

Gendered Food Mapping of Fried Sweetpotato in Kwara State, Nigeria

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

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ABSTRACT

The study was conducted at three administrative levels in Kwara state namely; state level (Offa city); local government level; Agbamu in Irepodun LGA and Ijagbo in Oyun LGA; (Oro (Irepodun) and Ijagbo (Oyun) LGA); and community level Araromi- Ipo (Lat and long), Omido, Igosun and Onila. All the areas selected are known for production, consumption and marketing of sweetpotato. A survey was conducted utilizing Focus Group Discussions (FGDs), Individual Interviews (II), Key Informant Interviews (KII) and Market Interviews (MI). Yoruba was the dominant ethnic group in the four communities. Farming is the main occupation for the majority of the respondents interviewed. The communities categorized themselves into three wealth categories namely; wealthy/rich, mid class and the poor. Most communities practiced both monocropping and intercropping of sweetpotato with maize and cassava. Important crops cultivated were; yam, cassava, maize and sweetpotato. The proportion of people producing sweetpotato in the communities visited ranged between 45 and 100%. About 80% of the farmers in the communities were male and the remaining 20% females. Agric sweetpotato, Alausa, Carrot potato and Aregbe were the most commonly grown sweetpotatoes. Farmers obtained their planting materials from irrigated land zones (36.80%), purchases (15.80%) and also from previous planting plots (10.50%). Important characteristics of good sweetpotato in general were; similar for male and female farmers namely; freshness, lack of infections, medium to big size, no rottenness and well matured roots. A good quality fried sweetpotato was described as mealy, not fibrous, moderate outer dryness, fresh and tasty. From the market study, three demand segments were constantly mentioned; retail, wholesale and community segments. The most important quality characteristics among traders were; absence of diseases and weevils visible on the root skin, firmness, high yield, size of the root, freshness and storability.

Keywords: fried, sweetpotato, gender, food mapping, cropping system, varieties, characteristics

1 INTRODUCTION

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

WP1 provides the evidence base for user's preferred characteristics for the selected products that are the focus of the RTBfoods project. Varietal preferences start with the demand from a range of users, such as producers, processors, retailers and consumers along the food chain. User's varietal choices are informed by the preferences they have for certain characteristics of the crop (characteristics preferred) that can be linked to traits.

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

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

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

The WP1 approach uses 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 for men, women and other social segments, 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 demanded. The approach has the following activities:

- Activity 1: State of Knowledge review
- Activity 2: Capacity strengthening and sharing
- **Activity 3: Gendered product mapping**
- Activity 4: Community-based RTB Food processing/preparation diagnosis
- Activity 5: Consumer taste tests in rural and urban market segments

This report presents the findings for Activity 3, Gendered product mapping.

objectives of activity 3, are to:

- Understand who is producing, processing, selling and consuming the crop and product, from a gendered perspective.
- Understand the multiple uses and products of the crop and possible trade-offs between uses
- Identify the quality characteristics and descriptors by stakeholder group (e.g. producers, processors) and demand segment (e.g. rural consumers).
- Understand how gender influences preferences and prioritisation for characteristics.

This activity focuses on both the crop and product, to identify the quality characteristics along the food chain (production, post-harvest and market) by different stakeholders, the multiple uses and trade-offs between uses, that may reflect different interests of men and women.

2 METHODOLOGY

2.1 Study location

Three levels of selection were made for the study in Kwara State, they were: state level; local government level; and community level (Table 1). At the state level, Offa, which is the second largest city in Kwara state was selected for market interview, expert fryers interview and consumer testing. Offa is located on 8.15 latitude, 4.72 longitude and 419 meters above sea level. Literature is rife on the fact that Offa is one of the major sweet potato growing areas in Nigeria.

At the Local government level, Agbamu in Irepodun LGA and Ijagbo in Oyun LGA were selected for expert fryers interview and consumer sensory testing interviews; while Oro (Irepodun) LGA and Ijagbo (Oyun) LGA were selected for MI. The above areas were selected premised on the fact that they are well known for the production, consumption and marketing of sweetpotato.

At the community level, four communities were selected from Irepodun and Oyun LGAs for KI, FGD MI and II. The communities are Araromi- Ipo (Lat and long); Omido (); Igosun (); and Onila ().

All the areas selected do produce, consume and market Sweetpotato. Moreover, they were selected premised on their readiness to participate in the interview which was premised on their agreement to give verbal and written consent.

Table 1 Places selected in Kwara state

Levels	Places selected and activities	Lat and Long	Reasons for selection
Kwara State	Offa (MI, EXI, CST)	8.15 and 4.72	Second largest city in Kwara state and one of the major sweetpotato growing areas in Nigeria
Local Government Areas	Agbamu (EXI, CST)		They produce, consume and market the crop. Moreover, they were ready to participate in the interview by giving verbal and written consent
(Irepodun and Oyun LGAs)	Oro (MI)		
Communities	Ijagbo (MI, EXI & CST)	8.17 and 4.73	
(In Irepodun and Oyun LGA)	Araromi Ipo (KI, FGD, MI, II)	8.2552 and 4.8060	They produce, consume and market the crop. Moreover, they were ready to participate in the interview by giving verbal and written consent
	Omido(KI, MI, II)	8.106 and 4.9260	
	Igosun (KI, FGD, MI, II)	8.1215 and 4.7684	
	Onila (KI, FGD, MI, II)	8.1170 and 4.8949	

Note: MI (Market Interview), EXP (Expert fryer interview); CST (Consumer Sensory test); KI (Key Informant); FGD (Focus group discussion); II (Individual Interview)

All the key informants interviewed were males and are 65 years old (between 59 and 71 years old) Table 2. They were all Yoruba in terms of ethnicity. About 50% of the interviewed key informants were elders, 25% were kings and the remaining were Vice president of sustainable farmers association of Nigeria (sufan) Kwara state branch.

Table 2 Summary of Key Informants

Signed consent form (Y/N)	Yes	100%
Gender	Male	100%
	Female	0%
Age (yrs.)		64.75
Ethnicity (if not too sensitive)	Yoruba	100%
Role/ Position in the community	Elder	50%
	Oba	25%
	Vice president of sustainable farmers association of Nigeria (sufan) Kwara state branch	25%

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

Participants to the FGDs were both men and women. The ages of the participants ranged between 25 and 80. As for men, they are 54 years old with minimum of 30 and maximum of 80. The ages of the women who participated into the FGDs ranged between 25 and 72. The major ethnicities of the participants were Yoruba (81% of them), followed by Fulani (13.21%), with Bassa and Tivi being

minorities. All the participants of the FGD were all involved in the production, processing and consumption of sweetpotato.

Table 3 Summary of FGDs

		Frequency	Percent
Received consent to participate (Y/N)	Yes	64	100
Education (level) Years	3	1	2.9
	4	1	2.9
	5	1	2.9
	6	29	85.3
	11	1	2.9
	15	1	2.9
Marital status	single - never married	8	22.9
	married/cohabiting	26	74.3
	other –specify	1	2.9
Major occupation	fulltime wage employed	1	1.82
	Artisan	2	3.64
	Farmer	42	76.36
	Teacher	1	1.82
	Trader	9	16.36
Ethnicity	BASSA	1	1.89
	Fulani	7	13.21
	TIVI	2	3.77
	Yoruba	43	81.13
Religion	Christian	35	74.47
	Muslim	12	25.53
Produce [crop] (Y/N)	Yes	59	100.00
Do you process or cook the crop?	Yes	59	100.00
Gender	F	32	50
	M	32	50

- II Q1-13 (demographic data: % men and women, age range, ethnic composition, relation to household head, religion, main profession, crop producers, crop processors)

About 77% of the individuals interviewed were males (Table 4). The ethnic distributions of the sample are Yoruba (77% of the sample), Gara (13%) with the rest being Fulani and Tiv. About 63% of respondents are household heads with spouses being 23%. The rest of the respondents are other family members. The majority of the respondents are Christians (77% of the sample); the rest being Muslims. Farming remains the primary occupation of 93% of the sample.

Table 4 Summary of IIs

		Frequency	Percent
Consent to participate in interview		30	100
Sex	Male	23	76,7
	Female	7	23,3
Education (specify level)	0	10	33,3
	6	5	16,7
	12	11	36,7
	18	4	13,3
Relation to the household head	Head	19	63,3
	Spouse	7	23,3
	Daughter	1	3,3
	Son	3	10
Marital status	single/never married	4	13,3
	married/cohabiting	24	80
	divorce/separated	1	3,3
	Others	1	3,3
Ethnicity	Fulani	2	6,7
	GARA (KOGI STATE)	4	13,3
	TIV (BENUE STATE)	1	3,3
	Yoruba	23	76,7
Religion	Christian	23	76,7
	Muslim	7	23,3
Main profession	Farmer	18	60
	self-employed 5 others	2	6,7
	farmer and self employed	7	23,3
	farmer and others	1	3,3
	farmer ; self-employed and part time wage employed	1	3,3
Do you grow [Sweetpotato]	Yes	30	100
q14_proc	Yes	30	100

3 FINDINGS: SOCIO-ECONOMIC CONTEXT AND PRODUCT PREFERENCES

3.1 Social segmentation and livelihoods

Table 5 presents a summary of the social segments observed in the four communities visited. Yoruba came to be the dominant ethnic groups in the four communities, followed by Makurdi and Kogi/ Fulani in Araromi, Tiv/Kogi and Fulani in Omido, Tiv in Onila and Igala in Ogosun. Farming is the main occupation for the majority of the respondents interviewed. In terms of sex, the respondents interviewed are in majority men. Poverty level ranged between 35 and 60% of the sample with Ogosun households being especially vulnerable.

Table 5: Social segments

Community name	Social segments (%)
Araromi	Ethnicity: Yoruba (90%) Makurdi (5%) Kogi/ Fulani (5%) Sex: female (10%) Occupation: Agriculture (100%) Wealth: Poor (35%)
Omido	Ethnicity: Yoruba (85%) Tiv/Kogi (10%) Fulani (5%) Sex: female headed (20%) Occupation: Agriculture (100%) Wealth: Poor (35%)
Onila	Ethnicity: Yoruba (84%), Tiv constitutes the rest Sex: Female (0%) Occupation: Agriculture (100%) Wealth: Poor (50%)
Ogusun	Ethnicity: Yoruba (88%), Igala constitutes the rest Sex: Female (43%) Occupation: Agriculture (75%) Wealth: Poor (60%)

The predominant livelihood activities are farming and trading among male and female in all the sampled communities (Table 6). Livelihood activities for men alone includes; cattle rearing (Onila FGD) and hunting (Igosun FGD). Bricklaying and carpentry work were usually done by young men.

Table 6: Livelihood activities

Male and Female FGD/Communities	Livelihood activities	Those they are important for
Araromi (Male and Female FGDs)	Farming Trading Artisan	Male and Female Male and Female Male and Female
Omido (Male and Female FGD)	Farming Trading Artisan Civil servants/ Government workers	Male and Female Male and Female Male and Female Male and Female
Igosun (Male and Female FGD)	Farming Garri Processing Trading Hunting Carpentry work Brick laying	Male and female Female Male and female Male Male (mostly young men) Male (mostly young men)
Onila (Male and Female FGD)	Farming Trading Artisans Cattle rearing	Male and Female Male and female Male and female Male only (mostly Fulani ethnic group)

The communities categorized themselves into three, which are: wealthy/rich, mid class and the poor (Table 7). The above table clearly shows that each community in the sample has different ways of describing the rich, mid class and poor people. There is no significant difference in the wealth categorization of male and female.

