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Cassava farmers' preferences for varieties and seed dissemination system in Nigeria: Gender and regional perspectives

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Cover photo: Harvesting a few roots from old cassava in Erin Oke village.
Cassava that stays in the ground for a long time is important for securing food and income.

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Acronyms and abbreviations

ADP	Agricultural Development Project (organized at state government level). Sometimes also called “Agricultural Development Program”
BNARDA	Benue State Agricultural and Rural Development Authority
CGIAR	Consultative Group for International Agricultural Research
CMS	Cassava Monitoring Survey
FGD	Focus group discussion
IITA	International Institute of Tropical Agriculture
LGA	Local Government Area
M&E	Monitoring and Evaluation
NRCRI	National Root Crops Research Institute
OAU	Obafemi Awolowo University
RTB	CGIAR Research Program on Roots, Tubers and Bananas
RTEP	Roots and Tubers Expansion Program
TME	Tropical *Manihot esculenta* (IITA landrace accessions)
TMS	Tropical *Manihot* Species
ToRs	Terms of Reference

Executive summary

The Cassava Monitoring Survey (CMS) project was funded by the CGIAR-RTB Program and the Bill & Melinda Gates Foundation. The main goal was to carry out a study on cassava adoption and diffusion patterns in Nigeria. This includes explaining why farmers are adopting certain varieties and describing preference differences across regions and gender. This specific study and report is part of Component IV of the broader CMS Project, and it covered gender-differentiated, end-user surveys on varietal and trait preferences. The objective of this component was to use qualitative methods to probe deeper into some of the information that was obtained in the quantitative survey on gender-based trait preferences and seed dissemination pathways.

The research questions asked why farmers in different cassava producing regions grow the major varieties reported in the initial quantitative survey, whether there are any specific preferred traits farmers are looking for in new varieties in each region, whether there are varietal preference differences among men and women farmers in each study region and across regions, whether farmers are using only local cassava varieties and not using any improved ones, what are the seed dissemination pathways for improved varieties, whether there are cases of dis-adoption of improved varieties and what are the main reasons for such behavior.

Data were collected from 20 randomly selected villages in 2016, five each in the Southwest, North, South-South and Southeast. The sampling frame was the 625 villages where the CMS Project conducted the questionnaire survey in 2015. The study adopted a cross-sectional survey approach. Focus Group Discussions (FGDs) were carried out in the study villages. There were four principal investigators in the study team, two males and two females. A discussion guide for village-level FGDs was developed that covered areas such as varieties grown in the village, traits preferences, and seed distribution pathways.

An important component of the study was to make sure that respondents in each community were divided by gender groups. Men and women were interviewed separately. The aim was to ensure that there was no restriction on either gender, especially the women, from voicing their opinions. The two female researchers worked with the village women and the two male researchers interviewed the men. Data analysis was done using qualitative content analytical methods.

Results showed that women and men cassava farmers in all regions liked varieties that are high yielding (with many big roots), especially if the cassava tolerates poor soil. The women and men farmers' concept of yield is not unlike the agronomists' idea. Farmers

want to harvest a large amount of useable root per area of land. However there is a slight preference for large roots; if given the choice between 100 kg of big roots, and 100 kg of small roots, farmers would choose the larger roots, which are easier to handle and have more edible root per area of peel. The women and men farmers in all regions generally expressed a preference for early maturing varieties (but they may also need some late maturing ones for food security). The variety must be capable of storage underground for a long time without rotting. Roots should last in the soil, un-harvested, for two years or more.

A few traits were in variable demand. For example, there was demand for varieties with high starch content, as well as for those with low starch, and for both white and yellow roots. Season and age determine processing traits more than does the variety. All varieties are considered easier to peel in the rainy season and when the roots are young. In the dry season, cassava is drier and difficult to peel but the grated mash is easier to dewater (drain).

Cassava farmers in all the regions want high yielding, early maturing cassava that can remain underground (for at least one year after maturity) without rotting). The Southwest expressed a need for cassava that controls weeds. Farmers in the North need cassava that resists mealybugs. The South-South wants varieties that tolerate poor soil.

All over Nigeria, most cassava processors are women, and they need cassava that is easy to peel. Peeling, unlike grating, is still largely done manually. This is by far the most important gender difference. In the Southwest and the North, men asked for markets for cassava roots but women have little trouble selling their *gari* and other finished products.

Women and men cassava producers in all regions are eager to try improved varieties and generally have a favorable opinion of them. Farmers in most villages observed that they go many years without receiving improved varieties, and that they do not know where to go for access to them. There is some local, farmer-to-farmer flow but, in general, most improved varieties have not reached most villages. If improved planting materials were more widely available, farmers would experiment with them and probably adopt more of them. Ideally, farmers would like someone to come to the village at planting time with bundles of stems of new varieties. In general, improved varieties are grown for many years and tend to replace local varieties. Occasionally an early improved variety has been dis-adopted, after twenty or thirty years. When improved varieties are dis-adopted, they are generally replaced by other improved cultivars, not by local ones.

Women and men farmers in all regions generally expressed a preference for early maturing varieties, to make money faster but also to reduce the number of times that they need to weed. Late maturing varieties may also be important, so that households can have cassava to harvest all year round. The farmers know that cassava stored in the ground is their “food bank”, and they want varieties that can be harvested in phases, a year or more after they are mature. Nigerian cassava farmers may need a mix of early maturing and late maturing/durable varieties, to have roots all year round.

In conclusion, the formal seed production and distribution sector (e.g., States-based Agricultural Development Programs, Roots and Tubers Expansion Program, Local Governments Councils, etc.), is generally under-resourced, with limited capacity to multiply and distribute the planting material of improved varieties. The informal sector (friends, relations, and neighbors) is largely carrying out their distribution but it is not very effective or efficient. This situation could be remedied with strategic support, funding, and adequate oversight of the sector. Appropriate seed laws and regulations will need to be formulated and followed.

While working with the farmers during data collection, it was not easy to link local names with the germplasm accession numbers that the International Institute of Tropical Agriculture (IITA) gave to the varieties at the point of official release. It is suggested that when IITA is planning to release a new cassava variety in future, it should involve the local farmers in the regions that are targeted to choose a local name that is easier for them to remember. The local name for the varieties can be in English or in a widely spoken regional language. When distributing seeds of improved varieties, include a name label in the seed bag or tag names to stems. This would also assist IITA intracking the adoption and diffusion pattern of improved cultivars during future monitoring and evaluation exercises.

Introduction

The Cassava Monitoring Survey (CMS) is an IITA project funded by the CGIAR-RTB Program and the Bill & Melinda Gates Foundation. The main goal of the CMS was to study adoption and diffusion patterns of improved cassava varieties in Nigeria. This includes explaining why farmers were adopting certain varieties and describing preference differences across regions and gender. The 2015 questionnaire-based study was a major component of the CMS; the present report is based on qualitative methods and is a follow-up to that study.

The 2015 CMS study was a quantitative survey administered to 2500 randomly selected household heads (mostly men). The spouses of about 30% of the household heads were interviewed separately. Most of the spouses were women but 39 were men. DNA samples were collected of cassava plants of each named variety, to compare genotypes with local names of varieties. That study showed that 60% of the farmers planted improved varieties in 2015 and the average farmer planted 1.8 varieties. They wanted cassava with good quality for processing into foods (especially *gari* and *fufu*), high yield, big roots, high market demand, and early maturity (IITA CMS Technical Report, 2015).

More than 75% of farmers have tried improved varieties. Mean land area under cassava was 0.87 ha, with 0.4 ha in improved varieties. Farmers' main reason for dis-adopting a variety was the non-availability of the planting material (IITA CMS Technical Report, 2015). This may sound puzzling to some readers; if farmers are growing a variety, they should be able to provide themselves with the stems of that variety. It turns out that not having planting material is a problem for those farmers who do not always save enough stems. If a household has harvested all of its cassava before planting time, and needs to borrow or buy stems from another farm or from the market, only the most popular varieties will be available. So "non-availability of the planting material" simply means that few people in the area grow that variety.

Cassava is planted by inserting a stem (a piece of the stalk of the plant) into the earth.

Cassava stems ready to be cut and planted. Cassava planting material (or seed) is bulky. It takes many stems to plant a field.

This study and report are part of Component IV of the broader CMS Project, and cover gender-differentiated, end-user surveys on varietal and trait preferences. The objective was to use qualitative methods to probe deeper into some of the information that was obtained in the quantitative survey on gender-based trait preferences and seed dissemination pathways. The questionnaire study disaggregated processing and agronomic traits, giving equal weight to each. In the current study all the traits were combined, to see whether farmers emphasized agronomy or processing.

Findings from the CMS questionnaire-based study led to other research questions, especially the following: 1) What are the actionable reasons that people give for not using improved cassava? 2) What are the main reasons for preferences about varieties? Are they different for men and women, different income groups, users of cassava? These questions informed the present study. See the specific ToRs in the Box below: Specific research questions for this study.

Specific research questions for this study

1. Why are farmers growing the major varieties identified in the initial CMS survey in that region?
2. Are there any specific preference traits farmers are looking for in that region?
3. Are there varietal preference differences among men and women farmers in each study region and across regions? This could be extended to include age differences inside each group.
4. Are farmers using only local cassava and not improved varieties? Why? What are the seed dissemination pathways for improved varieties?
5. Are there cases of dis-adoption and what are the main reasons for such behavior?

Source: Terms of Reference

The order of the following chapters follows these ToRs explicitly.

Materials and methods

Data were collected from 20 randomly selected villages in 2016, five each in the Southwest, North, South-South, and Southeast (Fig. 1). The sampling frame was the 625 villages where CMS had enumerated the questionnaire-based survey in 2015. The study adopted a cross-sectional survey approach.

Data were collected through Focus Group Discussions (FGDs) in the study villages. A discussion guide for village-level FGDs was designed in consultation with IITA, CGIAR-RTB, and the Gates Foundation. The guide covered areas such as varieties grown in the village, traits preferences, and seed distribution pathways (see Annex 1). There were four principal investigators in the study team, two males and two females. They were supported by the village-based extension agent of the State-level Agricultural Development Programs (ADPs) and the farmers' leader of the cassava growers in each village. In each village, the team conducted two interviews (one with men and one with women) for a total of 40 interviews. See Annex 2 for the names of villages visited.

An important component of the study was to make sure that respondents in each community were divided by gender groups. Men and women were interviewed separately to ensure that both genders, especially the women, were free to voice their opinions.

The two female researchers worked with the village women and the two male researchers interviewed the men.

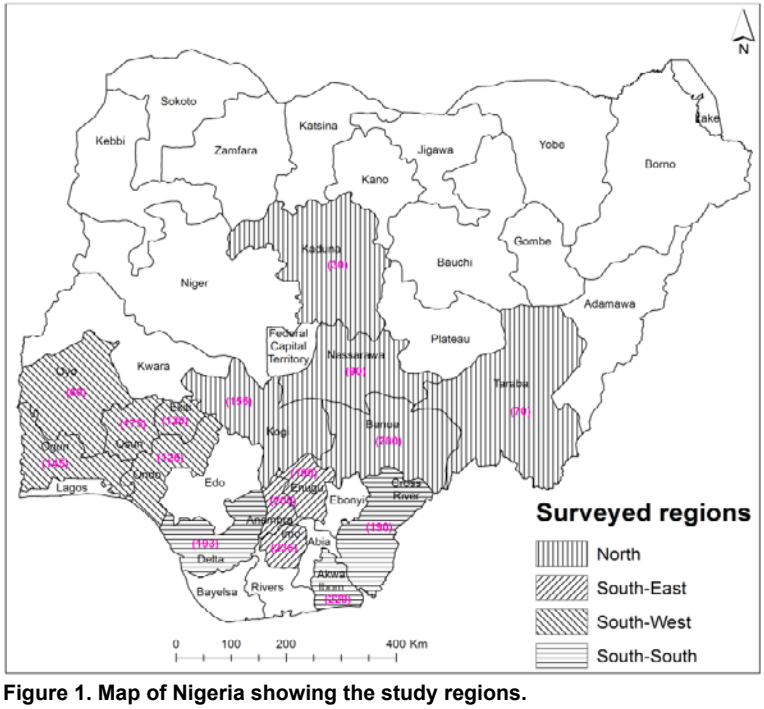


Figure 1. Map of Nigeria showing the study regions.

In each study village, the team held one meeting with women and a simultaneous, separate meeting with men.

The team also met processors in the villages and asked them to explain their work, tools used, steps involved, and preferences for varieties and traits. The bulk of the information collected was analyzed and has been presented separately in the text boxes that are spread through several pages of this report.

Where members of the team could speak the local language or when the village-based extension agent was available, FGD interviews were conducted in the local language and farmers' responses were translated into English. Most other interviews were held in Pidgin English (Nigerian Creole). The team asked each question one at a time and took field notes (in English) with a marker pen on a large flip chart. The flip chart was taped to the wall (if there was a wall) or otherwise displayed for easy referencing of information supplied until the close of the FGD session. See Annex 1 for the list of questions.

