturity	Strong stem that is storable, branching
6	Early maturing	Quick peeling using knife	High starch content	Less water
7	High starch content	Soft skin of cassava root		Quick peeling using knife
8	Multipurpose use	No fibre		Compatible to most soil/ soft skin of cassava roots
9		Fresh leaves		No fibre

Table 30 Quality characteristics of a good cassava root in general in Imo State (Nigeria) by FGDs

Summary women's FGDs	Summary men's FGDs
Big roots, white sap, dry roots (hard to break), heaviness, white root, big tubers, sour taste, mature, fresh skin, healthy root, bright peel, wet peel	Big roots, dark brown, many roots, white

Table 31 Quality characteristics of a good raw sweetpotato root in general in individual interviews (Uganda)

	Women (n=60)	Men (n=12)
Big size root	28.6	22.2
Firm root	15.6	14.3
Smooth skin	13.0	15.9
Sweet	8.9	4.8
Good smell	7.0	11.1
Good colour	3.8	9.5

	Women (n=60)	Men (n=12)
Good appearance	3.2	6.3
Mealy	3.2	3.2
No damage	2.9	9.5
No fibre	1.6	0
Not watery	1.3	0

Note: Order of characteristics is based on women's ranking (from most frequently mentioned to less frequently mentioned).

Table 32 Most important crop characteristics in order of preference for sweetpotato in FGDs

Importance	Men's groups focus	Women's groups focus	Kamwenge	Lira
1	Early maturity	Big size roots	Sweet taste	Big size roots
2	Sweet taste	Hardness	Hardness	Early maturity
3	Big size roots	High yield	High yield	Vitamin A
4	High yield	Sweet taste	Disease resistance	Sweet taste
5	Disease resistance	sappy	Early maturity	High yield
6		Smoothness	Sappy	

Table 15: Characteristics of a good crop for matooke by sex and district in individual interviews (Uganda)

Characteristics	Rankings					Summary scores				
	Women	Men	Mbarara	Nakaseke	AL	Women	Men	Mbarara	Nakaseke	AL
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
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

9.2 Annex 2: Title

what is published

- 1 Iragaba, P., Hamba, S., Nuwamanya, E., Kanaabi, M., Nanyonjo, R. A., Mpamire, D., ... Kawuki, R.
2 S. (2021). Identification of cassava quality attributes preferred by Ugandan users along the food
3 chain. *International Journal of Food Science and Technology*, 56(3), 1184–1192.
4 <https://doi.org/10.1111/ijfs.14878>
- 5 Nanyonjo, A. R., Kawuki, R. S., Kyazze, F., Esuma, W., Wembabazi, E., Dufour, D., ... Tufan, H.
6 (2021). Assessment of end user traits and physicochemical qualities of cassava flour: a case of
7 Zombo district, Uganda. *International Journal of Food Science and Technology*, 56(3), 1289–1297.
8 <https://doi.org/10.1111/ijfs.14940>
- 9



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