Table 7 Wealth categories and description

Communities	Description of Wealthy / Rich class	Description of Mid- class	Description of Poor class
Araromi (Female)	<p>FGD</p> <ul style="list-style-type: none"> - Very thriving Business - Has building and car - Houses like flat - People with a lot of livestock <p>20%</p>	<ul style="list-style-type: none"> - Whoever can eat well without begging before eating - Having few livestock <p>30%</p>	<ul style="list-style-type: none"> - People that find it difficult to feed themselves <p>50%</p>
Araromi (Male)	<p>FGD</p> <ul style="list-style-type: none"> - Own a house (flat) - Own a car - Has generator and good drinkable water <p>20%</p>	<ul style="list-style-type: none"> - Lives in rented apartments - Have 1-2 acres of land - May have a plot of land for building <p>30%</p>	<p>Lives in rented apartment , they have nothing for mobility They don't have land of their own They are hired labourers</p> <p>50%</p>
Omido FGD (Male)	<ul style="list-style-type: none"> - Car (4 – 5) - Building (3-4) flat - 10 hectares and above of land <p>30%</p>	<ul style="list-style-type: none"> - Car (1) - Motor cycle (mobility) - Have building not as good as rich ones - 10 acres and above of land <p>55%</p>	<ul style="list-style-type: none"> - No car - They are tenants - Eat whatever comes their way <p>15%</p>
Omido FGD(Female)	<p>The appearance and freshness of a person 3-5houses in Lagos and other cities Having family in oversea</p> <p>20%</p>	<p>They can feed their family Have/own one house Send children to school</p> <p>50%</p>	<p>They cannot wear good cloth Rented apartments Cannot send children to school No food and good cloth</p> <p>30%</p>
Onila FGD (Male)	<p>The appearance and freshness of a person 3-5houses in Lagos and other cities Having family in oversea</p> <p>20%</p>	<p>They can feed their family Have/own one house Send children to school</p> <p>50%</p>	<p>They cannot wear good cloth Rented apartments Cannot send children to school No food and good cloth</p> <p>30%</p>
Onila (Female)	<p>FGD</p> <p>Own a house (flat) Own 2 cars Have large acres of land</p> <p>10%</p>	<p>Having face me and face you house Have motor cycle Not having enough land</p> <p>20%</p>	<p>Lives in rented apartment , No motor cycles/ no means of mobility No land at all</p> <p>70%</p>
Igosun (Female)	<p>FGD</p> <p>Own a house (flat) Own a car That has generator and good drinkable water 2-3 ha</p> <p>20%</p>	<p>Lives in rented apartment Some have tricycle Has acres of land for farm (1-2 acres) Many have a plot of land for building</p> <p>30%</p>	<p>Lives in rented apartment They have nothing for mobility They don't have land of their own They are hired labourers</p> <p>50%</p>
Igosun FGD (Male)	<p>Heaving about 20ha of land</p>	<p>Having up to 50 acres or more</p>	<p>Having acres of land less than 5</p>

Communities	Description of Wealthy / Rich class	Description of Mid- class	Description of Poor class
	They have tractor/ hire it They have some people to work on their farm and feed them 10%	They hire tractors 20%	They don't have money to hire tractor 70%

3.2 Farming practices and social segmentation

3.2.1 Farming practices and social segmentation

In Araromi, both male and female don't intercrop sweetpotato with any crop (Table 8). The men said "We don't intercrop, we do monocropping to enhance high yield", we don't intercrop because vines of sweetpotato do spread, hence it can damage other crops planted with it'. Moreover, Kogi and Tiv ethnic groups do practice only monocropping of sweetpotato (Omido Female FGD). Other communities do practice both monocropping and intercropping of sweetpotato with maize and cassava.

Table 8: Farming practices

Male/female FGD + Community name	Farming practice (Q4.1)	People who practice (Q4.2)
Men's Araromi FGD	Few people plant on flat beds surface for irrigation Monocropping ('We don't intercrop', we do monocropping to enhance yield", we don't intercrop because vines do spread, hence it can damage other crops planted with it)	Mostly by men Men and women do monocropping
Women's Araromi FGD	Not Inter-cropped ("For it to be very fine (Big) Planted on Ridges (for higher and better yield)	Men grow it more than women Both male and female plant on ridges
Men's Omido FGD	On Ridges (For high yield) By Water Sides (During dry season for irrigation)	Both male and female (« we do it the same way »)
Women's Omido FGD	Monocropping (For it to yield very well) Intercropping with cassava, maize, tomato	Tiv and Kogi people Yoruba male and female
Men FGD Onila	Monocropping for less fertile soil Intercropping for fertile soil	Male and female (same way, no difference) Male and female (no difference)

Male/female FGD + Community name	Farming practice (Q4.1)	People who practice (Q4.2)
Women's FGD Onila	Making of Ridges (for high yield) Intercrop with cassava after a month of planting (so that the land will not be fallow after harvesting sweetpotato)	Male and Female
Men FGD Igosun	Monocropping (to produce more) and Intercropping with maize & cassava 3 months (for land management)	Men and women
Women FGD Igosun	Planted on newly cultivated land on ridges (For optimal yield) Monocropping and intercropping with maize and cassava	Men and women

The only difference in the separate plots of male and female is the size of farmland/plots. Men operate on larger plots than their female counterparts. There is no difference in the activities carried out on male and female plots aside their sizes

"On separate plots, we carry out the same activities with our men on sweetpotato farm because they taught us how to do grow it" (Araromi female FGD)

Table 9: Differences in men and women's plots

Male/female FGD + Community name *	Women's plots	Men's plots
Women's FGD, Araromi	They operate on lesser plots than male counterparts (4 out of 10 stone for female)	Operate on more plot than their female counterparts' plot (6 out of 10 stones for men)
Men's FGD, Araromi	They operate on lesser separate plots than male counterparts (3 out 10 stone for female)	Operate on more separate plots than female counterparts (7 out of 10 stone for men)
Women's FGD, Omido	They operate on lesser separate plots than male counterpart (40%) and it is not as neat as men's plot	They operate on more separate plots than female counterparts (60%) neater than female's plot
Men's FGD, Omido	Women operate on 5% separate plots	Men operate on 95% separate plot (men were of the opinion that it is not common for women to have separate plot)
Women's FGD, Onila	Women operate on 40% separate plots	Men operate on separate 60% plots
Men's FGD, Onila	Women operate on 40% separate plots	Men operate on separate 60% plots
Women's FGD, Igosun	Women operate on 20% separate plots	Men operate on separate 80% plots

Male/female FGD + Community name *	Women's plots	Men's plots
Men's FGD, Igosun	Women operate on separate plots	Men operate on separate 80% plots

3.2.2 Important crops in the community

The importance of the cultivated crops according to women and men in the enumerated communities is shown in Table 10. Results from FGDs revealed no differences across gender in terms of the importance of the cultivated crops (Table 11). Yam is the first most important crop for both men and women in the enumerated communities given that it is a staple crop in the region. Cassava and maize were ranked as the second and third most important crops, respectively, for both men and women. Apart from being staple crops, they also represent an important source of income. Sweetpotato was ranked as the fourth most important crop in the visited communities.

Table 10: Important crops in rural communities

Crop importance	Women	Men
1 st	Yam	Yam
2 nd	Cassava	Cassava
3 rd	Maize	Maize
4 th	Sweetpotato	Sweetpotato

Table 11: Reasons why the crop is important and for who

Crop	Reasons why the crop is important (FGD 5.2)	People for who the crop is important (FGD 5.3)
Yam	Staple food	Men and women (all FGDs except Omido's women's and Onila men FGD)
Casava	For food and income (All FGDs)	Men and Women (all FGDs)
Maize	Food and Income (ALL FGDs)	Men and women (all FGDs except Omido women who ranked it sweetpotato as third important crop)

Note: Yam was considered as the most important crop by six out of the eight focus group discussions. Omido women ranked cassava as first and sweetpotato as third important crop while Onila men ranked sweetpotato as first important crop during the FGDs.

Of all the communities in the sample, it was only Onila male FGD and Omido female FGD that ranked sweetpotato as first and third most important crop respectively. In other communities it was not among the first three important crops. The most common reason why it is not among the most important crops is that it is highly perishable and prone to pest and diseases ("kokoro").

Table 12 : Why sweetpotato was not among the three most important crops

Communities	Reasons from Men's FGD	Reasons from Women's FGD
Araromi	<ul style="list-style-type: none"> - It is not easy to store, it spoils easily - It is easily infested with pest - It is sweet like sugar and can cause pile - It is not marketable especially the flour 	<ul style="list-style-type: none"> - Not storable like yam - It can be easily affected by termites, weevils and something like maggot - It has sugary taste
Omido	<ul style="list-style-type: none"> - Not storable like yam - It is too sweet (It has sugary taste) - It can be easily affected by termites and weevils ("Kokoro") 	<ul style="list-style-type: none"> - They ranked Sweetpotato as 3rd important crop. - However, they said it has "kokoro" weevils/termites
Igosun	<ul style="list-style-type: none"> - It is highly perishable compared to yam - Marketability is difficult during glut - It is fadama (when planted during dry season with irrigation) that sells much and it is difficult to produce such 	<p>One cannot pound it alone *It can cause pile ("jedi gedi") for some people *It is not storable like yam</p>
Onila	<p>Ranked sweetpotato as first because</p> <ul style="list-style-type: none"> -it matures easily (short cycle) -we plant it 3 times in a year and we don't do weeding more than 1 time - it is a serious source of income -Easy to propagate unlike yam. - it is quick to cook, you don't feel hungry easily when you eat it (full stomach) more than another crop 	<ul style="list-style-type: none"> - It is not easy to store, it spoils easily - One cannot pound it alone without mixing it with yam.

3.2.3 Crop of focus

The discussions showed that the way sweetpotato is grown did not differ significantly across the four communities visited, but did slightly varies between ethnic groups. Sweetpotato is grown as sole/mono crop on rolls by the Tiv/Gbari/Kogi people, and is inter cropping with vegetables and pepper by the Yorubas. When the sweet potato is just established before its start spreading then okra, efo (Amaranthus), and pepper is planted. After sweet potato harvest; cassava is planted; the reason for inter crop being that the land is very fertile and it will be like a waste planting only one crop.

The proportion of people producing sweetpotato in the communities visited ranged between 45 and 100% (Table 13). About 80% of the farmers in the community are male and the remaining 20% are females. Most of the female farmers own farms independently. Most of them are wives of late farmers and they work on their husbands' land. The sales of sweetpotato are about 30% on average and ranged between 10% (in Omido) and 93% (in Araromi)

Table 13: Differences in men and women's plots

Community	Description of how the crop is grown	Proportion (%) of people in the community who grow the crop	Proportion (%) of the crop that the average household uses for making the product
Onila	<ul style="list-style-type: none"> - Making of Ridges (for high yield) - Monocropping for less fertile soil and intercropping for fertile soil (generally intercrop is done with cassava after a month of planting) 	100 %	10% used for home consumption 60% sold off, 20% is processed into flour (Elubo) 10% dried
Omido	<ul style="list-style-type: none"> - Making of Ridges (for high yield) - Monocropping and intercropping (generally intercrop is done with cassava, maize, tomato) 	45%	90% used for home consumption only 10% sold
Igosun	<ul style="list-style-type: none"> - Making of Ridges (for high yield) - Monocropping and intercropping (generally intercrop is done with cassava and maize) 	60%	Home consumption: (20%). Product sold: 50% Other products Like Elubo (flour): 30%
Araromi	<ul style="list-style-type: none"> - Making of Ridges - Monocropping 	50%	Home consumption: (5%) Product sold: 93% Others (for friends and family): 2%

3.2.4 Varieties of the crop and planting material

The different varieties grown in the study communities are presented in Table 14. It shows that Agric sweetpotato was the first most grown variety for women and the third for men. Alausa was cited as the first most grown for men and the second most for women. Carrot potato is the second and third most preferred variety for men and women, respectively.