Notes from the FGD were written on a big sheet of paper, with a marker pen, and taped up where participants could see them.

After the meeting, the team would compare notes. Left to right: Bentley, Madu, Olaosebikan, and Olanrewaju.

After finishing the questions, the researchers were often able to visit cassava farms if a special case of pest attack or excellent/poor crop performance had been mentioned during the FGD, or visit a processing activity, along with having a brief, open-ended chat with some of the villagers.

Data analysis was done using qualitative content analytical methods (see Krippendorff, 1980; Mostyn, 1985). In the results and discussion section below, there are five sub-sections that discuss the findings in the order outlined in the ToRs (see Box above: Specific questions for this study).

Results and discussion

What farmers like about the varieties they grow

Nigerian farmers like the cassava varieties they have because they are:

- High yielding, with many big roots
- Early maturing
- Durable (stay well underground, for at least two years)
- Also: tolerate poor soils, are cattle resistant, not watery, drought-resistant (in the North)

A few traits are optional or variable, e.g., some farmers like more starch, some like less. There is a demand for yellow and for white roots. And even though farmers express a demand for precocious varieties, farm communities may also need some that are late maturing. But, in general, trait preferences are straightforward (e.g., every variety can be high yielding, whether targeting women or men, or any region).

For processing traits, season and age are more important than variety. Agronomic traits are, in general, more important than those concerned with processing. Women demand cassava that is easy to peel, although this need could possibly be met by another research solution, not by plant breeding.

Contemporary cassava varieties

Each community grows some four to eight varieties: about two of these are usually so crucial that every household grows them. In each region, a handful of varieties predominate and are grown in three or four communities. The others are old ones on their way out, new ones that have reached only a few communities, or the odd variety that a traveler brought back home some years ago. Few varieties are grown in more than one region. Men and women tend to grow the same varieties.

Some of the improved varieties arrived fairly recently, including some from ADPs that are no longer able to distribute planting material (see Section 4.1). In the recent past, ADPs actively distributed seeds of several crops in various States of Nigeria (Bentley et al., 2011).

In the Southwest, of the 19 varieties documented in this survey, only seven were mentioned in three or more villages. The most preferred variety is an improved one ("Agric", probably a complex of improved varieties). Farmers call most improved varieties Agric because these were released with long serial numbers instead of names and the numbers are difficult to remember. Vitamin A cassava is recent but so well received that women in three villages are growing it. In general, women and men grow the same varieties (Table 1).

Table 1: Cassava varieties by village, as mentioned by women and men in the Southwest.

	Mentioned by women	***Mentioned by men***
Agric	4: Akeredolu, Ilesa, Ajagbale, Afolu Ise	5: Akeredolu, Erin Oke, Ilesa, Ajagbale, Afolu Ise
Oko Iyawo	5: Akeredolu, Erin Oke, Ilesa, Ajagbale, Afolu Ise	4: Akeredolu, Ilesa, Ajagbale, Afolu Ise
White cassava *(Ege Fifun)*	3: Akeredolu, Erin Oke, Ajagbale	3: Akeredolu, Ilesa, Ajagbale
Idileru	2: Akeredolu, Erin Oke	4: Akeredolu, Erin Oke, Ilesa, Afolu Ise
Black cassava (*Ege Dudu* or Mallam-Bida)	3: Akeredolu, Erin Oke, Ajagbale	2: Akeredolu, Erin Oke
Red Cassava (Ege Pupa or Ankara)	3: Ajagbale, Afolu Ise	2: Ajagbale, Afolu Ise
Vitamin A or Yellow Cassava	3: Akeredolu, Erin Oke, Ilesa	1: Ilesa
*TME 419***	1: Ilesa	2: Ilesa, Ajagbale
Tomude		2: Akeredolu, Erin Oke
Ege Igbira or Ege Fifun (Elebejebe)	1: Afolu Ise	1: Afolu Ise
Ege Ogbomoso or Medongo	1: Afolu Ise	1:Afolu Ise
Local Cassava		1: Erin Oke
Onikoko		1: Erin Oke
IITA		1: Ilesa
Bola Ige		1: Ilesa
Ege Olowo Oyinbo	1: Ajagbale	
Ege Oleke		1: Ajagbale
Ege Elese Adiye	1: Afolu Ise	

Based on farmers' perceptions, improved varieties are listed in italics.
*The women in Ilesa said that there were two kinds of Agric: a white one and a black one.
** The women in Ilesa said that TME 419 was also called Aregbesola.

White cassava really does have a stem with a whitish sheen.

Red cassava really does have red petioles. Color terms are a neat, practical way to name varieties.

In the North, only three varieties (out of 27) are grown in three or more villages. There are a few popular varieties (including Agric or BNARDA) which are improved and many uncommon varieties grown in only one of the study villages (Table 2).

Table 2: Cassava varieties by village, as mentioned by women and men in the North.

	Mentioned by women	***Mentioned by men***
Agric or BNARDA	4: Ajaokuta, Mbanyom, Ikyugwer, Mbaatsua	4: Ajaokuta, Mbanyom, Ikyugwer, Mbaatsua
Oko Iyawo	3: Oke Dayo, Ajaokuta, Mbanyom	2: Oke Dayo, Ajaokuta
Akpu	3: Mbanyom, Ikyugwer, Mbaatsua	2: Ikyugwer, Mbaatsua
Walli (Dan Warri)	2: Mbanyom, Mbaatsua	2: Mbanyom, Mbaatsua
Dangbo	2: Ikyugwer, Mbaatsua	2: Ikyugwer
Yanyume Wuhe	2: Mbanyom, Mbaatsua	1: Mbaatsua
Malam Bida	1:Oke Dayo	1: Oke Dayo
Obalo Kene	1: Oke Dayo	1: Oke Dayo
Dolowolojo	1: Oke Dayo	1: Oke Dayo
Pakimesi (or Mesi)	1: Oke Dayo	1: Oke Dayo
White Cassava	1: Ajaokuta	1: Ajaokuta
Red Cassava	1: Ajaokuta	1: Ajaokuta
Odongbo	1: Mbanyom	1: Mbanyom
Supi	1: Ikyugwer	1: Ikyugwer
Yakpe	1: Mbaatsua	1: Mbaatsua
Payan	1: Mbaatsua	1: Mbaatsua
Atakalogo	2: Mbanyom, Mbaatsua	
Okpekpe		1: Oke Dayo
Yellow Cassava (Vitamin A)		1: Oke Dayo, Ikyugwer
Give Me Chance	1: Ajaokuta	
Egbodagbate		1: Ajaokuta
Ejigolo		1: Ajaokuta
Rekia		1: Ajaokuta
Aneko		1: Ajaokuta
Akpu Apupu		1: Mbanyom
Akpu Aii		1: Mbanyom
Imande		1: Mbaatsua

Based on farmers' perceptions, improved varieties are listed in italics.

In the South-South, only five varieties (out of 36) are grown in three or more study villages. Many varieties are uncommon (Table 3).

Cassava can be peeled, cut into large pieces and dried to make chips, or *alibo*, which are later pounded to make *lafun*.

Table 3: Cassava varieties by village, as mentioned by women and men in the South-South.

	Mentioned by women	***Mentioned by men***
Red Cassava (Ewa ni Sheshe, Ndat Okpo, Ndat Ndat Okpo, Adadara Okpo, Ndadara Okpo, Adadat Okpo)	4: Abija, Duwang-Uyanga, Ikot Urom, Ikot Akpan Essien	5: Abija, Duwang-Uyanga, Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
White Cassava (Afia Okpo, Ewani Pipi)	4: Abija, Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia	3: Duwang-Uyanga, Ikot Urom, Ikot Akpan Essien
Panya (Panyan Akpu)	2: Duwang-Uyanga, Ikot Akpan Essien	3: Abija, Duwang-Uyanga, Ikot Akpan Essien
Black Cassava (Enwenwe Okpo, Obubut Okpo)	2: Ikot Urom, Ikot Akpan Essien	3: Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
Give Me Chance	1: Ikot Urom	3: Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
Six Months (Six Six, 66)	2: Duwang-Uyanga, Ikot Akpan Essien	2: Duwang Uyanga, Ikot Akpan Essien
Abeghe Tighe	2: Ikot Urom, Ikot Akpan Ntia	1: Ikot Urom
Eshi Ukom	1: Abija	1: Abija
Ebeingbede	1: Abija	1: Abija
Don't Worry	1: Abija	1: Abija
Better Life (TMS 30572)	1: Abija	1: Abija
Five Five (TMS 30555)*	1: Duwang-Uyanga	1: Duwang-Uyanga
Okpo Ekong	1: Duwang-Uyanga	1: Duwang-Uyanga
Okpo Utut (Utut)	1: Ikot Akpan Essien	1: Ikot Akpan Essien
Vitamin A	1: Ikot Akpan Essien	1: Ikot Akpan Ntia
Nwa Ikot	1: Ikot Akpan Essien	1: Ikot Akpan Essien
Eka Erong	1: Ikot Akpan Ntia	1: Ikot Akpan Ntia
Eka Uyai	1: Ikot Akpan Ntia	1: Ikot Akpan Ntia
Jumbo (Okpo Jumbo)	1: Ikot Akpan Ntia	1: Ikot Akpan Ntia
Okpo Imo	1: Ikot Akpan Ntia	1: Ikot Akpan Ntia
Belombelom	1: Abija	
Panya ma Pipi		1: Abija
Eri (stressed on the last syllable) (not "Eric")		1: Abija
Three Three (33)		1: Duwang-Uyanga
419		1: Duwang-Uyanga
Nko-Etan	1: Duwang-Uyanga	
Oko-Iwa	1: Duwang-Uyanga	
Ipong Imenke		1: Duwang-Uyanga
Udia Iwa	1: Ikot Urom	
Okpo Kobo		1: Ikot Urom
Awacha		1: Ikot Urom
Atiak Akpan		1: Ikot Akpan Essien
Oto Okon Tian		1: Ikot Akpan Essien
Okpobo	1: Ikot Akpan Ntia	
Ukara Idem	1: Ikot Akpan Ntia	
Okpo Ofon		1: Ikot Akpan Ntia

Based on farmers' perceptions, improved varieties are listed in italics. *The name "TMS 30555" was provided by the village-based ADP person.

In the Southeast, only two of 42 varieties are grown in three study villages. Many varieties are localized (Table 4). Improved varieties are fairly popular.

Table 4: Cassava varieties by village, as mentioned by women and men in the Southeast.

	Mentioned by women	***Mentioned by men***
Nwa Ocha (One with God, Akpu-ji)	2: Amiri, Amugo	3: Amiri, Amugo, Oraifite
Onu Anwuru Oku (or Onu Anwuru)	3: Amiri, Amala, Oraifite	2: Amala, Oraifite
Ndu Ka N'ala	2: Amiri, Oraifite	2: Amiri, Oraifite
Onu Uhie	2: Amiri, Amala	2: Amiri, Amugo
Vitamin A (Yellow Cassava)	2: Nara, Oraifite	2: Amala, Oraifite
White Cassava (Akpu Ocha, White Stem)	2: Nara, Oraifite	2: Nara, Oraifite
Canopy (Okanenu)	2: Amiri, Oraifite	1: Oraifite
Nwa Ocha Agric (or Nwa Ochanke Agric or Nwa Nkwo Agric)	2: Amala, Amugo	1: Amala
Agric	2: Amiri, Oraifite	
Nwa Ekere (Nwa Groundnut)	2: Amiri, Amala	
Afu Di Aku N'anya	1: Amiri	1: Amiri
Panya	1: Amiri	1: Amiri
Nkporo Oji (black cassava)	1: Amiri	1:Amiri
Nwa Jenny	1: Amala	1: Amala
Nwa Jenny Abaka	1: Amala	1: Amala
Try and See	1: Amala	1: Amala
Iwa	1: Amugo	1: Amala
Otu Pam	1: Amugo	1: Amugo
Onu Tanjele (Agric)	1: Amugo	1: Amugo
Onu Cutex (Agric)	1: Nara	1: Nara
Agada Gbachiruzo	1: Nara	1: Nara
Saint Paul	1: Amiri	
Oti Okpo	1: Amiri	
Gold Coast		1: Amiri
Long John	1: Amala	
Ishi Okpuru Gi Na Oke	1: Amala	
Otorokwekem	1: Amala	
Nwa Nkwo (local)		1: Amala
Onye Ocha		1: Amala
Ere Egolu Igwe (Red Cassava and Agric)	1: Amugo	
Ome Nwangwa		1:Amugo
Arua Agbagba Bicycle	1: Nara	
Police Cassava	1: Nara	
Agbogho Nwagu (white)	1: Nara	
Ochinwerere	1: Nara	
Ohu Pam	1: Nara	
Agric (Light Yellow)	1: Nara	
Ekpe Calabar		1: Nara
Nwa Opokopo		1: Nara
Omeiri		1: Nara
Nwanyibiaoka	1: Oraifite	
Akpu Red	1: Oraifite	

Based on farmers' perceptions, improved varieties are listed in italics.