Table 14: Varieties grown in order of importance (II)

Importance	Women	Men	All
1	Agric sweet potato/ white variety (N)	ALAUUSA (HAUSA VARIETY)	ALAUUSA (HAUSA VARIETY)
2	ALAUUSA (HAUSA VARIETY)	Carrot potato (N)	Carrot potato
3	Carrot potato	Agric sweet potato/ white variety (N)	Agric sweet potato/ white variety (N)
4	Aregbe variety	AREGBE VARIETY	AREGBE VARIETY
5	Onigangan Potato	Red skin and white flesh variety	Red skin and white flesh variety

Varieties grown in the study communities were also discussed during the FGDs and ranked, and results presented in Table 15. Regardless the sex, Alausa and Aregbe were enumerated as the first and second most grown varieties. They are preferred because they can be easily marketable

and are of high yield. The individual and FGD both show that Alausa is the most preferred variety for men and the second most preferred for women from the individual interviews. Contrary to the FGDs, Aregbe was ranked the fourth most grown variety during the individual interviews.

Table 15: Varieties grown in the community and ranking in order of preference (FGD)

Importance	Men's FGD	Women's FGD
1	Alausa	Alausa
2	Aregbe	Aregbe
3	Tomude	Carrot / Tomude
4	Carrot 5pupa"	Anamo Agric Olesunebe
5	Anamo Agric Pakurumo	Anamo Agric Pakurumo
6	Anamo Agric Olesunebe	

The reasons for planting a given sweetpotato variety vary not only according to variety itself but also according to sex (Table 16). Most men prefer Agric sweetpotato because its early maturity, its high yield, good taste and because it is easily marketable. Most women prefer it because of its high yield and its good taste and because it can be easily marketable. Men prefer Alausa because it can be easily marketable and due to its short duration to maturity, less sweetness whilst women prefer it for its storability. Women prefer Aregbe because of its storability whereas men prefer it for its resistance to diseases and less sweetness. Carrot potato is preferred for its high yield and early maturity

Table 16: Reasons why the variety is grown (II).

Variety* **	Reasons why preferred	% of women citing	% of men citing
Agric sweet potato/ white variety (L)	High yield	33.3	66.7
	Early maturity	13.33	90.91
	Good taste	20	60.61
	Easily marketable	26.67	30.30
ALAUUSA (HAUSA VARIETY) (L)	Storability	10	20
	For eye sight		30
	Easily marketable	60	80
	Adapt to all types of soil		10
	Not too sweet		30
	Early maturity	20	70
AREGBE VARIETY (L)	Yield moderately high		7.14
	Late maturity		14.20
	Resistant to diseases		7.14
	Less sweet		7.14
	Easily marketable	100	7.14
Carrot potato (I)	Early maturity	50	100
	Easily marketable	16.67	41.60
	High yield	16.67	100

* Local (L), New variety, recently released (N), Improved variety (I)

** Use scientific names where possible

The least preferred variety in all the communities is vitamin A (Carrot sweetpotato). Communities have different reasons for giving it lesser preference as shown in Table 17.

Observation: Most of the respondents have never seen the Vitamin A/ carrot (Orange fleshed sweetpotato) before. For instance, during the FGD at Igosun, a woman said "today is my first time of seeing this variety and it looks nice' about three other women joined in saying "I am just seeing it

today too”. Two of them now said, “we have seen it before but it is not good when boiled, fried and pounded, it can only be eaten raw. The same scenario plays out in most of the FGDs. Hence, the perception of it being less preferred comes from those that have seen it/heard about it before.

Table 17: Less preferred varieties and reasons why

FGDs	Less preferred Variety	Reasons
Men’s Araromi FGD	1) Vitamin A 2) Tomude	<i>They are not marketable</i> <i>Highly perishable</i> <i>Scatters in the mouth when eaten</i> <i>It matures over a long period of time (4-5 months)</i> <i>It is not attractive</i> <i>It has high sugar content</i>
Women’s Araromi FGD	Vitamin A	<i>No market for it</i> <i>It is too soft when cooked (“we like it because we know the value when eaten raw”) but most people don’t know its value</i>
Men’s FGD Omido	<i>The red one (purple reddish skin and cream within) is less preferred because</i>	<i>“it is old, not because of its characteristics” (it is more than 60 years)</i> <i>There is no market for it</i> <i>It is too sweet</i>
Women’s Omido FGD	The red one (purple reddish skin and cream within)	the sugar is much
Men’s FGD , Onila	Vitamin A	The vines are difficult to get
Women’s Onila FGD,	1) Vitamin A	It is not well known here like other varieties. We learnt it cannot be fried, it can only be eaten raw
Men’s Igosun FGD ,	Vitamin A (Carrot)	It is not common, not well known It “scatters” when cooked One cannot add it to yam for pounding it will be too soft If not well cooked it is not good for consumption and when well-cooked it will scatter
Women’s Igosun FGD,	Vitamin A	Lack of sensitization It has thread, it is for sick people It cannot be pounded alone and if mixed with yam for pounding it will affect the paste negatively (Turning the paste to pap)

The individual interviews showed that the majority of spouse/partners tend to cultivate the same (Table 18). However it was also mentioned that some couples do produce different varieties.

Table 18: Varieties preferred by spouse

		Frequency	Percent
Does your spouse/partner grow this first most important variety?	No	8	28.57%
	Yes	20	71.43%
Does your spouse/partner grow this second most important variety?	No	6	42.86%
	Yes	8	57.14%
Does your spouse/partner grow this third most important variety?	No	5	50.00%
	Yes	5	50.00%

Analyse qualitatively by reviewing and summarising each of the responses from the IIs. Add quotes if possible.

Planting material

The individual discussions showed that farmers keep their planting materials at irrigated land zones (36.80%), get them from their previous planting plots (10.50%), purchased some (15.80%) (Table 19). They also get their planting materials from friends (10.50%) and peers (12.30%). Only 3.50% of the interviewed farmers declared getting planting materials from extension agents. These results imply that planting materials are mostly exchanged informally.

Table 19: Source of planting material (II)

Source of planting material	% of men citing N=23	% of women citing N=7	Total N=30
Agric Extension agent	4.30%	0.00%	3.50%
Friends	13.00%	0.00%	10.50%
from other farmers (at free cost)	10.90%	18.20%	12.30%
Gotten from the Yorubas	2.20%	0.00%	1.80%
Grown at irrigated land areas	43.50%	9.10%	36.80%
Husband	0.00%	27.30%	5.30%
Own farm - FROM PREVIOUS PLANTING	10.90%	9.10%	10.50%
Purchased	13.00%	27.30%	15.80%
Remains from the farm	2.20%	0.00%	1.80%
Site where farmers plant the crops	0.00%	9.10%	1.80%

The main constraints to improved sweetpotato production across the surveyed communities has to do with limited access to planting materials (vines for planting dried up before the next year and scarcity of the vine during planting season due to lack of accessibility), high diseases and pests attacks (easy attack of disease and pest on the new variety). These constraints affect both men and women.

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

Table 20 presents the features that make individual farmers (women and men) consider a particular sweetpotato crop as good. For the interviewed females, freshness, lack of infections, medium to big size, no rottenness and well matured roots appeared to be the characteristics that show that a sweetpotato is good. The same trends were observed from the men side, except their level of

importance where some characteristics have different importance according to the sex of the farmers.

Table 20: Characteristics of a good crop (II)

Importance	Women	Men	All
1	Freshness	Freshness	Freshness
2	Lack of infection	Lack of infection	Lack of infection
3	Colour	Size of the roots	Size of the roots
4	Size of the roots	Colour	Colour
5	No rotteness	Maturity of the roots	Maturity of the roots
6	Maturity of the roots	No rotteness	No rotteness

Different perspectives of a good sweetpotato emerged. Table 21 describes the characteristics of a good quality product disaggregated by sex. During the female FGDs, easy to peel, medium yield, good gari, disease resistant and good storability in the field emerged as the characteristics that show that a sweetpotato is good. As for the men FGDs, high yield, disease resistant, high starch and good gari were cited as the most important characteristics of a good sweetpotato crop.

Table 21: Characteristics of a good crop (FGDs)

Importance	Women	Men	All
1	Easy to peel	High yield	Good gari
2	Medium yield	Disease resistant	High starch
3	Good gari	High starch	High yield
4	Disease resistant	Good gari	Disease resistant
5	Storability in the field		Storability
6			

Table 22: Most important crop characteristics in order of preference

Importance	Men's focus groups	Women's focus groups	X region	X region
1	✓ <i>Marketability (Having industrial usage)</i>	✓ Highly acceptable for market	Araromi	
2	✓ <i>Low sugar content like yam</i>	✓ Yield much (High yielding)		
3	✓ <i>If it is storable like yam</i>	✓ Not too sugary sweet		
1	✓ Smoothness (When it is smooth, it will have no holes, no crack, it will be fresh)	✓ No rope inside ✓ Smooth and fresh ✓ No too much "oje"-3rd	Omido	
2	✓ Pest Free: No signs of insects/weevils on it			
3	✓ Not having thread like strands ("okun") in it when cut open			
1	✓ Sweet sugary	✓ When it is hard	Igosun	
2	✓ Can be eaten raw			

Importance	Men's focus groups	Women's focus groups	X region	X region
3	✓ High productivity	✓ When it is fresh and shinning (When it has no hole & insect) ✓ When it is not smelling ('Ti ko ba ju)		
1	✓ No rope inside -1st	✓ Smoothness: (no wrinkles, no cracks, no termites)	Onila	
2	✓ Smooth and fresh	✓ Not smelling - there is no holes and small insects like worms in it, not rotten		
3	✓ No too much "oje"	✓ weighty: it should be big and heavy		

3.2.6 Uses of the Crop

In all the eight focus group discussions both male and female asserted that leaves and peels of sweetpotato are used as animal feed (Table 23). Men and women in Araromi, Igosun and Onila opined that the leaves are source of soup. Only Araromi male FGD said the leaves are source of fertilizer.

Table 23: Summary table of products and important characteristics (FGD)

Products	Uses
Leaves	For livestock feeds by all FGDs (Male and female in all communities of study) For soup/edible vegetables (Araromi, Igosun, and Onila male and female FGDs) As source of fertilizer (Araromi Male FGD)
Peels	For animal feed by all FGDs (male and female in all the eight communities)
Vines	As planting material for all (Male and Female)
Roots	For elubo (sweetpotato flour) in making "amala" For fried sweetpotato For boiled sweetpotato For pounded sweetpotato when mixed with yam (All FGDs male and female)

The characteristics of sweetpotato products desired by individual men and women are presented in Table 24. The table shows that a substantial proportion of both men and women prefer a moderately sweet final product. Flavour was not mentioned by women whilst only a small proportion of men considered colour.

Table 24: Frequency of citations of groups that sweetpotato products were mentioned as important by sex and region (II)

		Male N=36	Female N=20	Total N=56
Cooking with beans	No infection		100.00%	100.00%
Biscuits	Sweetness	100.00%		100.00%
Boiled	Appearance- It is attractive	28.60%	0.00%	20.00%
	free from pest and diseases.	14.30%	0.00%	10.00%
	FRESH	14.30%	0.00%	10.00%

		Male N=36	Female N=20	Total N=56
	It gives Vitamin	0.00%	33.30%	10.00%
	NO INFECTION	28.60%	33.30%	30.00%
	not rotten	0.00%	33.30%	10.00%
	Very sweet	14.30%	0.00%	10.00%
Boiled WITH BEANS	FRESH	50.00%	0.00%	33.30%
	NO INFECTION	50.00%	0.00%	33.30%
	not rotten	0.00%	100.00%	33.30%
chin chin	very attractive	100.00%		100.00%
		0.00%	100.00%	25.00%
Chips	Flour (dried root and mill)	33.30%	0.00%	25.00%
	Sweetness	33.30%	0.00%	25.00%
	Thinness- Because the chips is cut too thin	33.30%	0.00%	25.00%
	FRESH	100.00%	0.00%	50.00%
EATING RAW	not rotten	0.00%	100.00%	50.00%
feed farm animals			100.00%	100.00%
		14.30%	66.70%	30.00%
Flour	Appearance- It is attractive	14.30%	0.00%	10.00%
	NO INFECTION	0.00%	33.30%	10.00%
	not be rotten or soft when held by the hand	14.30%	0.00%	10.00%
	Sweetness	28.60%	0.00%	20.00%
	TASTE	14.30%	0.00%	10.00%
	The texture in the mouth is good	14.30%	0.00%	10.00%
	food for children	very attractive	100.00%	
Fried	FRESH	50.00%	0.00%	33.30%
	not be rotten or soft when held by the hand	50.00%	0.00%	33.30%
	not rotten	0.00%	100.00%	33.30%
It is used to prepare soup	flour (amele)		100.00%	100.00%
Peels - dried for feeding animals			100.00%	100.00%
PORRIDGE	Appearance- It is attractive	50.00%	0.00%	20.00%
	Because it reduces the house expenses	50.00%	0.00%	20.00%
	NO INFECTION	0.00%	33.30%	20.00%
	not rotten	0.00%	33.30%	20.00%
Pounded	Eating	0.00%	50.00%	12.50%
	NO INFECTION	16.70%	50.00%	25.00%
	Sweetness	33.30%	0.00%	25.00%
	TASTE	33.30%	0.00%	25.00%
	very attractive	16.70%	0.00%	12.50%
SELLING, EATING OF FRESH SWEETPOTATO	FRESHNESS OF THE SKIN	100.00%		100.00%
Snack	Sweetness	100.00%		100.00%

3.2.7 Labour

The II shows that processing of sweetpotato into fried and other products is a task done by women with support of boys (Table 25).

Table 25: Frequency of citations of people who conduct the (indicate: production + processing OR selling for X product) by sex and region (II)

People who produce and process the product	% of women citing N=	% of men citing N=
Men	33.34	0
Women	100	100

The raw roots are mostly sold by men and women in all the communities sampled (Table 26). Only the women in some communities sells the processed (fried) sweetpotato (men don't sell fried sweetpotato). No one sells leaves nor peels in all the communities. Vines are sometimes sold when scarce by both male and female.

Table 26: Persons responsible for processing and selling sweetpotato products (FGD)

Products	Who sells ?
Roots (fresh /raw)	Sold by male and female
Roots processed e.g. fried	Sold by female
Leaves and peels	No one sells the peels and leaves in all the communities
Vines	Usually people give it out to whoever needs it. Sometimes sold when scarce by both male and female.

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

Table 27 provides an indication of the level of independence that men and women exercise in making sweetpotato production and utilization decisions. The table shows that men exercise a higher level of independence, but still consult someone like their spouses, in all aspects related to sweetpotato production and marketing. Results suggest that women only exercising independence with regards to marketing and some independence with regards to the variety of crop to plant and the use of profits from sale of alternative products.

Table 27: Mean score of independence in decisions by sex and region (II)

	Male	Female	Total
What variety of sweetpotatoto plant	3.3	2.25	3.13
Use of crop (what product)	3.2	1.75	2.96
Marketing	3.15	3.00	3.13
Use of profits from sale of fried sweetpotato	3	2.75	2.96

*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.

Table 28: Frequency of citations of people who make decisions on sweetpotato by sex and region (II)

	Male N=34	Female N=15	Total N=49
Distant relative	2.90%	0.00%	2.00%
I make the decision myself	61.80%	73.30%	65.30%
Mummy	0.00%	6.70%	2.00%
Children	8.80%	0.00%	6.10%
Husband and Children	0.00%	6.70%	2.00%
Myself and my wife	2.90%	0.00%	2.00%
Myself, I take all the decision regarding the product	0.00%	6.70%	2.00%
Myself, wife and children	14.70%	0.00%	10.20%
Wife	8.80%	6.70%	8.20%

3.3.1 Household food budgeting

Table 29 presents the quantity of sweetpotato utilized for home consumption by sex. On the average 12.8 bags of sweetpotato are consumed in a household headed by men whilst in a households headed by women, 6.67 bags of sweetpotato are on average consumed. The proportion of the harvest for home consumption is relatively lower in a household headed by women as compared to a household headed by men.

Table 29: Quantity of harvest used for home consumption by sex and region (II)

	Women	Men
Range (bags)	6-7	1-60
Mean (bags)	6.67	12.8
% of harvest	11	22

This result suggests that sweetpotato is a more important commercial crop for men; more than 74% of the harvest is sold against 41% for women (Table 30).

Table 30: Quantity of harvest sold by sex and region(II)

Product (fresh or processed)		Women	Men
Fresh	Range (kg/t)	6-50	7-143
	Mean (kg/t)	29.67	53.81
	% of harvest	41.14	74.64

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

Discussions with individuals revealed significant changes in processing and sales of sweetpotato. As for processing, sweetpotato is nowadays being processed into many products as compared to the past, and many new production techniques have been learnt as well. In terms of sales, positive changes have also been noted such as an increase in sales.

3.4 Preparation and processing the product

There was no significant difference between the processing procedures across the communities sampled. In all the communities sampled, except Omido, women wash before peeling and still wash again after peeling. In Omido women only was after peeling. Moreover, among the men groups only Iggesund male FGD mentioned washing before peeling

Table 31 : Preparation method of fried sweetpotato

Community	Method of preparation from Male (FGD)	Method of preparation from Female (FGD)
Araromi	<ul style="list-style-type: none"> - Peeling - Washing - Slicing and - Frying 	<ul style="list-style-type: none"> - Wash first - Peel it - Wash it again - Cut it to sizes required - Add salt - Fry it
Omido	<ul style="list-style-type: none"> - Peel - Slice - Wash - Add Salt and Fry 	<ul style="list-style-type: none"> - Peeling - Slice into water - Drain excess water - Add salt and fry.
Igosun	<ul style="list-style-type: none"> Wash Peel Wash again with salt Slice it 'ferefere' Add salt to it Put it on hot oil to fry 	<ul style="list-style-type: none"> Wash Peel Wash again & drain Slice it Add salt to it and fry
Onila	<ul style="list-style-type: none"> Peel slice in water Drain excess water , add salt and fry. 	<ul style="list-style-type: none"> Wash Peel Wash Cut/slice Fry in groundnut oil

The steps for frying of sweetpotato are mostly carried out by women and girls in all the communities sampled. According to Igosun men, harvesting is done by hired labourers from Markurdi ethnic group.

The most important processing steps that can impact significantly the quality of the final products as revealed by the interviewed individuals are presented in Table 32. Washing, slicing, frying emerged as important steps that can significantly impact the quality of the final products as indicated by 26% of the interviewed individuals (29.50% of men and 16.70% of women). The peeling and cutting steps were cited by a relatively large proportion of the interviewed (11.80% of the men and 33.40% of women for the cutting steps and 17.70% of men and 16.70% of women for the peeling steps)

Table 32: The most important processing steps to obtain a higher quality fried sweetpotato cited by sex and gender(II)

The most important processing steps to obtain a higher quality	Male N=17	Female N=6	Total N=23
Cutting	11.80%	33.40%	17.20%
Peeling	17.70%	16.70%	17.20%
High heat when frying	0.00%	16.70%	4.30%
It must not stay in the water for long after slicing for frying	11.80%	0.00%	8.60%
SLICING	5.90%	16.70%	8.60%
PUTTING IN THE RIGHT AMOUNT OF SALT	5.90%	0.00%	4.30%
THE OIL FOR FRYING MAY BE VERY HOT OR THE POTATO WILL DRINK OIL	5.90%	0.00%	4.30%
Washing, peeling, slicing, frying	29.50%	16.70%	26.00%

Processing resources and access

Required resources are: knife, bowl, sieve, frying pan/pot, bowl, vegetable oil/palm oil. Women in the communities sampled had access to most of the resources, especially the fixed ones (knife, sieve, bowl, pot etc), but there were times they did not have vegetable oil, hence, they used palm oil when vegetable oil was not available to fry sweetpotato.

Peeler, fryer and buckets are the key cooking utensils required for frying sweetpotato in the study regions as indicated in Table 33. Data analysis showed that women generally borrow bucket they used from their husband and peeler and fryer of their husbands who are unlikely to demand it during a divorce. As for men, data showed that the peeler and fryer used are borrowed from the spouses, and the bucket too. For the latter, their spouses are unlikely to demand it during a divorce.

Table 33: Mean score of access (1-4*)to equipment or utensils required for processing the crop into the product by sex, region and ethnicity

Equipment or utensils required for processing the crop into the product	Mean score of access 1-4*					
	Women	Men	Region X	Region Y	Yoruba	Ethnic minority
Peeler	2.3	4				
Fryer	2.0	4				
Bucket	4.0	2.1				

*Legend

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

3.5 Consumption of the product

There was no difference in what communities consume their sweetpotato with (Table 34). It depends on what is available at the household level. "We eat it with what is available per time" (Igosun woman). There is no difference by gender in what it is consumed with.

Table 34: What fried sweetpotato is consumed with

Communities	Product consumed with from Male FGD	Product consumed with from Female FGD
Araromi	Egg, bean and fried pepper (stew) etc	Beans, stew, egg and tea
Omido	Stew One can eat it without anything	Atadindin" (fried pepper/stew) plus onion, pap from corn, rice (cooked rice), fried egg and bean
Igosun	Beans, gari, and pap	Beans, gari, pap and any other thing, depending on what is available
Onila	Atadindin plus onion (fry pepper) pap from corn Rice (cooked rice) Fried egg Beans	Fried stew can be eaten plain

3.6 Product characteristics

The quality characteristics of a final product depends on the quality characteristics of the crop (raw material) and the processing ability of the crop. You may distinguish the raw final product just after processing (for example raw gari e.g. dry gari) and the final product ready to eat (for example gari cooked into eba or gari added with water and peanuts).

In the supportive text, write a summary description of the characteristics that were mentioned by the respondents by gender, region, and other important factors of social difference (e.g. ethnicity, age). What were the types of characteristics that were important for women, men and other groups?

Compare the findings to the FGD responses. What is similar and what is different? Why may there be differences? You can summarise the characteristics mentioned in the FGD by sex and region in tables, and compare to the II. The FGD may also reveal very important information about why these characteristics are important for certain people, or a richer description of the characteristics. These can be used to add detail to this section.

Importantly, you may also want to a paragraph about your assessment of what characteristics are important based on the constraints, access to resources etc, that farmers and processors experience. Just make sure that you add that this is your opinion and what evidence it is based on. Add quotes to illustrate findings.

This assessment is very important, as it will help guide the work of Work Package 2, and eventually, what characteristics are added into new varieties. Therefore if there are particular characteristics that are important for specific groups, such as women or an ethnic minority, please highlight this in the text so we ensure that different needs are reflected in our RTBfoods work.

Relevant questions are:

Raw Material (Crop for the product)

II questions:

***In your opinion, what variety(ies) give the highest quality [product under study]? Why? Facilitator to note if these varieties are different then the varieties they grow” (Q14), or what was stated by the FGD the previous day. II Q19.**

The II data shows that the varieties that give a high quality sweetpotato product include Alausa and Pakuruma “tiwantiwan”. Alausa is said to give a good fired sweetpotato because it is sweet and not too sugary sweet, it is satisfying in the mouth, and is fresh and smooth. As for Pakuruma “tiwantiwan”, it is common (pojuloja), it is big size, it is not too sugary, it is smooth, if not gbakugbaku, and is easy to peel

***If you were to purchase the crop on the market to make the product, how do you recognise and perceive a good crop variety for making a high-quality [product]? By looking at it, by touching, smelling or by tasting it? Rank in order of importance 1=most important. Note for use for pairwise ranking exercise. II Q20.**

What are characteristics of a variety of the crop that give a poor quality [product under study] so that you would not use or buy it? II Q21.