The meanings of varietal names

In all four regions, the vernacular names of varieties may be a key to the variety's appearance in the field; these include color (e.g., "white cassava"because of the stem or "red cassava" because the leaf has traces of color and the skin of the root is reddish. A variety may be named after a place, usually where the local people sourced it, e.g., Tomude (which in Yoruba means "from the town of Omu"). "Agric" is a suite of varieties that farmers got from their State ADP. Many improved varieties were released with long numbers instead of names. Local people have forgotten these numbers, making it difficult for us to tell exactly which improved varieties have been adopted. A few are named for processing traits. Some names refer to a preferred trait, especially high yield. These names can be highly memorable, even poetic.

In the Southwest, two variety names, Idileru and Oko Iyawo, both refer to high yield. Idileru means "big bottom"; Oko Iyawo is "the husband of the wife" (i.e., a new groom) because the variety is early maturing and high yielding, so that the young husband can plant the cassava and harvest it for his wife before their first child is born (Table 5). A varietal name should be easy to remember, and the sexual innuendos in these two names make them hard to forget.

Table 5: Meanings of the names of cassava varieties in the Southwest.

Varietal name	***Meaning. Unless otherwise indicated, all non-English terms are Yoruba***
Agric	Short for "Agricultural Development Project" (ADP), the source of the variety (probably several improved varieties)
Oko Iyawo	The husband of the wife, i.e., the new groom. The young husband will be able to plant this cassava soon after marrying and be able to harvest it for his wife before their first child is born. Oko Iyawo may be several varieties, at least some of which are local
White Cassava (Ege Fifun)	A suite of varieties: some are old, and others are recent and improved. They have white roots or whitish stems and leaves
Idileru	"Big bottom", i.e., high yielding. May be an early improved (or selected) variety
Black Cassava (Ege Dudu)	Ege Dudu is Yoruba for "black cassava". The stems and roots are black or have a dark tint. This is probably a suite of improved and local varieties
Red Cassava (Ege Pupa or Ankara)	Ege Pupa is Yoruba for "red cassava". It has reddish leaves and roots and red petioles. Probably a local variety or suite of varieties
Vitamin A or Yellow Cassava	A new, improved variety. People don't have a name for it, but describe it as "yellow"
TME 419**	Improved variety (TME = tropical *Manihot esculenta*)
Tomude	Local variety "from the town of Omu"
Igbira or Ege Fifun (Elebejebe)	The Igbira people introduced it to the Southwest. "Ege Fifun" is "White Cassava." "Ebe" means heaps and "Elebejebe" means that this variety forms heap upon heap.
Ege Ogbomoso or Medongo	Cassava from the town of Ogbomoso. Medongo was the original name, used by the people from Ogbomoso
Local Cassava	

Varietal name	*Meaning. Unless otherwise indicated, all non-English terms are Yoruba*
Onikoko	“Belongs to cocoa” (used as a nurse plant to shade young cocoa plants)
IITA	A variety associated with IITA
Bola Ige	A man named Bola Ige was the State Governor in Oyo State when this variety was distributed. It is an improved variety that arrived in about 1979
Ege Olowo Oyinbo	“Ege” is the Yoruba word for “cassava” and “Olowo Oyinbo” was a man from the village who brought the variety from Lagos
Ege Oleke	Named after a person called Oleke who brought the variety in 1996
Ege Elese Adiye	“Chicken leg cassava,” named for the stems which are thin like chicken legs and not too tall
Ege Pupa/ Oba Igbira	“Red Cassava” or “King of the Igbira”

North. A village has a dynamic roster of varieties, which come and go over the years as new varieties come in and replace older ones. Some villagers can remember the arrival of each variety they grow; no variety is older than living memory.

As in the Southwest, many cassava varieties in the North are named for descriptive traits such as color or for the perceived place of origin. Many names highlight agronomic traits such as high yield (e.g., Dolowolojo, “I will repay you in eight months”) or big roots (Imande), taste (Yanyume Wuhe, “too good to share”). Yakpe (“eat and die”) is a poisonous variety (Table 6).

Table 6: Meanings of the names of cassava varieties in the North.

Varietal name	*Meaning. Unless otherwise indicated, non-English terms are Tiv*
Agric or BNARDA	Named after the ADP or BNARDA
Oko Iyawo	The Northerners have preserved the Yoruba name (“new groom”) even though few speak Yoruba. Northern farmers believe it is an improved variety
Akpu	*Fufu*, i.e. the slightly fermented, paste-like food made from cassava. (*Akpu* is also the Igbo word for “cassava”)
Walli (Dan Warri)	Hausa for “From the town of Warri”
Dangbo	Tiv for “tall person” because the variety has tall stems
Yanyume Wuhe	Tiv for “eat alone and do not share with the co-wife” (because this variety is too tasty to share)
Malam Bida	From Hausa for ““gentleman from Bida” because it was introduced by a person from Bida. (Or it is derived from the varietal name Baranbida, which we saw in the Southwest?)
Obalo Kene	Named after the king (*obalo*) of Kene, who introduced it
Dolowolojo	From the Yoruba for “Give me eight months and I will pay you your money,” because it matures in eight months
Pakimesi (or Mesi)	Yoruba for “cassava from Mesi”
White Cassava	It has white stems and roots
Red Cassava	The inner root skin is red, and it has red stems and petioles
Odongbo	Meaning unclear

Varietal name	*Meaning. Unless otherwise indicated, non-English terms are Tiv*
Supi	Meaning unclear
Yakpe	Tiv for “eat and die” because the leaves are poisonous enough to kill cattle
Payan	Named after the “Payan tribe.” (Since there is no ethnic group called Payan, this may be a reference to Panya, i.e., Equatorial Guinea).
Atakalogo	A Tiv name comparing the variety to white sweetpotato
Okpekpe	Meaning unclear
Yellow Cassava	(Vitamin A)
Give Me Chance	I.e., “give me space or room to grow”, because the plant is big
Egbodagbate	Meaning unclear
Ejigolo	Named for Ejigolo town, where the variety came from
Rekia	A woman’s name
Aneko	Eko is the Yoruba name for Lagos. In Tiv, Aneko means “from Lagos”
Akpu Apupu	Tiv for “white *fufu*”, i.e., the white version of the variety named Akpu
Akpu Aii	Tiv for “black *fufu*”, i.e., the black version of the Akpu variety
Imande	Tiv for “leprosy.” When someone has leprosy, the leg grows big, like this root

In the South-South, descriptive traits include color but varieties are also named for architecture (the spreading branches of Give Me Chance). Origin names recall travels to Equatorial Guinea (Panya) in the 1940s, and also show that some projects were able to make their names live on in the name of the variety they introduced, e.g., “Better Life”. People do remember short numbers for varieties (such as Six Six). Some of the poetic names refer to high yield, such as Oto Oko Tien (making enough money to build a house) and Atiak Akpan (a storage box bulging with cassava). Other named agronomic traits include “Don’t Worry” (for a variety that is low maintenance) and “Give Me Chance,” for the large size of the plant (Table 7).

Table 7: Meanings of the names of cassava varieties in the South-South.

Varietal name	*Meaning. Unless otherwise indicated, non-English terms are Anaang*
Red Cassava	Various versions of the term for “red cassava” in Boki, Efik, and Anaang languages (Ewa ni Sheshe, Ndat Okpo, Ndat Ndat Okpo, Adadara Okpo, Ndadara Okpo, Adadat Okpo)
White Cassava	Versions in Anaang and Boki languages (Afia Okpo, Ewani Pipi)
Panya (Panyan Akpu)	“Equatorial Guinea” (probably from “España” or “Español” (the colonial language of Equatorial Guinea, where some Nigerians travelled during the Second World War and returned with cassava varieties
Black Cassava	Black Cassava (with two versions of the name in the Anaang language: Enwenwe Okpo, Obubut Okpo))
Give Me Chance	The plant has spreading branches and needs a lot of space (“chance”) to grow
Six Months (Six Six, 66)	The variety yields roots in six months

Varietal name	*Meaning. Unless otherwise indicated, non-English terms are Anaang*
Abeghe Tighe	“The leaves fall” in the Anaang language. When you harvest the plant, the roots and the leaves are knocked off, because the roots spread horizontally and are easily broken off
Eshi Ukom	“Leaf of the cotton tree” in the Boki language. The leaf of this variety looks fresh, like the young leaf of a cotton tree
Ebeingbede	Means something like “the hand is open to receive many roots” in the Boki Language
Don’t Worry	This variety turns out well, no matter how you care for it
Better Life (TMS 3572)	Named after the Better Life Program of former First Lady, Mariam Babangida
Five Five (55, 30555)	When harvested each plant will have more than five roots
Okpo Ekong	Okpo means “stem” in Anaang. The variety is named after a person named Ekong
Okpo Utut (Utut)	Utut means “plenty” in Anaang. The variety yields plenty of roots
Vitamin A	Rich in carotene
Nwa Ikot	“Second born daughter (*nwa*) of the forest.” The meaning is obscure. It may be a loan from Igbo, where *nwa* means “child” (i.e., child of the forest, a variety that grows well in the bush)
Eka Erong	“Black mother sheep” in Anaang. Named after its black stem and because it gives many roots
Eka Uyai	“Beautiful mother” in Anaang. Named after its fine, high yield
Jumbo (Okpo Jumbo)	May be named for a person called Jumbo who brought the variety, or because the roots are big
Okpo Imo	Named for the Nigerian State of Imo, where people sourced it
Belombelom	Named for the “Belombelom people” of Equatorial Guinea. (There actually are no ethnic groups or major places called Belombelom in Equatorial Guinea, although there is a “Balengue” language
Panya ma Pipi	“White Panya” a variety from Equatorial Guinea
Eri	Meaning unclear
Three Three	It often has three roots
419 (Four One Nine)	Number given by plant breeders
Nko-Etan	Named after a person who introduced it
Oko-Iwa	Meaning unclear
Ipong Imenke	Efik for “one man alone cannot lift it.” It is a very big plant, with big stems and roots. It takes more than one person to carry the harvested plant
Udia Iwa	Meaning unclear
Okpo Kobo	Named for the Kobo (a hundredth of a Naira), Nigerian currency introduced in the 1970s, so this is the “stem that came with the Naira and the Kobo”
Awacha	An Anaang name from the Igbo *nwa ocha* for “white child”
Atiak Akpan	In Anaang, an *akpan* is a bamboo box and *atiak akpan* means “expands the akpan.” The variety yielded so much that it would stretch out the bamboo box that held the harvested roots
Oto Okon Tian	*Oto* means “plant” in Anaang and *okon tian* is a permanent house. If you plant this variety you can earn enough money to make a house
Okpobo	Meaning unclear
Ukara Idem	Anaang for “long like a machete” because of this variety’s long roots
Okpo Ofon	You can roast and eat this variety. *Ofon* means “roast” in Anaang

In the Southeast, cassava varieties are also named for descriptive traits, especially colors, such as Onu Tanjele, named for the greyish color of the tender, emerging leaves. Names also recall the place of origin (e.g., Saint Paul) or Ekpe Calabar, brought back by wage-labor migrants to Calabar on the coast. Like the Panya varieties from the South-South, the name of the Ekpe Calabar variety suggests that even when farmers migrate to seek paid work, they are alert for new crop varieties to experiment with at home (Table 8).

Agronomic traits, especially high yield, are captured in some imaginative names like “Try and See,” and Ohu Pam (“ten pounds”, for all the money one could make from this variety) and two other varieties named for the bicycles the farmers longed to buy after the harvest. Other varieties are named for quick maturity (Ome Nwangwa) or even for processing (Iwa, “sliceable”). The Otorokwekem variety is named for its ability to withstand being blown over in the wind.

Blown over in the wind (not Otorokwekem).

Table 8: Meanings of the names of cassava varieties in the Southeast.

Varietal name	Meaning. Unless otherwise indicated, non-English terms are from Igbo
Ndu Ka N'ala	"Life is still in the soil," named for the large roots
Onu Uhie	"Red mouth" (i.e., red emerging or tender leaves)
Nwanyi Ocha (One with God, Akpu-ji)	"Fair, pretty woman" (the stem is good looking). "One with God" because when He is with you, you will have plenty of yield. "Ji" means "yam" so Akpu-ji is "yam cassava": cassava with roots as big as yam
Onu Anwuru Oku (or Onu Anwuru)	*Onu* means "mouth," but it also means the emerging leaf. *Anwuru* means "snuff, or smoke". Named for the smoky grey leaves when they first emerge
Vitamin A (Yellow or Carrot Cassava)	Self-explanatory
White Cassava (Akpu Ocha, White Stem)	*Akpu Ocha* means "white cassava"
Canopy (Okanenu)	*Okanenu* means "canopy"
Nwa Ocha Agric (Nwa Ochanke Agric or Nwa Nkwo Agric)	Nwa Ocha is "white child". Here it is said to be short for Nwa Ochanke. "Nwa" means child. The meaning of *ochanke* is unclear. *Nkwo* is a market day so *nwa nkwo* is a child born on nkwo (meaning unclear)
Agric	Improved varieties, named for the ADP or a similar program
Afu Di Aku N'anya	"If you have wealth, others will envy you" named for the high yield of this variety
Panya	A variety brought from Equatorial Guinea, colloquially called "Panya" (cf. Español)
Nkporo Oji (Black Cassava)	"Black stem"
Nwa Jenny	"Jenny child" named for the woman who brought this variety to the community
Nwa Jenny Abaka	*Abaka* means "branches." A variety with many branches
Try and See	The Agric Officer who brought this variety said, "If you doubt, go, try and see." When you plant this, it grows better than you would expect, just judging by the stem
Iwa	Meaning slightly unclear, but refers to cassava that is good for *abacha* because it is easy to slice and is not fibrous. (It is also the Anaang word for "cassava", although the local people seem unaware of that)
Otu Pam	"One pound (sterling)." A British pound was a lot of money before Independence and one could make a good profit by selling the roots
Onu Tanjele	Onu is "emerging leaf" and *tanjele* is a dark, lead-colored mineral pigment used to highlight the color of women's eyes. Named for the grey color of the tender leaf
Onu Cutex	Cutex is a commercial brand of nail polish. Named for the red color of the emerging leaf
Agada Gbachiruzo	"Blocks the road," i.e., a big plant
Saint Paul	A variety obtained through the Saint Paul Catholic Mission
Oti Okpo	"Boxer". Meaning unclear
Nwa Ekere (Nwa Groundnut)	*Ekere* means "groundnut." A variety with many small roots that reminds farmers of digging up peanut plants
Gold Coast	Villagers think the variety was sourced from Ghana
Long John	A variety with long roots

Ishi Okpuru Gi Na Oke	“You are blind that you cannot see the boundary between my field and yours.” People plant a line of this variety (with a tall stem and distinctive chocolate color) to mark their field edges
Otorokwekem	“Tall, stable, strong,” (a variety with a thick, tall stem that can withstand windstorms)
Nwa Nkwo (local)	There are two varieties with this name, one local and one improved
Onye Ocha	“White person” (a variety with light colored leaves)
Ere Egolu Igwe (Red Cassava, Agric)	“You buy a bicycle” (with all the money you will make growing this high yielding variety)
Ome Nwangwa	“Very quick,” an early maturing variety
Arua Agbagba Bicycle (Red Cassava)	Enough money to buy a bicycle
Police Cassava	A variety that grows straight and tall like a police officer
Agbogho Nwagu	“Young beautiful lioness,” because the roots are beautiful to behold and give *gari* with a fine color
Ochinwerere	“Straight” (it has a long stem)
Ohu Pam	“Ten pounds (sterling),” a variety that could make a lot of money
Agric (Light Yellow)	Sourced from Agricultural Officers
Ekpe Calabar	“Ekpe” is an Efik word, meaning unknown. Sourced from people who travelled to Calabar to work
Nwa Opokopo	“Coming back from the bush with plenty of children.” This high-yielding can stay in the ground for many years
Omeiri	“Very fast” (early maturing)
Nwanyibiaoka	“A woman dominates (or becomes bigger and stronger).” It Is high yielding
Akpu Red (Red cassava)	*Akpu* means “cassava”

What farmers like in specific varieties

In general, the improved varieties have what farmers like and are gradually squeezing out the local varieties. Improved varieties are becoming the standards because they are early maturing and high yielding.

Women and men farmers in all regions generally want varieties to be:

- High yielding (many, big roots)
- Early maturing (ideally reaching maturity within six or seven months), and
- Able to remain underground for a long time (at least for two years, i.e., one year or more after maturity)

These are prerequisites, a short list of specific agronomic traits that all varieties must have. If some of the varieties that stay well in the ground are late maturing, that might be an acceptable trade-off. While every household needs some cassava that is early maturing (to break the hungry season) it is also important to have cassava all year round, like a Bank account which people can steadily withdraw from, to provide food and to make money.

There are also some traits that are required only in some varieties, or in some places. For example, some communities prefer shorter varieties which are less likely to topple over in the wind. Other villages are pleased with their tall cassava varieties. Like the women, men do mention processing and culinary traits (e.g., going well in soup).

“Poundable” means “not toxic,” and does not refer to the texture of the root. Poundable cassava can be boiled, pounded, and eaten with no further processing, because the variety is sweet, or nontoxic. It is somewhat odd that farmers mention “poundability” so often. They even express a preference for poundable varieties in communities where people always process their cassava and have not eaten it boiled for a generation. Many adult Nigerians have never eaten freshly boiled cassava in their entire life, yet for some reason they pay attention to this trait. It may be worth remembering which varieties are toxic and which are not, just in case a person ever needs to eat some fresh (boiled) cassava. In some regions, such as I the South-South and Southeast, people make a cassava food called *abacha*, which is better if made from nontoxic varieties.

The women mention processing traits (e.g., being easy to peel) more often than the men because women process most of the cassava. When it is is difficult to peel, the women end up cutting off some of the good root with the peel, so this lowers not only the efficiency of women’s labor but also the economic yield. Women also noticed the agronomic traits of cassava varieties.

In the Southwest there a few quite specific reasons to prefer some varieties (Table 9). For example, the women of Ajagbale village in the Southwest like black cassava because it makes good shade when intercropped with cocoa. The young cocoa plants can be planted under the cassava (No doubt the farmers then harvest the cassava and replace them with a definitive shade plant.)

Table 9: Traits preferred by women and men in the Southwest, variety by variety.

	Mentioned by women	***Mentioned by men***
Agric	**Agro.** Matures early, in one year. High yielding. Keeps well in the soil, doesn’t rot. Tall stem, branches well, and smothers weeds. **Proc.** High starch content. The white root swells and makes good white *gari, fufu,* starch, and tapioca	**Agro**. Early maturing: 1 to 1.5 years. High yielding. **Proc**. It may look as if you had harvested a small quantity, but it toasts well (swells). It has an acceptable white color, a good taste, and is not bitter. The *gari* and *eba* are very good. It is very good for drinking *gari* in cold water like a snack

	Mentioned by women	*Mentioned by men*
Oko Iyawo	**Agro**. Matures early, in 9 months or one year. It branches well and suppresses weeds. **Proc**. It gives butter colored *gari, fufu,* and *lafun*. It can be boiled, pounded, and eaten. It makes a lot of *gari* and gives it a glittering color	**Agro**. High yielding. Ready to harvest in about 9 months. The roots bulk well at 1 to 1.5 years **Proc**. You can pound it like yam. It's good for *fufu*. It has starch. It gives good starch which we use on our clothes
White cassava (Ege Fifun)	**Agro**. Matures early, in 7 months to 1 year. It has white roots and stems **Proc**. It is good for *gari, fufu,* and *lafun.* The *gari* has a fine color and glitters like glass, attractive to the eye. It has a sweet taste when peeled	**Agro**. Early maturing, even from 2 months it begins to bulk. In good soil at 5 months it is harvested **Proc**. It is good with any soup. It is high in starch content and we eat the starch from it
Idileru	**Agro**. Big roots and many roots. It is heavy to carry **Proc**. High dry matter	**Agro**. The bottom is heavy with yield. It keeps well underground **Proc**. The root is white. Good for *lafun* and *gari*
Black Cassava (Ege Dudu or Baranbida)	**Agro**. It has long roots, and many of them. It is early maturing, It keeps well underground for 3 years **Proc**. Swells when toasted as *gari*. Makes good, white *gari, fufu* and *lafun*. Can stay more than 2 days after harvesting, before peeling and processing but once peeled, it must be grated	**Agro**. High yielding. It keeps well underground. Has strong stems and branches
Red Cassava (Ege Pupa or Ankara)	**Agro**. It matures within 1 year, doesn't rot, and stays well underground for up to 3 years. It has a red root cover, and red stems and petioles **Proc**. The leaves can be boiled and eaten. It makes white *gari*	**Proc**. We boil it and eat it. The *gari* from it is good
Vitamin A or Yellow Cassava	**Agro**. Matures early, in 1 year. Has many, big roots **Proc**. Rich in Vitamin A. Corrects eye sight. Makes good *gari* and there is no need to add palm oil (to make it yellow). The leaves can be cooked and eaten. It is used for flour to bake bread	**Agro**. It matures in one year **Proc**. The *fufu* quality is good. You do not need to add palm oil to make *gari* (because it is yellow)
TME 419	**Agro**. High yielding, with 6 to 8 roots. Suppresses weeds with its tall stem and branches that form an umbrella shape	**Agro**. High yielding. Early maturing, in 9 months **Proc**. Gives lots of starch, more than other varieties. It is good for food
Tomude	**Proc**. Can be boiled, pounded and eaten. The root is yellow	**Proc**. You can boil and pound it like yam without fermenting it
Igbira or Ege Fifun (Elebejebe)	**Agro**. Big root size **Proc**. Good for *gari, fufu* and *lafun*	

	Mentioned by women	*Mentioned by men*
Ege Ogbomosho or Medongo	**Agro**. Stays well underground for over 3 years, and does not rot. Matures late, in 2 years **Proc**. The big roots make cream color *gari*. Also good for *fufu* and *lafun*	
Local cassava		**Agro**. Because of poor yield people have almost stopped growing it
Onikoko		**Agro**. Extra-early maturing, bulks within 6 months
IITA		Farmers are still evaluating it
Bola Ige		**Agro**. The yield can be good, but less than Agric
Ege Olowo Oyinbo	**Agro**. Early maturing: 7 months to 1 year. Has white roots and stems **Proc**. It is good for *gari* and *fufu*	
Ege Oleke		It's not a very good variety
Ege Elese Adiye	**Agro**. Early maturing: 7 months **Proc**. Can be boiled and eaten. Good for *gari, fufu*	
Ege Pupa/ Oba Igbira	**Proc**. Poundable, can be boiled and eaten	

The North. When describing what they liked about each variety, women and men in the North gave more or less equal attention to agronomic and processing traits (Table 10). Some people in the North mentioned cassava for making dried cassava (alibo), which can be stored for a long time. When the root is nontoxic, the cassava leaves can be cooked and eaten as a sauce. Some cassava varieties are so nontoxic that they are safe to eat raw, as shown in this short video http://www.agtube.org/en/content/you-can-eat-some-cassava-varieties-raw. Also available at: https://youtu.be/s_0uUu93v14. This may be important as a snack, when people are working in the field.

Table 10: Traits preferred by women and men in the North, variety by variety.

	Mentioned by women	***Mentioned by men***
Agric or BNARDA	**Agro**. It can survive in waterlogged land. It matures early, in 7 months to a year. It is not tall, and branches well. Storable for up to 3 years without rotting **Proc**. Can be milled with guinea corn for food, and is good for *akpu* and *gari* because the root is white. Poundable, i.e., nontoxic: can be roasted or boiled and eaten like yam	**Agro**. In 7 months to 1 year you can harvest it, depending on the land. It has many roots and is fast maturing. Resists pests and diseases such as apolo (mealybug). Stays in the ground without rotting **Proc**. Soft and easy to process. Good for *gari* and it makes a very good, heavy *akpu (fufu)*. It is very good for roasting
Oko Iyawo	**Agro**. Early maturing: 7 months to 1 year. In 6 months; the roots are *pokopoko, pekepeke,* i.e., yummy yummy. Has long roots, and keeps well in non-swampy soil **Proc**. Poundable, can boiled and can be eaten like yam. Good for *gari, akpu* and *lafun*. Leaves can be cooked and eaten to cure fever and typhoid fever	**Agro**. It matures in 8 months to 1 year **Proc**. The tuber is very good. You can cook it and roast it to eat. It swells and draws when you make gari. It is good for akpu. Soft and easy to process
Akpu	**Agro**. Early maturing: 1 year. Stores well in non-swampy soil **Proc**. Good for *akpu, gari,* and *alibo*. Attractive on the market because of its fine white color	**Agro**. Fast maturing. If you plant it in April you harvest it in August. If the soil is good it produces well with big, big roots **Proc**. Not as poisonous as Yakpe. (You don't eat it and die. You can feed the residues to livestock.) The *akpu* is white. Does not need to be fermented. Makes good *akpu* and *alibo*
Walli (Dan Warri)	**Agro**. Can regenerate its stem when you cut it off **Proc**. Poundable, can be boiled and eaten. Palatable leaves. Roots are sweet and can be roasted or boiled and eaten	**Proc**. A sweet variety. You can just boil it or roast it, or put the leaves in soup, like vegetables. You can eat it raw if you want to. You can mix it with sweet potato and make *fufu*
Dangbo	**Agro**. Tall stem, big roots, early maturing: 1 year; stores well in the soil for up to 3 years **Proc**. Poundable, especially during the dry season. "We love this variety because it is very sweet when roasted or boiled." Good for *akpu,* and *gari.* Makes white *gari* and *akpu*	**Agro**. Has big, long roots. **Proc**. Is good for making *gari*,and makes good *akpu*
Yanyume Wuhe	**Agro**. Early maturing: 1 year. Stores well in the soil for up to 2 years **Proc**. Poundable, can be boiled or roasted and eaten	**Proc**. It is sweet. It is good like yam
Malam Bida	**Agro**. Early maturing, in 1.5 to 2 years, and has big roots	**Agro**. High yielding: big tubers, very long and thick **Proc**. Good for *gari*