Table 35: Summary of poor quality raw material characteristics (II)

Rank/Importance	Poor quality raw material characteristics
1	Not fresh
2	Not big in size
3	Rotten (too soft)
4	Wrinkle

FGD questions:

*Thinking about when you harvest the crop or purchase the crop on the market to make the product, how do you recognise when the crop will make a good, high quality [product under study]? What are the characteristics? Rank in order of importance 1=most important. Note for use for pairwise ranking exercise. FGD Q10.

*How do you recognise a bad crop variety for the [product under study]? What are the characteristics? Has your community experienced this before? Please describe. FGD Q 11.

Through the colour (orange flesh and skin)

Processing (revise as applicable to your product)

II questions:

*Thinking about when you process the [crop], what would be the characteristics that show it has good processing-ability into [product]? Rank in order of importance 1=most important. Note for use for pairwise ranking exercise. II Q23.

Table 36: Summary of good processing characteristics (II)

Rank/Importance	Good processing characteristics
1	Colour (bright brown colour)
2	The taste, in mouth (sweet like sugar but not too sugar-sugar)
3	The texture in mouth (to make krin –krin in mouth)
4	The aroma, when it smells fresh and fine

*When buying or selling the product (after processing the product), what are the essential and most important characteristics required for a high quality product? By looking at it, by touching, smelling or by tasting it? Rank in order of importance 1=most important. Note for use for pairwise ranking exercise. II Q24.

Table 37: Summary of good product characteristics (II)

Rank/Importance	Good product characteristics
1	Colour (bright brown colour)
2	Taste in mouth (sweet like sugar but not too sugar-sugar)
3	Texture in mouth (to make <i>krin</i> – <i>krin</i> in mouth)
4	Aroma, when it smells fresh and fine

What are the quality characteristics that would influence, your decision or a customer's decision, not to buy or use the [product under study]? Why? II Q24.1

Table 38: Summary of poor quality product characteristics (II)

Rank/Importance	Poor quality raw material characteristics
1	The taste is <i>koro</i> (bitter) because is not well fried it burnt
2	It does not have characteristics smell of fried sweet potato
3	The colour is not attractive
4	

Pairwise for characteristics (see appendix A). Facilitator to collect the most important top six characteristics from Q20, 23, 24. II Q25.

Discussions with individuals showed that a fried sweetpotato of a good quality must be moderately soft (not too hard and not too soft at hand), stay long (does not spoil quickly after frying), have good

appearance (must be attractive to the eye, must not become black after a while), and shouldn't change colour and taste when in the mouth

FGD questions:

***Thinking about when you process the [crop], what would be the characteristics that show it has good processing-ability into [product] at each stage of processing? Rank in order of importance 1=most important. Note for use for pairwise ranking exercise. FGD Q14.**

Pairwise for raw material and processing characteristics (see appendix A). Facilitator to collect the community's most important top six characteristics from Q10 and Q14. FGD Q15.

The FGDs revealed that the sweetpotato roots that are smooth (not "gbakugbakun" not cracked, no holes) and free of weevils, have no wrinkles and no fibre within like thread have a good processing/frying ability. Also roots that do not taste as sugar have a good processing/frying ability.

Table 39: Summary of good raw material and processing characteristics (FGD)

Raw materials characteristics	Processing characteristics
Smooth (not "gbakugbakun" not cracked, no holes)	Freshness when fried
Free of weevils	Not wrinkled
No wrinkles	Well-cooked within
The taste is not too sweet as sugar	Good taste in the mouth – not too sweet
Not having fibre within like thread	Dry but not too dry, it should feel like yam in the mouth
When it does not smell offensively	Not having thread like feeling in the mouth and not scatter (pototo)

Ranking	Important Characteristics
1	Smoothness
2	No insect
3	Easy to peel (No cracks)
4	Store for long
5	Big size
6	Availability of the sweet potato

Final product (raw or ready to eat final product) characteristics

FGD questions:

***What is a high quality final [product]? What are the characteristics? Rank in order of importance. Note for use for pairwise ranking exercise. FGD Q17.**

Pairwise for final product characteristics (see appendix A). Facilitator to collect the community's most important top six characteristics from Q17. FGD Q18.

The characteristics of a good quality fried sweetpotato were also discussed during the FGDs. Results showed that mealiness (i.e. ability not to scatter (pototo) and not having thread like feeling in the mouth), moderate outer dryness(i.e. dry but not too dry - it should feel like yam in the mouth), freshness when fried, and tasty are the characteristics that make a quality fried sweetpotato (i.e. the final product)

4 FINDINGS: MARKET STUDY

4.1 Sample information

Majority of the interviewed traders in Kwara state was female (about 55%), except in Omido and Araromi communities where 75 and 50% of the interviewed were males (Table 40). Their average age was 46 years with the maximum average age being observed in Igosun (59 years) and the minimum in Oro (37 years). Majority of the sample is Yoruba (About 67% versus 9.5% of Ausa and Falani, respectively, 8.6% being Gara, and 5.715 of Benue). The average household size was 9 persons. The interviewed traders have 15 years of trading experience, and about 4 years of formal education. About 57% of these traders own means of transportation. Motorbikes constitute the main means of transportation owned. They all possess means of communication, except one of the interviewed traders in Onila community. Only 57% of these traders think that road to their nearest town is in good conditions. On average, the distance to the nearest market from trader's home is about 6 km. Sweetpotato ranks second as one of the main crops the traders are dealing with. Yam comes first, okra as the third crop traded by the interviewed traders.

Table 40: Background information on sample

	OMIDO	ARAROMI	Igosun	Owode Market	Onila Aladura	ORO Market	Mile 12, Lagos
Gender – Male	75.00%	50.00%	33.33%	40.00%	20.00%	0.00%	100.00%
Age in years	38	57	59	45	38	37	50
Ethnicity							
Yoruba	100%	100%	100%	40%	60%	67%	
Gara				60%			
Fulani						33%	33%
Ausa							67%
Benue					40%		
HHsize	8	7.5	7.6	8	9.8	5.33	14
Experience in years	8.25	8	17.6	15.6	10.4	14	29.33
Education in years	5	3	3.33	5.25	5	1.67	5
Ownership of means transportation	Yes (100%)	Yes (100%)	Yes (60%)	Yes (40%)	No	No	Yes (100%)
(If yes, type)	motorbikes	motorbikes	motorbikes and 1 car	motorbikes			Motorbikes and cars
Ownership of means of communication	Yes	Yes	Yes	Yes	Yes (80%)	Yes	Yes
(If yes, type)	Not android	Not android	Not android	Not android	Not android	Not android	Android
Road to nearest town is good (Y/N)	No	Yes	No	Yes	No	Yes	Yes
Distance to market from the home (in km)	2	5	0.5	3.5	26	7	0.75
Main occupation	1	1	1	1	1	1	1
(Specify)							
Crops person is dealing with (indicate main crops or products)		Sweetpotatoes, okra, pepper, cassava, yam	Cashez nut; Yam; Sweetpotato, Maize; Rice; Groundnut; Gari- Pepper – Beans –Plantain – Orange	SP,yam, maize Guinea corn – Cashew nut – rice (ofada)	SP – yam – pepper – cashew nut – tomato – okra – gari – cassava	Sweetpotato – tomatoes – pepper – okra	Sweetpotato, Yam

4.2 The value chain

***What are the major locations where sweetpotato is grown and marketed?**

Agbamu was ranked first among the state main areas of production, followed by Omido, and Igosun (Table 41). Onila / Ajoko and Ajengbe were ranked as the 4th and 5th main production areas in the state, respectively. Regarding the location where the sweetpotato is marketed, Offa was cited as the 1st major marketed location, followed by gbamu, Igosun, and Lagos. Oro / Ganmo were ranked as the 5th location where sweetpotato is marketed.

Table 41: Major locations where sweetpotato is grown and marketed

Rank	Major locations where sweetpotato is grown	Major locations where sweetpotato is marketed
1	Agbamu	Offa
2	Omido	Agbamu
3	Igosun	Igosun
4	Onila / Ajoko	Lagos
5	Ajengbe	Oro / Ganmo
6	Oro	

What is the proportion (percentage) of the crop kept by the farmer for home consumption and what is sold by farmers, and to which markets in (MI Q9 (first), Q16 (Nigeria)

- Fresh form
- Processed form: [product]
- Processed form: other products from the crop

And

MI Q10 (first), Q17 (Nigeria) What is the proportion (percentage) of the crop consumed in urban areas around the market you are situated; in: Fresh form, Processed form: [what product], Processed form: alternative products from the crop.

The proportions of the crop consumed and that is situated in fresh form, and in processed forms are discussed. Sweetpotato roots are most commonly consumed in fried form: 45% of the total sweetpotato consumed in rural area, 42.5% in towns, and 75% in urban areas (Table 42). It is also transformed into flour to make “amala”, and consumed boiled. Part of the sweetpotato is also transformed into other products like “kunu”, “asaro”, “chinchin”, and cooked with beans (Figure 1).

Table 42: Proportion (%) of crop used in fresh and processed forms

	Processed forms	Percentage (%)
Rural level	Boiled form	10.5
	Fried SP	45
	pounded SP	22.5
	SP flour	16.25
	SP mix-cooked with beans	2.5
	Asaro porridge	1.5
	Kunu	0.5
	Chinchin	1.25
Town level	Boiled form	35

	Processed forms	Percentage (%)
	Fried SP	42.5
	SP flour	10
	SP mix-cooked with beans	2.5
	Asaro porridge	5
	Chips	5
Urban level	Boiled form	10
	Fried SP	75
	SP flour	10
	Chips	5