	Mentioned by women	*Mentioned by men*
Obalo Kene	**Agro**. Early maturing: 1 year, has big roots **Proc**. Poundable, can be boiled and eaten like yam. It gives *gari* with a fine, creamy color	**Agro**. It stores well underground for 3 years **Proc**. You can cook it and eat it pounded, although we seldom eat it like that now
Dolowolojo	**Agro**. Early maturing: 5 to 7 months **Proc**. Not palatable, high cyanide content. Good for *fufu* only	**Agro**. Fast maturing
Pakimesi (or Mesi)	**Proc**. Good for *gari, fufu* and *lafun*	**Agro**. High yielding **Proc**. Good for *gari* and *lafun*
White cassava	**Agro**. Early maturing: 1 year. Does not rot; keeps well in the soil up for to 2 years **Proc**. Has less fiber. *Gari, akpu* and *abacha* come out very fine, with a fine color	**Agro**. Can stay 2 years in the ground. Takes a long time to spoil **Proc**. The *gari* is very white. It gets much starch
Red cassava	**Agro**. Early maturing: 1 year **Proc**. Leaves are edible and can be cooked with melon (egusi). The roots can be roasted and eaten like yam. Has less fiber	**Agro**. It can stay in the ground for a long time **Proc**. There is little starch
Odongbo	**Agro**. Doesn't rot; stays well in the soil for up to 2 years, and can withstand swampy areas **Proc**. Good for *gari* and *akpu*	**Agro**. Roots are longer than Akpu Apupu. Resists apolo (mealybug). Does not easily decay underground **Proc**. Roots can be peeled, dried, and pounded into *gari*
Supi	**Agro**. Early maturing in 6 months (people are still evaluating it)	**Agro**. It is a low plant. It matures quickly **Proc**. Yellow. Makes good *akpu* and has less starch
Yakpe	(The women had nothing good to say about it)	**Agro**. Rats and livestock cannot destroy it, because if they eat it they die. It produces well and has big roots. Not attacked by the soil maggot **Proc**. Gives good *akpu*. Makes good chips (*alibo*)
Payan	**Agro**. Early maturing: 1 year **Proc**. Poundable and can be mixed with yam or sweet potato	**Agro**. Has big, big roots **Proc**. Is good to roast and eat or to make *akpu* or *gari*
Atakalogo	**Agro**. Early maturing: 1 year **Proc**. Root is milky white. Poundable, can be boiled or roasted and eaten or even eaten raw	
Okpekpe		**Proc**. You can pound it and make *lafun*
Yellow Cassava		**Agro**. It is growing fast on the farm (new variety, the respondents are just getting to know it)

	Mentioned by women	*Mentioned by men*
Give Me Chance	**Agro**. Branches well, with many roots and big roots **Proc**. Has less fiber and is good for *gari, akpu,* and *abacha*	
Egbodagbate		**Agro**. Produces more roots
Ejigolo		It's like Agric
Rekia		**Agro**. It could stay in the ground for 3 years **Proc**. It could make pounded yam
Aneko		Not very good. Abandoned
Akpu Apupu		**Agro**. Skin is white. Produces a lot, almost as much as BNARDA. **Proc**. Root is white. You can boil it like Dan Warri
Akpu Aii		It is like Akpu Apupu
Imande		Similar to Dan Wari and BNARDA

Abacha is made by boiling and slicing the roots, soaking them overnight, washing, and drying: these processes help to detoxify the cassava. It is a sort of noodle and is also called tapioca.

Cassava akara (or akara akpu), a snack food, for sale in the market in Ngor Okpala, Imo State.

Cassava and maize intercropped with oil palm.

In the South-South people mention that some varieties can be intercropped with oil palm, which is the most important cash crop in this region. Some people mention late maturing as a desirable quality. While “easy to peel” is the most important trait for women (see Chapter 2 and Section 3.2), ease of peeling rarely shows up when varieties are described, probably because most varieties are equally difficult to peel (but see Abeghe Tighe, on Table 11). In the South-South some people make a*bacha*, which can be made from bitter varieties but is better if made from nontoxic ones.

Gari is kneaded with hot water to make eba, a staple of Nigerian cuisine.

Molding gari (eba).

Table 11: Traits preferred by women and men in the South-South, variety by variety.

	Mentioned by women	***Mentioned by men***
Red Cassava (Ewa ni Sheshe, Ndat Okpo, Ndat Ndat Okpo, Adadara Okpo, Ndadara Okpo, Adadat Okpo)	**Agro**. Early maturing: 7 to 8 months. High yielding (8 roots per plant). Storable in the soil for over 2 years **Proc**. Good for *gari, akpu*. Good for feeding a large household. Does not have too much water. It can be boiled and eaten	**Agro**. Withstands watery soil. High yield. Big roots (the size of a person's forearm). Early maturing: 6 months. Can be intercropped with oil palms **Proc**. Makes good *gari, fufu* and flour
White Cassava (Afia Okpo, Ewani Pipi)	**Agro**. Early maturing: 1 year. Big tubers. Stores in the soil up to 2 year. High yielding **Proc**. Gives white *akpu*. Has high dry matter. Is good for *gari, akpu*, and *abacha*. A sweet variety that can be boiled and eaten	**Proc**. Good for making all the foods. The leaves are edible. You can fry *gari* the day you dig it up; other varieties will draw too much if you do that. Is less starchy than other varieties. It is white and can be used to make *gari* and *fufu*
Panya (Panyan Akpu)	**Agro**. Early maturing: 1 year. Big roots, like yam **Proc**. Nontoxic so it is can be boiled and eaten and is good for *abacha.* Edible leaves. Makes a lot of *gari*	**Agro**. Quick maturing. Stays in the soil for 2 years **Proc**. You can boil it or roast it and eat it, or make *gari* and many other dishes or even can eat it raw
Black Cassava (Enwenwe Okpo, Obubut Okpo)	**Agro**. Late maturing: 1 year. Stays in the soil for over 1 year or 2 **Proc**. A sweet variety that can be boiled and eaten or cooked as *abacha* and can be eaten raw. High in dry matter and starch, not too much water	**Agro**. It stays up to one year in the soil without spoiling (some say 3 or 4 years) **Proc**. It is sweet: you can cook it and eat it. In an emergency you can eat it raw. It makes *gari* and good, white *fufu*
Give Me Chance	**Agro**. Branches well, high yielding: with 6 roots, big roots. Late maturing: 1.5 years. Stores up to 1.5 years **Proc**. Good for *akpu, gari, abacha.* Makes yellow *gari* that can be made without palm oil	**Agro**. High yielding (a basket full of roots from 1 plant). Long roots. You can plant it any time of the year, even in the dry season. The plant has many branches (good stem yield) **Proc**. You don't need to add palm oil when you make *gari* because it is yellow
Six Months (Six Six, 66)	**Agro**. Early maturing: 6 months. Has a tall, thick stem. You harvest a small portion of the cassava field and your basket is filled with roots	**Agro**. Bulks faster. Doesn't choose weather (i.e., grows in any type of weather). Can be cropped twice a year (fast maturing). You cut it and replant it (it ratoons) **Proc**. For *gari* and *fufu*

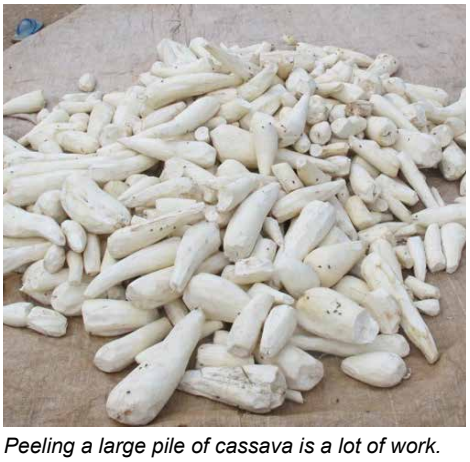
	Mentioned by women	*Mentioned by men*
Abeghe Tighe	**Agro**. Early maturing: 10 months. High yielding and has big root size. **Proc**. Easy to peel	Early maturing: if planted in Feb it produces tubers in early Nov or in Dec. High yield. Will not spoil underground
Eshi Ukom	**Agro**. Ratoons, is high yielding, keeps well in the soil for up to 3 years. **Proc**. Sweet variety that gives good, white *gari* which also swells. It is good for *akara* (snack food)	**Agro**. Matures in 5 months **Proc**. Mainly used for making *gari*
Ebeingbede	**Agro**. Its poisonous smell drives away the goats and other livestock. Early maturing: 6 months	**Agro**. High yield with very large roots **Proc**. Good for quality *gari*
Don't Worry	**Agro**. High yielding, big tubers, early maturing: 6 months	**Agro**. Requires less weeding. High yielding
Better Life (TMS 30572)	**Agro**. Stores well in the soil up to 2 years. Doesn't rot but is late maturing: 2 years	**Agro**. Early maturing and high yield
Five Five (55, 30555)	**Agro**. Early maturing: 1 year **Proc**. White roots, good for *akpu, gari, abacha*. Is much like the three leaf yam (*Dioscorea dumetorum)* to eat	**Agro**. It can last more than one year, so it sustains you during famine times **Proc**. It has little water. It rises, or swells
Okpo Ekong	**Agro**. Early maturing: 1 year. Can survive in swampy soil	**Agro**. Matures in 6 months, so you can plant it twice a year. Does not rot in the soil. Grows well in swampy soil **Proc**. Good for *fufu* and *gari*
Okpo Utut (Utut)	**Agro**. High yielding with many roots **Proc**. A sweet variety with less water	**Agro**. High yielding **Proc**. For *fufu, gari,* and starch
Vitamin A	Not harvested yet (don't know)	Not harvested yet (don't know)
Nwa Ikot	None mentioned	**Agro**. Long-lasting in the soil **Proc**. Nontoxic. For *gari, fufu,* and porridge
Eka Erong	**Agro**. Early maturing: 1.5 years. Keeps well in the soil. High yield with 7 to 10 roots **Proc**. Good for *abacha* (nontoxic). Gives a lot of starch and *gari*	**Agro**. You can plant it in the dry season **Proc**. Has more starch than other varieties. It is good for *abacha*
Eka Uyai	**Agro**. Early maturing: 1 year. Yields up to 5 roots per plant **Proc**. Makes lots of good, white *gari* and *akpu*	**Agro**. Quick to mature (6 months) **Proc**. You can make *gari* and *fufu*, but cannot eat it straightaway

	Mentioned by women	*Mentioned by men*
Jumbo (Okpo Jumbo)	**Agro**. Early maturing: 10 months. High yielding with big roots. Does not select soil (tolerates infertile soil)	**Agro**. The roots are big and attractive to buyers **Proc**. You can cook and eat without fermenting, so you can make *abacha*
Okpo Imo	**Agro**. Short stem, branches well, big roots **Proc**. The roots have lots of starch. Good for *gari*	**Agro**. It is high yielding, but only in fertile soil. It can give more than 10 roots
Belombelom	**Agro**. Can remain in the soil for up to 4 years	
Panya ma Pipi		**Agro**. Matures in 6 months—1 year. High yielding **Proc**. Is white, and a substitute for Panya, which takes 3 years to mature. Less poisonous
Eri		**Agro**. High yielding **Proc**. Produces fine *gari* and starch
Three Three		**Agro**. Yields well on fertile soil
419		**Agro**. Gives 10 roots (high yielding). Stores well in the soil **Proc**. Has little sugar and is good for diabetics
Nko Etan	**Agro**. Early maturing: 1 year, big roots. Stores up to 1 year in the ground **Proc**. Poundable (nontoxic), can be boiled and eaten, or made into *abacha*	
Oko-Iwa	**Agro**. Early maturing: 1 year **Proc**. Good for *akpu, gari,* and *abacha*	
Ipong Imenke		**Agro**. Can last 3 or 4 years in the ground and then you can fallow the land and when you clear it you can still harvest the 7-year old plants. Even if you cut the stem, it comes up. The roots are several meters long **Proc**. Has lots of starch, especially If it is old
Udia Iwa	**Proc**. Poundable, can be boiled and eaten. Can also be eaten raw	
Okpo Kobo		**Agro**. High yielding **Proc**. Can be eaten raw

	Mentioned by women	*Mentioned by men*
Awacha		**Proc**. You could uproot it and fry it the same day
Atiak Akpan		**Agro**. High yielding, with big roots **Proc**. For *fufu* and *gari*
Oto Okon Tian		**Proc**. High yielding **Agro**. Good for *gari* and *fufu*
Okpobo	**Agro**. Can be intercropped with oil palm	
Ukara Idem	Agro. Has big roots long like machete	
Okpo Ofon		**Proc**. You roast and eat it or eat it like pounded yam

The Southeast. For some reason, farmers in the Southeast mentioned processing less than those in other regions, although they did single out a variety that is easy to peel (Nwanyi Ocha), which is important but unusual. People make *abacha* in the Southeast, which is best made from nontoxic varieties. Villagers like several varieties because they are low in fiber, which is good for making *abacha*.

Unlike the Southwest and the North, where short, wind-proof varieties were praised, in the Southeast farmers grow some tall varieties (e.g., Police Cassava), and some are tall enough to shade people as they rest in the field. Southeastern farmers like some varieties just because they have an unmistakable leaf and stem color, so they are good for marking field edges. This suggests that agriculture is so intensive that people are worried about their neighbors encroaching on a field, and the land is too valuable to waste any by putting up a fence, so a living, edible boundary marker is ideal (Table 12).



Peeling a large pile of cassava is a lot of work.

Women peel cassava with a kitchen knife, one root at a time.

Table 12: Traits preferred by women and men in the Southeast, variety by variety.

	Mentioned by women	*Mentioned by men*
Nwanyi Ocha (One with God, Akpu-ji)	**Agro**. Short stem, high yielding, branches well, Early maturing: 10 months **Proc**. Has a soft skin, is easy to peel and makes good, white *akpu* and *gari* (swells and draws)	**Agro**. High yielding. Ripens in 6 months. Can last 18 months, but not 2 years **Proc**. You can pound it like yam. It makes white food
Onu Anwuru Oku (or Onu Anwuru) **Agro**. Early maturing: 6 months, high yielding, likes waterlogged soil		**Agro**. High yielding. More resistant to mealy bugs and disease. Has lots of stems. Fast maturing: 1 year or a year and 2 months
Ndu Ka N'ala	**Agro**. Has a short stem, is high yielding with up to 10 tubers, keeps well in the soil up to 2 years (and the roots get bigger). Is early maturing: 1 year **Proc**. Has starch, draws and is good for *akpu*	**Agro**. Good yield. Grows in any soil. Matures in 9 months—1 year. Can stay up to 3 years in the soil **Proc**. Ferments well: doesn't produce much fiber
Onu Uhie	**Agro**. High yielding: 8 tubers per plant, short stem, branches well. Early maturing: 9 months	**Agro**. Slow maturing but will stay in the soil for 3 years **Proc**. Is soft, so it cooks quickly. Good for *gari*
Vitamin A (Yellow, Carrot Cassava)	**Proc**. Can be eaten raw or boiled. Has yellow inner root color	**Agro**. High yield. Survives the dry season. Is resistant to pests and diseases **Proc**. Less starch. You can eat it raw like a carrot
White Cassava (Akpu Ocha, White Stem)	**Agro**. Early maturing: 9 months or 1 year. Stays well in the soil: 2 years. High yielding: 6 to 7 tubers per plant. Does not select soils (tolerates poor soil) **Proc**. Not fibrous, less starchy, good for *abacha.* Gives white *gari, akpu*, and *abacha*	**Agro**. Good yield, resists disease
Canopy (Okanenu)	**Agro**. High yielding. Forms roots and can ratoon from 6 months. Early maturing: 1 year, stores in the soil up to 2 years. Branches well and provides shade **Proc**. Good for *gari* and *akpu*. Less starch	**Agro**. Gives some yield, but more stems and you can sit in its shade
Nwa Ocha Agric (or Nwa Ochanke Agric or Nwa Nkwo Agric)	**Agro**. High yielding: 8 roots per plant, short stem, branches well. Early maturing: 9 months **Proc**. Good for *gari* and *akpu*	**Agro**. The rootsare good, straight, and strong. When you harvest and put the plant back, it grows again. It grows lots of stems **Proc**. Has good starch for g*ari*, heavy
Agric	**Agro**. Early maturing: 9 months to 1 year. High yielding and has long roots. Has thick stem, branches well, high yielding	
Nwa Ekere (Nwa Groundnut)	**Agro**. Keeps well in the ground	

	Mentioned by women	*Mentioned by men*
Afu Di Aku N'anya	**Agro**. High yielding and has long, fat roots. Stays in the soil for up to 6 years. Late maturing: 2 years	**Agro**. Stays in the soil for 3 years without spoiling
Panya	**Proc**. Poundable, can be boiled and eaten, although people only use it for *akpu*	**Agro**. It sustained the Igbo Nation during the war. It gives big tubers. It stays many years in the soil **Proc**. You can roast it in the fire or boil it like yam
Nkporo Oji (Black Cassava)	**Agro**. High yielding, has short, stout roots, matures in 1 year; storable in soil for over 2 years	**Agro**. Can stay many years in the soil and has big tubers (high yielding)
Nwa Jenny	**Agro**. Has tall stem, high yielding, late maturing: over 1½ years	**Agro**. Survives in any soil: in dry land, and in shrub land. If you plant it under palm it does well
Nwa Jenny Abaka	**Agro**. Early maturing: 9 months to 1 ½ years. Can stay in the soil for up to 2 years. High yield with big tubers, up to 5 per plants. Ratoons well	**Agro**. It always has big roots. You can cut and replant the stem. It gives many branches for planting a large farm
Try and See	**Agro**. Branches from the base. High yielding: 7 to 9 roots per plant. Stores well in the soil. Early maturing: 8 months. Can be ratooned	**Agro**. Matures in 6 months. Produces a big root, and many. You can plant it late in the season and it does not die **Proc**. It doesn't have much water. Dewaters fast. And you fry it before the others
Iwa	**Proc**. Poundable, can be boiled and eaten	**Agro**. Always has a straight stem. Root is always large **Proc**. Can be roasted and eaten like yam. You make *gari* and *fufu*
Otu Pam	**Agro**. Early maturing: 7 months to 1 year. Storable in the soil for to 2 to 3 years. High yield: 4 to 5 roots per plant. Doesn't select soil (suitable for all soil types), short stem and branches well. **Proc**. Good for *abacha*, light, tasty. Has little fiber so it is easy to slice. *Gari* and *akpu* swell and rise	**Agro**. High yielding. The roots are bigger than those of other varieties. It makes more money

	Mentioned by women	*Mentioned by men*
Onu Tanjele (Agric)	**Agro**. High yielding, always gives plenty of roots, has tall stem, early maturing: 7 months to 1 year. Stays in the soil for up to 2 years. The planted stem does not die when planted **Proc**. Plenty of starch and the cassava is dry. Will give plenty of *fufu* and *gari* and we produce good quality *abacha* because it is sweet and not fibrous	**Agro**. If you plant it in fertile soil it will give you a big harvest
Onu Cutex (Agric)	**Agro**. Early maturing: 1 year, high yield. Doesn't select soil (grows in any soil) **Proc**. Good for *abacha*	None mentioned
Agada Gbachiruzo	**Agro**. Branches from the base with small leaves. High yielding, early maturing **Proc**. Not fibrous, good for *abacha*	**Agro**. It branches and will cover everything. It likes new bush and in 2 or 3 years it will not rot **Proc**. If you make *gari* it is pure bright
Saint Paul	**Agro**. Early maturing: 6 months	
Oti Okpo	**Agro**. Has short stem, high yielding, matures in 1 year. The roots shoot out (spread near the surface, making them easy to harvest)	
Gold Coast		**Agro**. Matures in 6 months. High yielding. Less toxic
Long John	**Agro**. It had a long root	
Ishi Okpuru Gi Na Oke	**Agro**. High yielding. The plant has a tall stem, and a distinct chocolate color, making it ideal for marking field boundaries. Forms roots early and can be ratooned	
Otorokwekem	**Agro**. Has a thick and tall stem which can withstand winds	
Nwa Nkwo (local)		**Agro**. Fast maturing: 9 to 10 months. Doesn't produce many roots, but its two roots are big. Grows in any land
Onye Ocha		**Agro**. It is used to mark the boundary of the farm because of the red leaves and white stems **Agro**. Good for *gari.* Is soft when you ferment it

	Mentioned by women	*Mentioned by men*
Ere Egolu Igwe (Red Cassava and Agric)	**Agro**. Early maturing: 9 months to 1 year. High yielding and has many big, long roots	
Ome Nwangwa		**Agro**. Grows fast **Proc**. You can cook it and eat it like yam. Does not have starch. If a variety has much starch you cannot eat it fresh
Arua Agbagba Bicycle (Red Cassava)	**Agro**. High yielding and matures in 1 year. Has roundish roots, thick stem and branches well. Has big roots	
Police Cassava	**Agro**. Early maturing, high yielding	
Agbogho Nwagu (white)	**Agro**. Stays for up to 2 years **Proc**. Not fibrous, good for *abacha,* gives fine color *gari* and *akpu* that also also swell	
Ochinwerere	**Agro**. Has a long stem	
Ohu Pam	None mentioned	
Agric	**Agro**. Early maturing: 9 months to 1 year. High yielding and has long roots	
Ekpe Calabar		None mentioned
Nwa Opokopo		**Agro**. Has many big, plump roots. It can stay in the ground for 10 years and not rot. **Proc**. Has starch. It is good for *gari* and *fufu*
Omeiri		**Agro**. Early maturing, in 6 months, or in 3 or 4 months
Nwanyibiaoka	**Agro**. Has a short stem, produces (true, botanical) seeds, sprouts well, is high yielding, roots are short and roundish	
Akpu Red (Red cassava)	**Agro**. High yielding, branches well **Proc**. Easy to pound into *akpu*, gives white fine color	

Improvements expressed for varieties currently grown

In all four regions, even some popular varieties came in for constructive criticism. Again, men do mention processing qualities. Women give importance to agronomic traits, not just processing. There is a certain consistency for preferred traits, across regions and genders.

Preferred agronomic traits: high yielding, fast maturing, stay well underground, nontoxic.

Preferred processing traits: nontoxic, not watery, low-fiber, white for making *fufu. Gari* and *fufu* should be moldable, meaning you can roll the food into a ball to eat it. See a short video on molding *gari* http://www.agtube.org/en/content/molding-gari-eat-it. Also available at: https://youtu.be/YwkRV_TS50g.

Women and men seldom mention ease of peeling, which suggests that they realize that most varieties are equally challenging to peel. In Chapter 2 we will see that easy-peeling cassava is crucial for the women.

The list is organized with the more popular varieties first. Notice how the varieties listed towards the end of each table are often local (unimproved), and come in for some sharp criticism.

In the Southwest, besides preferring high yielding, early maturing varieties that last for a long time underground, men and women farmers want varieties that suppress weeds (Table 13). Women want varieties that are easy to peel and had some criticisms of the improved Agric varieties. Women and men farmers want short varieties that can withstand the wind. Some varieties are susceptible to grasscutters (a large rodent, the greater cane rat). Some preferences are contradictory: for example, farmers would like a variety that the Fulani cattle do not eat but also dislike extremely toxic varieties which can poison the local goats.

Table 13: Improvements that women and men in the Southwest suggest for varieties.