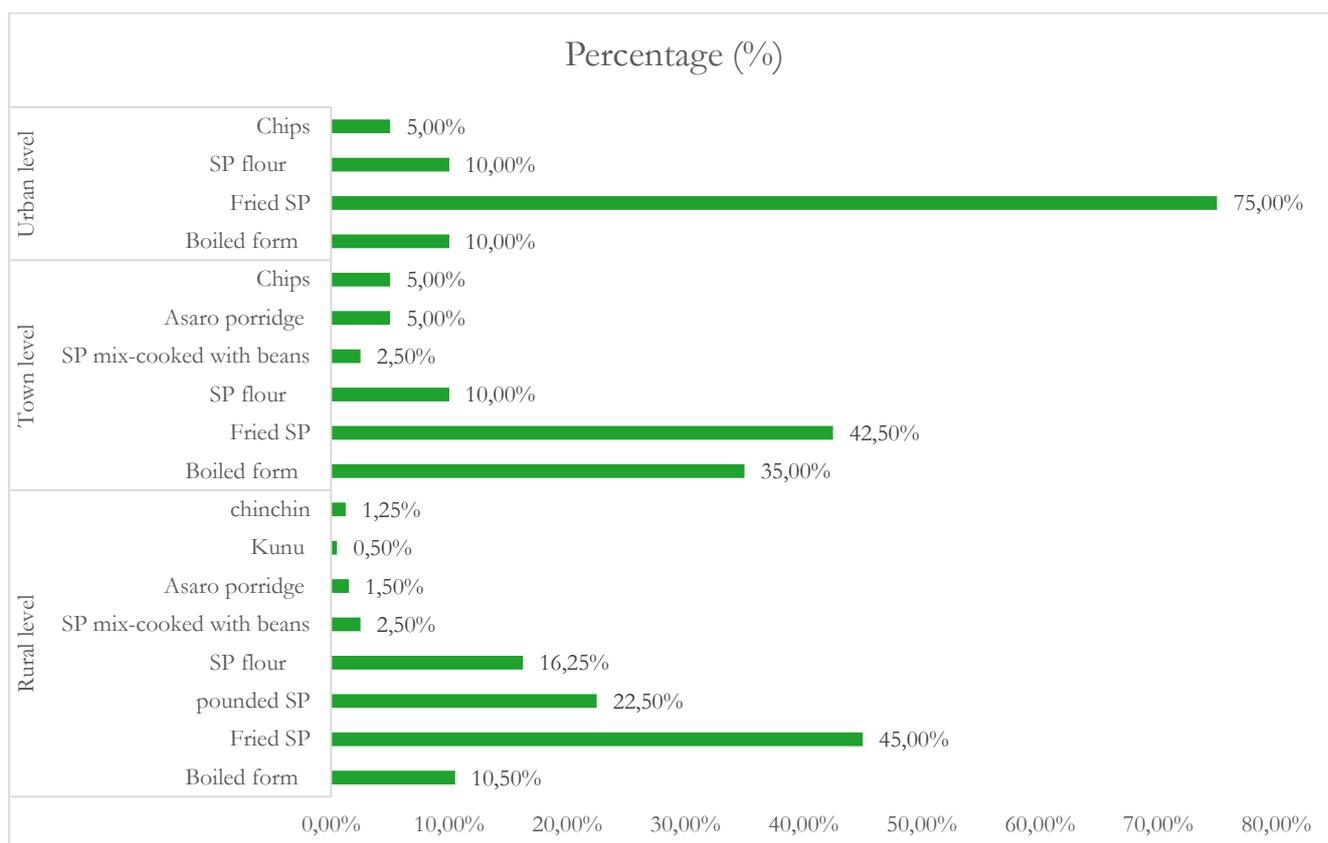


Figure 1: Other processed forms of sweetpotato

***What are the major locations where the sweetpotato is processed and marketed?**

Sweetpotato in Kwara is majorly processed in Oro, followed by Offa, Agbamu. The interviewed traders also ranked Ajase / Ijagbo / Igosun / Lagos as the 4th locations where sweetpotato is predominantly processed, and Arandun / Erinle / Ilorin / Kaduna as the 5th locations. Regarding the location where the processed sweetpotato is marketed, Oro and Offa were cited as the 1st and 2nd major marketed locations, respectively. Igosun / Ajase / Lagos were ranked as the 3rd location where the processed sweetpotato is marketed.

Table 43: Major locations where sweetpotato is processed and marketed

Rank	Major locations where the [product] is processed	Major locations where the processed product is marketed
1	Oro	Oro
2	Offa	Offa
3	Agbamu	Igosun / Ajase / Lagos
4	Ajase / Ijagbo / Igosun / Lagos	Arandun / Ijagbo / Owode / Kaduna

Rank	Major locations where the [product] is processed	Major locations where the processed product is marketed
5	Arandun / Erinle / Ilorin / Kaduna	Erinle / Omido / Kanu /
6	Ilemonan / Owode / Omido / Kanu	Gnamo / Ilemonan / Agbamu / Zanfara / Sokoto

***What are the demand segments associated with fried sweetpotato? (at the applicable level, i.e. community, processing site, city)?**

From discussions with traders, three demand segments were constantly mentioned: retail segment cited by all the participants to the discussions, wholesale and community segments by 86% and 57% of them respectively (Table 44).

Table 44: Demand segments associated with sweetpotato

Demand segments	Percentage of citations
community level	57.14%
wholesaler market	85.71%
retail market	100.00%

***What are the demographics of the customer groups / buyers of [product]? e.g. female customers, male customers, youth, high-end restaurants, wealth categories) MI Q22 (first questionnaire), Q30 (revised Nigeria)**

Customers were in majority female (77% of them) and elders (65%) (Table 45 and 46). Sweetpotato is mostly consumed by poor and middle class households (45% and 40% respectively). About 15% of those consuming sweetpotato are from rich households, with this proportion being highest in urban areas (20% of consumers being rich in urban areas against 10% in community market and 15% in retail market). Market segments predominantly served are market-specific. While fryers represent the major market segment served by retailers (44% of the market segments), community traders sell predominantly to wholesalers (49% of their market segments), and wholesalers sell mostly to retailers (33% of their market segments) and other urban wholesalers (26% of the market segments). In all, community traders sell predominantly to wholesalers who in turn sell their major product to retailers. Retailers sell predominantly to fryers.

Table 45: Demographics of the customer groups/buyers of sweetpotato

		Wholesaler market	Community level	Retailer market
Gender customers (%)	Male	23.17	22.25	22.714
	Female	76.83	77.75	77.286
Youth(%)		37.00	36.25	32.14
Elders (%)		63.00	63.75	67.86
Wealth categories (%)	Rich (%)	20.00	10.00	15.000
	Intermediary (%)	50.00	40.00	45.000
	Poor (%)	30.00	50.00	40.000
Market segments(%)	High-end restaurants (%)	2.14	0.00	0.000
	Wholesaler	26.00	49.00	24.400
	Retailers	32.67	19.00	14.667
	Home consumption	18.19	8.00	16.500
	Fryers	21.00	24.00	44.433

***What are these customers demanding(e.g. what crop characteristics are they interested in?) MI Q23 (first), Q31 (Nigeria)**

Discussions with the participants showed that customers' preferences do not vary according to market segments but along with usages (Table 46). In general, customers in different market segments prefer sweetpotato varieties with yellow skin and yellow flesh, followed by white skin and yellow flesh varieties. In terms of sweetpotato attributes, they prefer roots that are

- clean: No “kokoro”, no holes, without “green” colour points as sign of diseases / weevils
- fresh (fine, good to look at; no marks, no holes on roots),
- medium and/or big in size
- can be stored for longer
- Sweet : they like just the way the roots are

Frying customers prefer sweetpotato that would still keep its attractive colour after being fried, consume less oil while frying, and that would get dried very well after frying.

For boiling purpose, customers prefer sweetpotato that would behave like yam in mouth after being boiled (Like yam in your mouth when boiled)

Table 46: Customer groups buying the product and demand preferences

Level and/or demand segment	Demographics of the customer groups / buyers of [product]	Description of what are these customers demanding
Community level :	<p>Gender:22.25% Male and 77.75% Female</p> <p>Buyers' categories: 0% high-end restaurants, 49% Wholesaler, 19% Retailers,8% home consumption, and 24% fryers</p> <p>Wealth categories (income class): 10% Rich, 40% Intermediary (middle income class), and 50% Poor</p> <p>36.25% Youth and 63.75% Elders</p>	<p>These customers demand yellow skin and yellow flesh varieties, followed by white skin and yellow flesh varieties.</p> <p>In terms of sweetpotato attributes, they prefer roots that are</p> <ul style="list-style-type: none"> - fresh (fine, good to look at; no marks, no holes on roots), - medium and/or big in size (small size makes peeling difficult. Those who use for chinchin have companies so don't want small size because of their machines) - behave like yam in mouth after boiling it (Like yam in your mouth when boiled) - can be stored for longer: Storage capability/potential (can be stored over long period of time, like at least 2 weeks without get spoiled) - Sweet : they like just the way the roots are <p>customers in this market segment also prefer sweetpotato with short cycle</p>
Wholesale market:	<p>Gender: 23.17% Male and 76.84% Female</p> <p>Buyers' categories: 2.14% high-end restaurants, 26% Wholesaler, 32.67% Retailers,</p>	<p>In terms of sweetpotato attributes, they prefer roots that are</p> <ul style="list-style-type: none"> - clean of the root: No “kokoro”, no holes - without “green” colour point– sign of diseases / weevils

Level and/or demand segment	Demographics of the customer groups / buyers of [product]	Description of what are these customers demanding
Retail market :	<p>18.19% homme consumption, and 21% fryers</p> <p>Wealth categories (income class): 20% Rich, 50% Intermediary (middle income class), and 30% Poor</p> <p>37% Youth and 63% Elders</p> <p>Gender:22.71% Male and 77.29% Female</p> <p>Buyers' categories: 0% high-end restaurants, 24.40% Wholesaler, 14.67% Retailers, 16.50% homme consumption, and 44.43% fryers</p> <p>Wealth categories (income class): 15% Rich, 45% Intermediary (middle income class), and 40% Poor</p> <p>32.14% Youth and 67.86% Elders</p>	<ul style="list-style-type: none"> - fresh (not roots that get old – roots harvested the same day), - medium and/or big in size (size also depends on price. When the price goes up, customers prefer medium size; and vice-versa) - behave like yam in mouth after boiling it (Like yam in your mouth when boiled) - Sweet : not at sugar level but sweet - can be stored for longer: Storage capability/potential (can be stored over long period of time, like at least 2 weeks without get spoiled) <p>Customers in this market segment ask for yellow skin and yellow flesh varieties, followed by white skin and yellow flesh varieties</p> <p>They also prefer roots that are</p> <ul style="list-style-type: none"> - cheap: not too expensive - “good/nice” shape: “straight”; when it is straight, it eases peeling activities according to fryers - can be stored for longer: Storage capability/potential (can be stored over long period of time, like at least 2 weeks without get spoiled) - after boiling it (Like yam in your mouth when boiled) - Sweet : children like just the way the roots are

4.3 Characteristics for a high-quality crop

Ranking of characteristics for a high-quality sweetpotato per demand segment (MI Q24 original questionnaire, Q32 revised Nigeria)

Discussions with traders showed that absence of diseases and weevils visible on the root skin was ranked the most important characteristic of a high-quality sweetpotato in all the study areas, which was followed by firmness (Table 47). High yield, size of the root and freshness were ranked 3rd, 4th, and 5th important characteristics of high-quality sweetpotato, respectively. Storage capability was ranked 6th important characteristics of high-quality sweetpotato.

Table 47: Characteristics of a high-quality crop

Rank	Characteristic	Indicators used for ranking crop characteristics and demand segment they are important for
1	Absence of diseases and weevils visible on the root skin	Attractiveness of the root: how attractive is the root / how root looks like – Absence / presence of green spot on the root / holes
2	Firmness	Firmness of roots after boiling/frying: cooking/frying attributes
3	High yield	Yield level: low to high
4	Size of the root	Size of the root: small to big/huge
5	Freshness	Freshness: how root looks like, does it look like a root just harvested or a root harvested days ago?
6	Storage capability	Number of weeks
7	Low consumption of oil when frying	Oil consumption level while frying: low to high
8	Sweetness: sweet just the way it is – not like sugar	
9	Root shape	Form / shape of the root – straightness: straight / bend
10	Mealiness	

4.4 Proportion of the crop consumed and sold

***Proportion of the crop consumed by farmers and sold to different customer groups (in percentages) (MI Q13 original questionnaire, Q20 revised Nigeria)**

Sweetpotato is predominantly sold to household consumers in urban areas / cities (about 63% of the roots sold), followed by fryers/food vendors (23% of the total roots sold) (Figure 2). Rural consumption represents only 12% of the total transactions by the interviewed traders in the study areas. The quantity of sweetpotato sold to institutions (hospitals and/or schools) and restaurants is still quite limited (less than 2% of the total roots transacted, respectively).

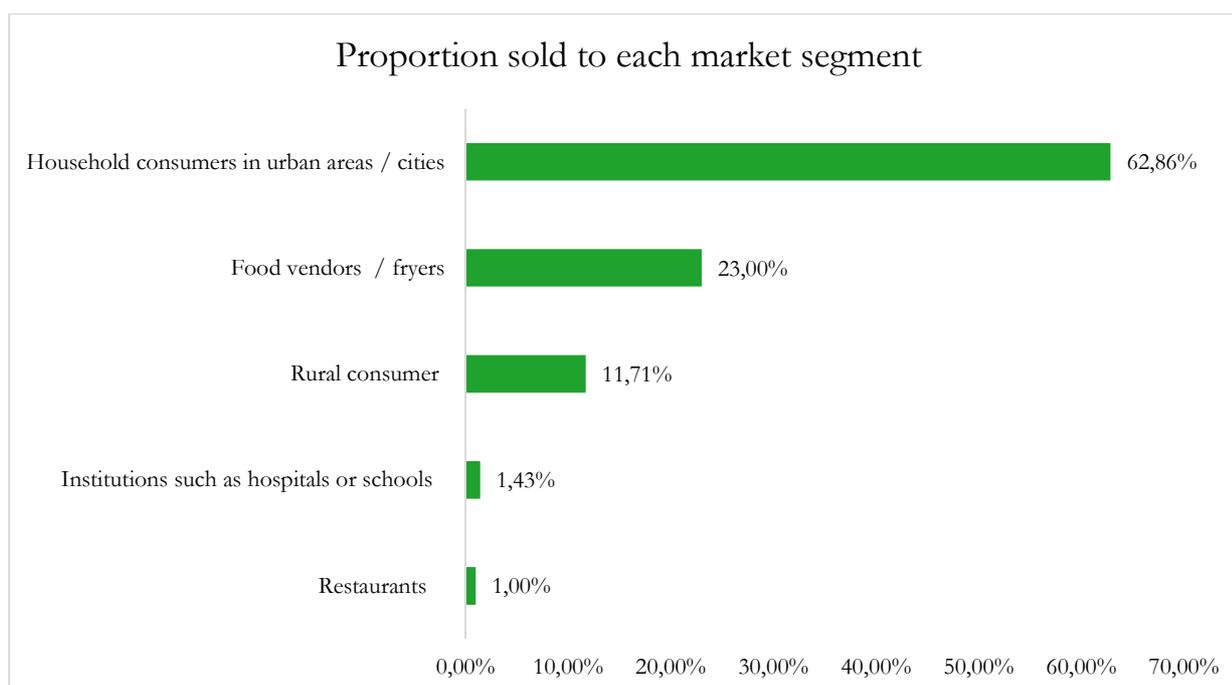


Figure 2 : Proportion sold to each market segment

4.5 Consumption patterns of different consumer groups

Consumption patterns of different consumer groups (Q21 Nigeria) This question may not be in each questionnaire.

Sweetpotato is predominantly consumed in urban zones (70 to 80% of the quantity sold against 20 – 30% of the quantity sold been consumed in rural areas) (Table 48). In addition, the two zones also differ in their preferences for sweetpotato attributes. While consumers in rural areas can accept any type of sweetpotato, consumers in cities and urban areas look mostly for roots that, at the first hands, look fine, fresh, are at least of medium size if not big, have desirable cooking and frying attributes, and roots that can be stored for long.

Table 48 Consumption patterns of different consumer groups

Consumer groups (adapt as necessary)	Rural areas	Urban areas
Quantity consumed	20 – 30% of the quantity sold	70 to 80% of the quantity sold e.g., Consumers in urban areas (like Lagos) consume more of SP than consumers from any other parts of the country because of its high population
Quality / type of roots accepted / preferred	Rural consumers accept/take whatever roots, urban consumers look for roots that look fine, good	Urban consumers like at least medium size root and big size

4.6 Variations of the product

What are the different variations of [the product]? e.g. varieties, processing key steps, processing parameters, quality differences of the pre-processed and the final products. The information is based on frequency of replies. (MI Q14 original questionnaire, Q22 revised Nigeria)

Summarise the variations of the product as described in the interviews. Indicate if the variations are linked to crop varieties, processing parameters, and if these results in quality differences of the pre-processed and the final products. Highlight differences by region, ethnicity or gender. Add quotes to illustrate.

What are the different varieties/types of the crop demanded? (this may not in each questionnaire)

Discussions with traders showed that white-agric (also named Alausa in some communities with white skin and yellow flesh) is ranked the most demanded sweetpotato variety in the study markets (Table 49). The reasons being white-agric has appreciable cooking and frying attributes and its roots are “straight” so easy to peel. “Anamo yellow” (skin: yellow and flesh: yellow) was cited as the second mostly demanded sweetpotato variety, followed by red-agric (skin: Red and flesh: white). The variety “vitamin A” (skin: orange flesh: orange) was ranked 4th important variety demanded by markets. Some characteristics of the “vitamin A” varieties have not been attractive to consumers, e.g. It is

never gets dried when frying, it gets too soft when boiled and easily gets soaked in hot water (during the boiling process).

Table 49 Varieties/types of crop demanded

Variety / types of the crop demanded	Order of importance	Reasons why this variety is demanded
White-agric (also named Alausa in some communities) Skin: White Flesh: Yellow	1	That is what consumer like, because it is not too sweet (sweet like sugar). Good for mixing up with yam (to do pounded SP+yam) because of it flesh yellow. When fried, the colour of fried SP is very attractive and fryers said it does not consume oil when frying. It gets dried very well after frying – When cooked/boiled, it is not too soft. Roots are “straight” (root shape) so easy to peel. Can be harvested already after 3 months. It is the most demanded now by clients
Anamo yellow Skin: Yellow Flesh: Yellow	2	When boiled, good firm / strong (whether hot or cold)
Red-agric Skin: Red Flesh: White	3	It is very sweet like pure sugar. it consumes oil when frying. Abandoned because of its sweetness which people, men and women thing causes pile, and because its long cycle duration: around 5 months before harvesting it. It is no longer demanded by customers/clients; so no markets nowadays for it. In terms of peeling, it is not easy to peel because roots have round (not straight) forms. Only for home consumption. Farmers eat them at home when it is produced; sometimes, when we go buy, they give some to us as gifts
Vitamin A / Skin: Orange Flesh: Orange	4	Is not well knows in the communities here and around. Too soft when boiled. When fried, it is not appreciated by consumer; it never gets dried (well as this yellow one) never. Not strong/firmed when boiled. It easily gets soaked in hot water (boiling process). After frying too, it becomes soft. We prefer eating it like carrot or do chinchin with
Aregbe Skin: White Flesh: Scream	5	
Elewe-eye Skin: Pink Flesh: Yellow	6	It consumes oil a lot. Need to be checked every time when cooking it to avoid having boiled SP that is too soft

4.7 Quantities of the crop and product traded

Quantities of the crop and product traded (during a year ; specify from when to when) (MI Q15 original questionnaire, Q23 revised Nigeria)

Table 50 shows the variability of sweetpotato sales. The quantity transacted per week varies according to season and marketing zones. In rural areas and cities, the average quantity of sweetpotato sold by traders during the wet season roughly tripled that of the dry season, which is about 80% and 356% more compared to the quantity of sales during the dry season in rural areas and cities, respectively. In contrast, the quantity of sales in urban areas was higher in the dry season than in the wet season (43% more compared to the quantity of sales during the wet season). The

reason being urban area is generally the converging area for the large part of the produce from production zones.

Table 50: Statistics for quantity of sweet potato trade weekly

Season		Rural areas	Town	Urban areas	Unit
Dry season	Minimum	8.67	4.50	1700.00	Bags / week
	Maximum	19.67	8.00	3400.00	Bags / week
	Mean	14.17	6.25	2550.00	Bags / week
Wet season	Minimum	9.33	19.50	1190.00	Bags / week
	Maximum	41.67	37.50	1700.00	Bags / week
	Mean	25.50	28.50	1445.00	Bags / week
All	Minimum	10.75	4.50	1190.00	Bags / week
	Maximum	47.50	37.50	3400.00	Bags / week
	Mean	29.13	21.00	2295.00	Bags / week

What is the daily throughput/amount traded daily in market of the product (in kg or tonnes), taking seasonality into account? This can only be done for market where the trader(s) are based.(MI Q16 original questionnaire, Q24 revised Nigeria)

The daily quantity of sweetpotato sold is higher during school period, followed by festive periods like Christmas, Sallah; suggesting that these are the peak periods for sweetpotato sales (Table 51). The planting period is the bottommost period for sweetpotato sales according the interviewed traders.

Table 51: Daily throughput/amount traded daily (bags)

Season/period		Rural areas	Town	Urban areas	Unit
wet seasons	Minimum	2.13	5.00	1190.00	Bags / day
	Maximum	6.25	9.50	1700.00	Bags / day
	Mean	4.19	7.25	1445.00	Bags / day
dry seasons	Minimum	0.88	0.75	1700.00	Bags / day
	Maximum	2.63	1.50	3400.00	Bags / day
	Mean	1.75	1.13	2550.00	Bags / day
planting time	Minimum	1.17	0.50	850.00	Bags / day
	Maximum	2.58	1.00	850.00	Bags / day
	Mean	1.88	0.75	850.00	Bags / day
festive periods	Minimum	3.75	20.00	3740.00	Bags / day
	Maximum	6.88	20.00	3740.00	Bags / day
	Mean	5.31	20.00	3740.00	Bags / day
time of school fees	Minimum	8.33	20.00	2040.00	Bags / day
	Maximum	11.33	40.00	2040.00	Bags / day
	Mean	9.83	30.00	2040.00	Bags / day

4.8 Transport, storage, and means of selling the crop

Transport, storage, and means of selling the crop (MI Q17 original questionnaire, Q25 revised Nigeria)

***What are the important characteristics of the crop associated with product transportation, storage and sale?(MI Q18 original questionnaire), OR During crop/product transportation, storage and sale, what are important characteristics that might affect the product? (Q26 revised Nigeria)**

Traders reportedly use motorbikes, car/truck as transportation means of sweetpotato roots purchasing zones to markets (Table 52). Roots are generally kept in bags and left in shops or under trees (if any) and/or covered with other bags/sacs.

Table 52 Means of transportations Daily throughput/amount traded daily (kg or tonnes) in xx Market (specify which market)

	Means	Important characteristics of the crop associated with product transportation, storage and sale OR Important characteristics that may affect the product
Transportation	Pick-up; bus/car; motorbikes	<ul style="list-style-type: none"> - Lack of air: if no air ventilation - Uprooting activities: roots that get marks from uprooting with hoe - Unloading/offloading activities - Sun light - Green colour on roots (due to leaving roots on ground after harvesting and for many weeks/months)
Storage	<ul style="list-style-type: none"> - Roots left in bags under trees - roots in bags and in shops - roots in bags and covered with other bags/sacs to avoid sun light 	<ul style="list-style-type: none"> - Sweetpotato cultivated with fertilizers - Sun light on roots will make root get spoiled quickly - Heat when roots are stored in bags / lack of ventilation - Animals
Means and forms of sales	<ul style="list-style-type: none"> - Sold in bags; sometimes in basins - In bunches : 4-8 roots per bunch 	<ul style="list-style-type: none"> - Heat when exposed to the sun light - When buyers carry up and down roots, checking up and down, not placing down the way it is supposed to be (treating roots without care)

Drivers of change

Drivers of change in terms of demand for crop and final product (MI Q20 original questionnaire, Q28 revised Nigeria)

Discussions with traders showed that sweetpotato demand is season-dependant; sweetpotato demand increases during the dry seasons, i.e., when prices of other products like yam, rice cassava,

cocoyam are high (Table 53). This suggests that the demand for sweetpotato is more likely to increase with an increase in prices of other crops. The demand for sweetpotato is also more likely to increase with population size, and with diversification in usages. The participants to the discussions also mentioned that demand for sweetpotato is more likely to decline with income constraints, during school vacation

Table 53: Drivers of change

	Crop
Demand in general	<ul style="list-style-type: none"> - Depends on the level of SP production (e.g., (1) if supply is low, it can affect demand, if production is not of good quality also, it can affect demand; (2) During dry season, demand increases since prices of other products become high. But during wet season, more supply than demand) - Depends on the availability of other crops like yam, cassava, cocoyam. E.g. (1) when these crops are really available in the market and are affordable, the demand for SP decreases; e.g. (2) Yam harvesting period. People who buy yam are those who also buy SP. When yam is out, so not expensive, they might switch to buying it and therefore reduce their demand for SP. When yam becomes rare, the demand for SP will start increasing. Yam is there during the wet season and demand for SP is low - Size of population, as it increases demand will also increase - Financial issues / Income constraints / level at the household level - School vacation – low demand during vacation because pupils on vacation - How much a market/locality is visited (e.g., presence/absence of traders from other states (Lagos, Ilorin, Osun) can affect demand of SP) - Increase in price of other crops (rice, yam,) - High price of SP. When price of SP becomes high, demand for it becomes low - Diversification in utilization of SP - Affordability. SP price is cheaper as compared to other crops like yam, rice, gari
Changes as far as major characteristics of the crop or end-product are concerned	<ul style="list-style-type: none"> - Attractiveness of fried Sweetpotato: don't change colour after being fried no matter time after it is fried - Storage capability; traders as well as producers will go for varieties than can stay longer - Boiling characteristics - varieties that behave like boiled yam - Yield / cheap price in markets - varieties with high yield - Frying (good) characteristics - Sweetness (not too sweet) - some like sweet (especially children) and others said when too sweet it gives pile - Firmness - Oil consumption level (should be low) - Price. Low quality roots can be bought when we drop the prices down; e.g., when roots do not meet up with customers' standards, they reduce the prices, and if you agree, they will buy - Very low supply can me make customers buy roots they didn't like - Shape of roots: when it is straight, it eases peeling activities (e.g. White-agric); fryers like it because it makes their peeling easier - Cycle duration; varieties with short cycle are preferred - Size of roots: Medium to big size is mostly demanded - Encouragement and motivation: marketing strategies; e.g., bringing information about new varieties might make customers try them out - Regular customers relationships; being regular customers

4.9 Economics of the product

Economics of the product, in terms of (MI Q19 original questionnaire, Q27 revised Nigeria)

a) price, by season, and trends over the last 10 years; for budget calculations try and use average prices and costs for the last 4 months.