	Mentioned by women	*Mentioned by men*
Agric	**Agro**. Should mature in 6 months. Reduce rot when stored in soil; should stay well in the soil for food security, to be sold when demand for products like *gari* is high. Have more roots **Proc**. Should have a stable color; it changes color after peeling if not grated immediately. We want less fiber. If harvested after I year, roots will be will be hard like wood and cannot be processed. The *gari* is "yayaya" (like poorly cooked beans that are hard). Does not mold well. You should be able to pound it and eat it	**Agro**. It could be a branched variety. Because it is erect it falls and goats eat the leaves. Make it shorter so the wind will not disturb it, and the shade will keep the weeds low. The grasscutter likes it so much **Proc**. It should be whiter, so it makes a very white *fufu.* For *gari* it is acceptable, but not for *fufu.* It is a bit too reddish for *fufu*. It has a lot of moisture and after being grated, it is too watery. It should be drier
Oko Iyawo	**Agro**. Reduce rotting so it keeps better underground, for more than 1 year. It should have 5 to 7 roots, not 1 to 3	**Agro**. We want it to be stored longer underground. The maximum time you can leave it in the ground is 1 year and then you can lose it
White cassava (Ege Fifun)	**Agro**. We cannot store stems. They dry up during the dry season. Reduce the rots (underground) **Proc**. We want to pound it, like *fufu*	**Agro**. It should control weeds **Proc**. It is no good for making *fufu*. It has too much starch, but it's very good for *gari*
Idileru	**Agro**. Branches too much, and makes weeding difficult	**Agro**. In 1 year it rots away. Could be bred to stay longer underground
Black Cassava (Ege Dudu or Baranbida)	**Agro**. Should be early maturing , in 1 year	**Agro**. Weeds come up too quickly. It could be early maturing. Needs lower stem height. The wind uproots it when it is about to rain
Red Cassava (Ege Pupa or Ankara)	**Agro**. It should mature earlier	**Agro**. Takes 3 years to form reasonable roots and yield is poor. You may get 1 root and that is not a very big root
Vitamin A or Yellow Cassava	**Agro**. It rots early. It should be improved to keep well in the soil	We hope that consumers will want it when it is ready to market. We need the stems to plant it
TME 419		**Agro**. It falls when there is a heavy breeze and then it stops growing
Tomude		**Proc**. It can be improved so it is not toxic, so you can boil it and eat it, so you can pound it
Igbira or Ege Fifun (Elebejebe)	Not sure	**Agro**. It does not keep well underground. It also spoils quickly after harvesting, by the fourth day
Ege Ogbomosho or Medongo	**Agro**. Improve it to be early maturing in 1 year	**Proc**. You cannot pound it because it does not soften easily and it is toxic
Local Cassava		**Agro**. It is almost disappearing. Takes 2 years before it starts to bulk and you get no reasonable income from it
Onikoko		**Agro**. Should be early maturing and able to be stored longer underground.

	Mentioned by women	*Mentioned by men*
IITA		**Agro**. It promises to give a good yield. We have never harvested it
Bola Ige		**Agro**. You have to control weeds. The grasscutter eats the stem before it even begins to develop root. It is not too high, but it branches too soon so you cannot carry a backpack sprayer
Ege Olowo Oyinbo	**Agro**. Reduce root rot to keep well underground and increase its ability to suppress weeds	
Ege Oleke		Not very popular. No one can remember using it
Ege Elese Adiye	No improvement	
Ege Pupa/ Oba Igbira	No Improvement	

In the North, drought resistance is mentioned once. Some varieties are too toxic. Men and women want fast maturing varieties that can stay in the soil for two years or more (Table 14).

Table 14: Improvements that women and men in the North suggest for varieties.

	Mentioned by women	*Mentioned by men*
Agric or BNARDA	**Agro**. Drought resistant. Should be storable in the ground without rotting. If not harvested within 1 year it has too much fiber. Should be high yielding and not need fertilizer. It should smother weeds **Proc**. During rainy season the root has too much water ("flows like River Niger") so it gives less *gari.* Should not turn black during processing	**Agro**. It doesn't last long in the ground (it rots). When it is in the ground for a long time and you remove it you see a hole in the center of the root. The root will be woody **Proc**. *Fufu* is black, but should be white. It has many varieties. Some you cannot eat without processing. Stored *alibo* is attacked by small beetles
Oko Iyawo	**Agro**. Rots after 1 year underground. **Proc**. Is not palatable: is high in cyanide	**Agro**. Cannot stay for long in the ground, especially in a wet area
Akpu	**Agro**. Reduce root rot, make it stay well in the soil for a long time. The root rots if not harvested after 1 year. After 2 years the inside of the root becomes fluffy **Proc**. Make the root drier	**Agro**. Starts to rot after 1 year in the soil. If the soil is bad it gives small roots. There is a centipede that makes holes in it **Proc**. You can't eat it raw. Even boiled, it has a sour taste
Walli (Dan Warri)	**Proc**. It takes longer to toast into *gari* during the rainy season because it has too much water. Reduce the water content	**Agro**. If you plant it the day you harvest, the root is bitter. You must wait for 4 days to plant. Roots are not big; even with fertilizer it doesn't produce well
Dangbo	**Agro**. Make it easy to harvest. Difficult to harvest because roots are deep. Rots after 1 year **Proc**. Reduce water content: it is difficult to process because it consumes much fuel, energy	**Agro**. You cannot plant it 2 years in the same soil or the yield will be poor
Yanyume Wuhe	None mentioned	No disadvantages

	Mentioned by women	*Mentioned by men*
Malam Bida	**Agro**. Make it early maturing, in 1 year **Proc**. Have less cyanide, to be less harmful to eat	**Proc**. It cannot be pounded (because of cyanide)
Obalo Kene	No improvement	**Agro**. Not early maturing; it takes 2 years
Dolowolojo	**Proc**. Reduce cyanide. It cannot be eaten boiled but must be processed into *gari* or *fufu*	**Proc**. It is toxic, dangerous and not good for food
Pakimesi (or Mesi)	No improvement	No problem
White cassava	None mentioned	**Agro**. It is slow (to mature)
Red cassava	**Agro**. Should keep better underground. Rots after a year and *gari* or *akpu* made from old roots has too much fiber	**Proc**. It does not get much starch
Odongbo	**Agro**. Make it early maturing	**Proc**. *Akpu* is black and no good. The *gari* does not shine bright white
Supi	No improvement yet	**Agro**. Doesn't grow tall so it is easy for weeds to take it over. "We have only recently obtained it so we don't really know it."
Yakpe	**Proc**. It is too poisonous	**Proc**. It is too poisonous unless it is processed
Payan	**Agro**. Does not branch well	No disadvantages
Atakalogo	No improvement noted yet	
Okpekpe		**Agro**. It takes two years to mature
Yellow cassava		It is very new and "we are still getting to know it."
Give Me Chance	None mentioned	
Egbodagbate		**Agro**. It only grows on uplands. It is late maturing
Ejigolo		**Agro**. It rots quickly in the ground
Rekia		**Agro**. Is small when mature. Needs to mature fast
Aneko		**Agro**. Matures too slowly **Proc**. Gets fibrous quickly and is no good for *gari*
Akpu Apupu		**Agro**. It can't stay for 2 years from the day you plant it. The other varieties can stay more
Akpu Aii		**Agro**. Only has 2 roots. **Proc**. Even after soaking, it is too fibrous (the *gari* has too many "sticks")
Imande		**Agro**. Has a long stem, so in a breeze it falls over. Takes 1 ½ or 2 years before you can enjoy the roots **Proc**. Too fibrous

In the South-South, the men want cassava varieties that produce well in infertile soil, and need little weeding. Both genders want cassava that matures quickly and resists rot (so it can stay in the soil for a long time). Some varieties are too bitter (Table 15).

Table 15: Improvements that women and men in the South-South suggest for varieties.

	Mentioned by women	***Mentioned by men***
Red Cassava	**Agro**. Make it early maturing	**Agro**. Matures slowly. Needs fertilizer to yield well
White Cassava (Afia Okpo, Ewani Pipi)	**Proc**. It has too much water	**Agro**. Low yield. Late maturing. It will not regrow if you uproot it early, clear the big roots and rebury it. It selects soil. Is susceptible to mosaic disease **Proc**. It's watery. Draws water when the rains start
Panya (Panyan Akpu)	No improvement	**Agro**. It takes 3 years before you harvest. It takes too much labor to weed **Proc**. It is toxic
Black Cassava (Enwenwe Okpo, Obubut Okpo)	None mentioned	**Agro**. You have to plant it early in the year before there is too much rain. You cannot plant it in the middle of the rainy season
Give Me Chance	None mentioned	**Agro**. It selects land. Cannot be intercropped with oil palm. Rots quickly **Proc**. The *gari* spoils quickly. Is too watery after being graedt
Six Months (Six Six, 66)	**Agro**. If not harvested after 10 months, it rots	**Agro**. Keep it from rotting after it is 6 months old. It needs fertile soil
Abeghe Tighe	**Agro**. Rots if not harvested after 10 months	**Agro**. Spoils after 1 year in the ground **Proc**. It is bitter (toxic)
Eshi Ukom	No improvement	**Agro**. Should be fast. Doesn't keep well underground
Ebeingbede	**Agro**. Reduce rot and make it keep well in the soil for long	**Agro**. Should produce more
Don't Worry	**Agro**. Rots after one year. Reduce rot and make it store well in the soil	**Proc**. Has too much water when you fry *gari*
Better Life (TMS 3572)	No improvement	No improvement
Five Five (55, 30555)	**Agro**. Rots after 1 year if planted in wet soil	**Proc**. Has too much starch
Okpo Ekong	**Proc**. Has too much water so it makes less *gari* and takes time to cook	**Proc**. Is watery
Okpo Utut (Utut)	None mentioned	**Agro**. Yields poorly without fertilizer
Vitamin A	Not sure yet	Still evaluating
Nwa Ikot	None mentioned	**Agro**. Low yielding
Eka Erong	**Agro**. Make it early maturing with big roots	**Agro**. Requires weeding

	Mentioned by women	*Mentioned by men*
Eka Uyai	**Agro**. It rots after 1 year in the ground. Make it storable in all soil types for up to 3 years	**Agro**. If goats eat the leaves they can die. It rots after a year in the ground
Jumbo (Okpo Jumbo)	**Agro**. Rots if not harvested after 10 months	**Proc**. It is toxic (if you eat it raw)
Okpo Imo	None mentioned	**Agro**. It requires fertile soil
Belombelom	None mentioned	
Panya ma Pipi		**Agro**. It does not stay underground for long, only for 2 years
Eri		**Agro**. It needs fertilizer to grow
Three Three		**Agro**. It selects land (must be grown in fertile land), but it should be able to grow anywhere **Proc**. It is toxic
419		**Agro**. If you apply herbicides on grass it will die. It needs space and distances must be measured. The nodes must face up when you plant it (unlike other varieties which can be planted either way) **Proc**. You cannot eat it raw
Nko-Etan	None mentioned	
Oko-Iwa	None mentioned	
Ipong Imenke		**Agro**. You have to plant it in fertile soil. It selects land (is choosy)
Udia Iwa	None mentioned	
Okpo Kobo		No problems
Awacha		**Agro**. It can't survive long. If you harvest it in September the stems soon spoil
Atiak Akpan		**Agro**. During the dry season the stem dries up The roots decay
Oto Okon Tian		**Agro**. It reaches maturity only after 2 or 3 years
Okpobo	None mentioned	
Ukara Idem	None mentioned	
Okpo Ofon		There is nothing bad about it

In the Southeast, women and men are more concerned with agronomic traits, and had little to say about processing (Table 16). Cassava is a woman's crop in the Southeast, and is gradually becoming a man's crop as well. The women make a sophisticated observation: varieties with broad leaves block out the sunlight, keeping the soil moist and promoting rot. Villagers want varieties that can stay well in the soil. Some varieties are susceptible to attacks by grasscutters (cane rats), and Fulani cattle. The men make a rare observation about peeling for one variety (Ekpe Calabar). The women would like to plant more Vitamin A cassava

Most rural women process cassava, which includes collecting the firewood.

Table 16: Improvements that women and men in the Southeast suggest for varieties.

	Mentioned by women	*Mentioned by men*
Nwanyi Ocha (One with God, Akpu-ji)	Nothing mentioned	**Agro**. If you don't harvest it by 2 years it decays
Onu Anwuru Oku (or Onu Anwuru)	**Agro**. It is "dull," i.e., grows slowly and forms roots slowly. Low yielding. "Increase its yield and early bulking for ratooning of stems."	**Agro**. It needs to yield more
Ndu Ka N'ala	**Agro**. Make it storable in all soil types for a long time. It dies quickly after sprouting, especially during the peak of rainy season	**Proc**. If you uproot it to make *fufu*, and wait for 2 days it can decay. *Fufu* must be processed very quickly. It contains much cyanide, which needs to be removed. It has much carbohydrate
Onu Uhie	**Agro**. It rots faster in fertile soil	**Agro**. It takes 2 years to grow, which is too long **Proc**. It dissolves in the water when you make *fufu*, because of the lack of starch. So some people mix it with *gari*. When you mix *gari* with water to make *eba*, the *gari* floats in the water because of the lack of starch.
Vitamin A (Yellow, Carrot Cassava)	**Agro**. It rots early. It should be improved to store well in the soil. Make planting materials more available	**Agro**. The grasscutters like it very well
White Cassava (Akpu Ocha, White Stem)	**Agro**. Make it high yielding up to 10 roots per plant. It rots after 1 year; make it stay longer in the soil. Reduce rot, and reduce the fluffy bread texture it gets when it is harvested late	**Agro**. The red monkey is eating it because it is sweet
Canopy (Okanenu)	**Agro**. It rots after 1 year if not harvested. Make it stay long erin the soil **Proc**. Reduce the water (increase its dry matter and starch content). It doesn't draw. It melts and doesn't rise in the rainy season (so one needs to thicken the *akpu* with *gari*)	**Agro**. It doesn't last in the soil. It needs space and is poor yielding. **Proc**. It's more fibrous
Nwa Ocha Agric (or Nwa Ochanke Agric or Nwa Nkwo Agric)	**Agro**. It rots faster in fertile soil	No problems
Agric	**Agro**. Improve yield without fertilizer application	
Nwa Ekere (Nwa Groundnut)	**Agro**. Make it early maturing and increase its root size and numbers	
Afu Di Aku N'anya	No improvements	There is nothing bad