Among the different demand segments, price changes over the last 5 years are shown in Table 54 and Figure 3. Generally, prices were higher at urban compared to the rural and town levels. At rural level, there was an increase in price from 2015 to 2016 followed by a reduction over the next two years and a minimal increase in 2019. At town level, prices decreased from 2015 to 2016, increased over the next two years and finally reduced in 2019.

Table 54: Price by season over the last 5 years

Price Per bag	Rural			Town level			Urban		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean
2019	2575	4250	3412.5	2250	4500	3375	8000	8000	8000
2018	1875	4400	3137.5	1900	6350	4125	9000	9000	9000
2017	3125	5500	4312.5	2150	5100	3625	9000	9000	9000
2016	3250	6375	4812.5	2750	2750	2750	8000	8000	8000
2015	2875	5250	4062.5	3000	5500	4250	8000	8000	8000

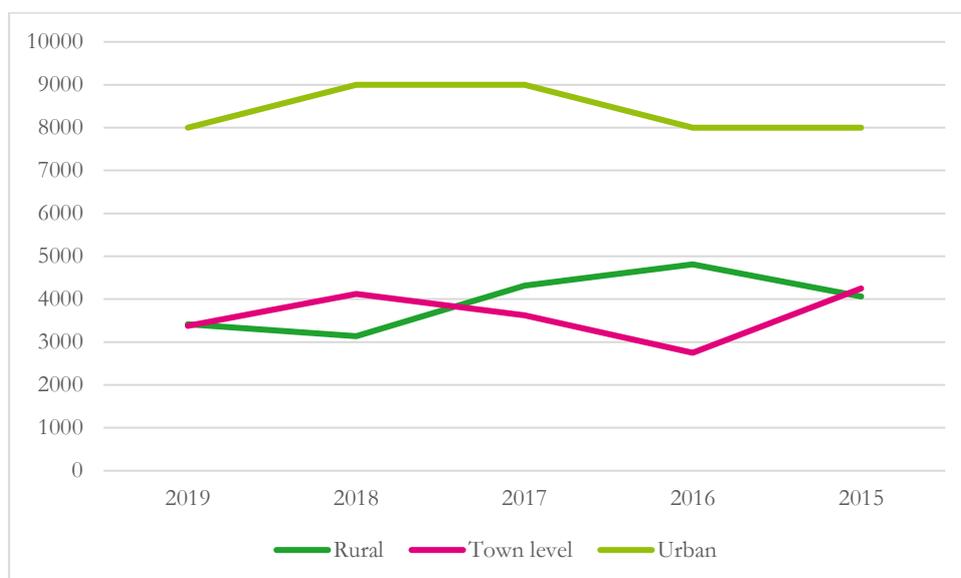


Figure 3: Trend lines of price over the last 5 years (Mean)

At urban level, prices were relatively stable over 5 years with a steady increase 2015-2018 and slight decrease in 2019.

b) cost elements in the value chain per kg or tonne? (e.g. transport, packaging, taxes, loading, off-loading, stallage rents etc.)

Table 55 shows cost elements in the sweetpotato value chain per bag. Buying price and variable costs were the highest cost elements across rural, town and urban marketing levels.

Table 55: Cost elements in the value chain per bag

Cost elements	Rural	Town	Urban
Buying price (Naira/bag)	2225.00	2375.00	2750.00
Uprooting (Naira/bag)	105.00	0.00	0.00
Packing and/or loading (Naira/bag)	161.25	150.00	150.00
Transportation (Naira/bag)	387.50	250.00	1350.00
Offloading in market (Naira/bag)	88.75	40.00	100.00
Ticket in market / offloading (Naira/bag)	48.75	35.00	175.00
Empty bag + thread (Naira/bag)	97.50	95.00	120.00
thread (Naira/bag)	9.13	8.00	0.00
Variable costs (Naira/bag)	3122.88	2953.00	4645.00

c) **profitability of the crop? (i.e. gross income minus costs, or % of profit margin as a share of gross income); this can be calculated after the interview has taken place, e.g. during the recap of the session or in the office. Also, if the information for this question is available in another, recently conducted study, then it's better to extract it from there and quote the source.**

The profitability analysis of the different demand segments of the sweetpotato value chain shows that sweetpotato marketing is more profitable (in terms of gross margin) in urban areas (3355 naira/bag) than in town (1547 naira per bag) and in rural (1143.79 naira/ bag)

Table 56: Profitability analysis of sweetpotato demand segments

Profitability analysis	Rural	Town	Urban
Selling price (Naira/bag)	4266.667	4500	8000
Variable costs (Naira/bag)	3122.875	2953	4645
Margin (Naira/bag)	1143.792	1547	3355

4.10 Conclusion

All the participants of the FGD had farming as their primary occupation and were all involved in the production, processing and consumption of sweetpotato. They are in majority Yoruba. Poverty level ranged between 35 and 60% of the sample with Ogosun households being especially vulnerable. Livelihood activities for men alone includes; cattle rearing (Onila FGD) and hunting (Igosun FGD). Bricklaying and carpentry work were usually done by young men

The way sweetpotato is grown did not differ significantly across the four communities visited, but did slightly varies between ethnic groups. Monocropping is the predominant production practice observed in the communities of the study. Some do practice intercropping of sweetpotato with maize and cassava, but it is rare. . Sweetpotato is grown as sole/mono crop on rolls by the Tiv/Gbari/Kogi people, and is inter cropping with vegetables and pepper by the Yorubas. Monocropping is done to enhance high yield. There is no significant difference in the production practices between men and women. The only difference in the separate plots of male and female is the size of farmland/plots. Men operate on larger plots than their female counterparts.

Sweetpotato was ranked as the fourth most important crop in the visited communities after yam, cassava and maize for both men and women. The most common reason why sweetpotato is not among the first three important crops is that it is highly perishable and prone to pest and diseases (“kokoro”).

Analysis of the different varieties grown in the study communities showed that Agric sweetpotato was the first most grown variety for women and the third for men. Alausa was cited as the first most grown for men and the second most for women. Carrot potato is the second and third most preferred variety for men and women, respectively. The reasons for planting a given sweetpotato variety vary not only according to variety itself but also according sex. The least preferred variety in all the communities is vitamin A (Carrot sweetpotato). Communities have different reasons for giving it lesser preference as shown above table. Most of the respondents have never seen the Vitamin A/ carrot (Orange fleshed sweetpotato) before.

Planting materials are mostly exchanged informally. Farmers keep their planting materials at irrigated land zones, get them from their previous planting plots, purchased some. Some also get their planting materials from friends and peers. The main constraints to improved sweetpotato production across the surveyed communities have to do with limited access to planting materials, high diseases and pests attacks.

The consumption level of sweetpotato varies according to the gender of the household heads. The proportion of the harvest for home consumption is relatively lower in a household headed by women as compared to a household headed by men. Sweetpotato is a more important commercial crop for men than for women. In terms of the level of independence in making decisions, men exercise a higher level of independence, but still consult someone like their spouses, in all aspects related to sweetpotato production and marketing. Women only exercise independence with regards to marketing and some independence with regards to the variety of crop to plant and the use of profits from sale of alternative products.

Processing of sweetpotato into fried and other products is a task done by women with support of some of their boys. Both men and women prefer a moderately sweet final product. A small proportion of men considered colour. Easy to peel, medium yield, good gari, disease resistant and good storability in the field emerged as the characteristics that show that a sweetpotato is good as far as women are concerned. As for the men, high yield, disease resistant, high starch and good gari were cited as the most important characteristics of a good sweetpotato crop. The most important processing steps that can impact significantly the quality of the final products are washing, peeling, slicing/cutting, frying. Alausa, Pakuruma“tiwantiwan”, and Pakuruma. Alausa are cited as the varieties that give a high quality sweetpotato product.

The market survey shows that the roots marketing and processing business in Kwara state are mainly done by women. Sweetpotato roots are consumed in fried form and are also transformed into flour to make “amala”, and are consumed boiled. Part of the sweetpotato is also transformed into other products like “kunu”, “asaro”, “chinchin”, and cooked with beans.

Three demand segments were constantly mentioned: retail segment, wholesale and community segments. Market segments predominantly served are market-specific. While fryers represent the major market segment served by retailers, community traders sell predominantly to wholesalers, and wholesalers sell mostly to retailers and other urban wholesalers. In all, community traders sell predominantly to wholesalers who in turn sell their major product to retailers. Retailers sell predominantly to fryers. Customers were in majority female and elders. Sweetpotato is mainly consumed in poor and middle class households. Sweetpotato is predominantly consumed in urban zones. Consumers in rural areas can accept any type of sweetpotato while consumers in cities and urban areas look mostly for roots that, at the first hands, look fine, fresh, are at least of medium size if not big, have desirable cooking and frying attributes, and roots that can be stored for long.

Customers' preferences do not vary according to market segments but along with usages. In general, customers in different market segments prefer sweetpotato varieties with yellow skin and yellow flesh, followed by white skin and yellow flesh varieties. In terms of sweetpotato attributes, they prefer roots that are clean, fresh, medium and/or big in size, can be stored for longer, and sweet.

Frying customers prefer sweetpotato that would still keep its attractive colour after being fried, consume less oil while frying, and that would get dried very well after frying. For boiling purpose, customers prefer sweetpotato that would behave like yam in mouth after being boiled (Like yam in your mouth when boiled).

Absence of diseases and weevils visible on the root skin was ranked as the most important characteristic of a high-quality sweetpotato, followed by firmness. High yield, size of the root and freshness were ranked 3rd, 4th, and 5th important characteristics of high-quality sweetpotato, respectively. Storage capability was ranked 6th important characteristics of high-quality sweetpotato

The different varieties/types of the crop demanded are white-agric, "Anamo yellow" (skin: yellow and flesh: yellow) and red-agric (skin: Red and flesh: white). The variety "vitamin A" (skin: orange flesh: orange) was ranked 4th important variety demanded by markets. Some characteristics of the "vitamin A" varieties have not been attractive to consumers, e.g. It is never gets dried when frying, it gets too soft when boiled and easily gets soaked in hot water (during the boiling process).

Sweetpotato marketing appears to be a profitable trade. The data suggests that the demand for sweetpotato is more likely to increase with an increase in prices of other crops and with population size, and with the on-going diversification in usages. Therefore, sweetpotato become important and will continue to be given the trading events these past years. To fully take advantage of its importance and value adding potential, the current bottlenecks that hamper its development have to be addressed.



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