	Mentioned by women	*Mentioned by men*
Panya	No improvements	**Agro**. It selects soil (requires fertile soil)
Nkporo Oji (black cassava)	None mentioned	**Agro**. It is late maturing **Proc**. If you make *abacha* you cannot eat it immediately. You have to ferment it for a day first. (The men are not the cooks and they may be wrong about this last one.)
Nwa Jenny	**Agro**. Increase its yield	**Agro**. It decays quickly after 10 months
Nwa Jenny Abaka	No improvement	**Agro**. It selects for fertile soil. It is late maturing, over 1 year. The root gets stripes inside it when it is harvested late. It gets termites and millipedes
Try and See	It is the savior of the poor masses	It is wonderful
Iwa	Nothing mentioned	Nothing bad
Otu Pam	**Agro**. Make it high yielding, resistant to cattle attack and good for all cassava products	**Agro**. It should have many roots
Onu Tanjele (Agric)	**Agro**. It should yield well, even without fertilizer	**Agro**. It doesn't produce on poor soil. It is toxic. If goats eat the leaves they can be troubled in the stomach
Onu Cutex (Agric)	**Agro**. Improve yield, increase root size and make it suitable for all soil types	**Agro**. It makes few roots and small ones. If the stick is too deep it gets like a big ball instead of making roots, a lump like a football that you cannot eat
Agada Gbachiruzo	**Agro**. Make it keep long in the soil, reduce branching because it blocks the sun, keeps the soil moist and makes the roots rot quickly in the soil	**Agro**. It grows only in fertile soil
Saint Paul	**Agro**. It doesn't store well After 1 year it gives *akpu* an off-white color and it turns fluffy and is difficult to ferment	
Oti Okpo	Not mentioned	
Gold Coast		**Agro**. The fresh roots spoil quickly
Long John	**Agro**. It is low yielding and late maturing. Increase its yield and early bulking for ratooning of stems	
Ishi Okpuru Gi Na Oke	Not mentioned	

	Mentioned by women	*Mentioned by men*
Otorokwekem	**Agro**. Low yielding: 2 big roots	
Nwa Nkwo (local)		No problems
Onye Ocha		**Agro**. Susceptible to insects (grasshoppers)
Ere Egolu Igwe (Red Cassava and Agric)	Not mentioned	
Ome Nwangwa		Nothing is bad about it
Arua Agbagba Bicycle (Red Cassava)	**Agro**. Reduce water content. Its high moisture content makes it rot quickly in the soil	
Police Cassava	**Agro**. It does not store for long in the soil. Grasscutters like it a lot and are able to find and eat it even when it is mixed with other varieties or intercropped. Make it keep well and resist grasscutters	
Agbogho Nwagu (white)	Not mentioned	
Ochinwerere	Not mentioned	
Ohu Pam	**Agro**. Make it high yielding and increase its root size	
Agric	**Agro**. Improve yield without fertilizer application	
Ekpe Calabar		**Agro**. We are rejecting it because you only get small, small roots **Proc**. Goats do not eat the skins (we would like to use the peelings to feed goats). And when you peel it, the root that is left is too small (i.e., the roots are thick)
Nwa Opokopo		**Agro**. The red monkey is eating it because it is sweet
Omeiri		**Agro**. The monkeys come, 100 of them, and they can finish it off, because it is sweet. **Proc**. If it is soaked overnight it is too watery to make *abacha, akpu,* or *gari*
Nwanyibiaoka	Nothing mentioned	
Akpu Red (Red cassava)	**Agro**. It is low yielding. Make it stay well and resist grasscutters	

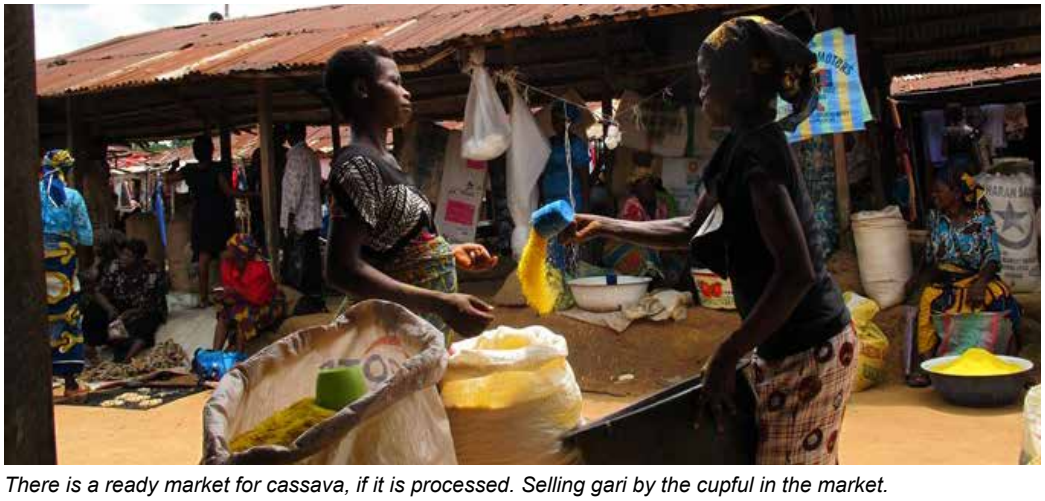
Regional preferences for cassava traits

In Chapter 1, the farmers were asked what varieties they planted and what were the advantages and shortcomings of each one. We saw that there are great regional differences in varieties planted but only slight differences in the perceived advantages and disadvantages of these varieties (e.g., women and men see early maturity as a good thing in all regions).

When the team asked what traits the farmers preferred in cassava in general (not variety by variety), the farmers mentioned a few new desired traits (Table 17). All the women want cassava that is easy to peel. Women and men want cassava that is high yielding. Most place a high value on cassava that is early maturing and stays well underground.

Table 17: Trait preferences by women and men in Nigeria.

Community	*Women*	*Men*
Southwest	Easy to peel Processing High yielding Early maturing	High yielding Early maturing Storable underground Controls weeds Ready market
North	Easy to peel High yielding Nontoxic Storable underground Processing	Early maturing Insect resistant High yielding Access to market
South-south	Easy to peel High yielding Stays well underground Processing	High yielding Stays well underground Tolerates poor soils Early maturing
Southeast	Early maturing Easy to peel Storable underground Big roots (high yielding)	Fast maturing High yielding Less starch Drought resistant



There is a ready market for cassava, if it is processed. Selling gari by the cupful in the market.

Southwestern women. Being easy to peel is the quality at the top of the list for women in the Southwest (Table 18). The women are also interested in other processing traits (e.g., nontoxic cassava, yellow or cream-colored roots). Women also mention the three main agronomic traits (yield, maturity, and storability).

Table 18: Traits preferred by women farmers in Southwest Nigeria.

	Why this is important	***No. villages***
1 Easy to peel	The women peel each root for processing. Easier peeling saves time and drudgery. The cover (skin) should not stick too well with the roots so we can peel it within 3 seconds	5 Akeredolu, Erin Oke, Ilesa, Ajagbale, Afolu Ise
2 Poundable (nontoxic)	Roots that are nontoxic and can be eaten boiled alone or mixed with breadfruit (this seems to have been more important a generation ago, when people actually ate boiled cassava): cassava that is poundable is not toxic, and the leaves can be made into sauce	4 Akeredolu, Erin Oke, Ajagbale, Afolu Ise
3 Makes yellow or cream colored *gari*	Consumers like yellow *gari* so when women make *gari* for sale they often add palm oil to it, for coloring	4 Akeredolu, Erin Oke, Ilesa, Afolu Ise
4 Stays well underground	It doesn't rot when allowed to stay in the soil for over 3 years to store for food security and for sale	4 Erin Oke, Ilesa, Ajagbale, Afolu Ise
5 Molds into a ball, draws	It is elastic, pliable. You can roll it into little balls, so it is nice to eat with your fingers. Starch makes it draw	3 Akeredolu, Ilesa, Ajagbale
6 Swells	It swells when toasted into *gari* and when the *gari* is cooked with water to make *eba*. (Swelling increases the "pot yield" the amount of food one can serve.)	3 Erin Oke, Ilesa, Ajagbale
7 High yielding	Cassava plant should have 6 to 8 roots and big roots, as long as one's arm	3 Ilesa, Ajagbale, Afolu Ise
8 Early maturing	Matures within 7 months	2 Ajagbale, Afolu Ise
9 Dewaters fast	After grating and fermenting it can take several hours or even all day to squeeze the water out of a bag of cassava mash	1 Akeredolu
10 Retains color	It should not change color and darken when grated or toasted	1 Ilesa

For Southwestern men, the three main agronomic traits rank highest. A few processing traits also featured on the men's list, along with weed and disease resistance (Table 19).

Table 19: Traits preferred by men farmers in Southwest Nigeria.

	Why this is important	***No. villages***
1 High yielding	We want high dry matter content and big roots, with many roots. High amount of dry matter content per hectare. Not too much water. Yield could even be double or triple what it is now	4 Akeredolu, Erin Oke, Ilesa, Ajagbale
2 Early maturing	It should be at least as fast as maize. Six months to maturity would be good, so that it would help to control weeds. Longer, slower cassava takes several weedings. Some varieties mature in seven months. If one matured in less, we could harvest it and replant it (during the same year), because we are dependent on it for food	4 Akeredolu, Erin Oke, Ajagbale, Afolu Ise
3 Stores well underground	It should last for 2 years and 6 months after full maturity, so we can harvest at any time of year. We want to preserve the cassava until there is a market, until the prices come up again	3 Akeredolu, Erin Oke, Afolu Ise
4 Controls weeds	To reduce drudgery and the cost of labor. Hand weeding is expensive and takes all the profits. The plant should smother weeds. It should be wide branching, and spreading	3 Akeredolu, Ilesa, Afolu Ise
5 Resistant to CMD	Cassava mosaic disease	1 Erin Oke
6 High dry matter and low moisture.	You see it when you process it. Some varieties fry quickly and easily. Some have too much water. Some you put in the press and it does not dewater easily	1 Erin Oke
7 Big roots	The market wants big roots, with diameters as large as that of a soft drink can	1 Ilesa
8 The color should not change	Some cassava varieties turn blackish on the inside four days after you harvest them. We want varieties that stay white for more than four days so we can market them. The best marketing is to sell roots raw, not as *gari*	1 Ilesa
9 Swelling	It should swell, when we fry it (toast it) into *gari* and when we add water to it to make *eba*	1 Ajagbale
10 Healthy	Free of pests and diseases	1 Ajagbale
11 Starch	After the cassava is fermented, when the mash is pressed, we put a bowl underneath to collect the starch, and we use it to wash our clothes	1 Ajagbale
12 Have vitamin A	(Local people have the idea that drinking too much *gari* harms the vision, so they think that the vitamin A variety may be good for their sight)	1 Afolu Ise
13 Leaves that can be eaten like vegetables	Some leaves are injurious to the health, toxic. (I.e., they want nontoxic leaves)	1 Afolu Ise
14 Good for *lafun*	Some varieties become watery very quickly.They should be firm to be able to stand for hours and retain food qualities	1 Afolu Ise

For Northern women, cassava must first be easy to peel (Table 20). Other processing traits (e.g., being nontoxic, with low-fiber, having good taste, and long shelf-life) are also important as are agronomic traits (yield, earliness, storage underground). There is a reference to the bad smell of Agric.

Table 20: Traits preferred by women farmers in Northern Nigeria.

	Why this is important	***No. villages***
Easy to peel	Women have to hand peel tons of cassava, just using a knife. There are few if any differences between varieties, but in general cassava is easier to peel during the rainy season. The dry season thickens the root's skin and makes it hard to peel. In the rainy season the skin is softer and easier to peel. Some say that Agric is the easiest to peel	4: Oke Dayo, Ajaokuta, Mbanyom, Ikyugwer
Root size and number (high yielding)	Very big roots, the size of yam, and ideally 6 per plant. Ten would be better. The roots should not be as big as a large papaya, because very big roots are full of water and are sometimes rotten or foamy (fluffy) in texture	4: Oke Dayo, Ajaokuta, Mbanyom, Ikyugwer
Early maturity	Cassava varieties that will mature between 6 months and 1 year. In Mbanyom if they can clear the cassava after 6 months, the women can plant upland rice	3: Oke Dayo, Ajaokuta, Mbanyom
Low cyanide content, poundable	Cyanide is poisonous and bitter. "Poundable" means nontoxic; you can boil the root, pound it, and eat it. People can also eat the leaves of poundable varieties	3: Oke Dayo, Mbanyom, Ikyugwer
Stores underground	The roots do not rot even in the rainy season, for 2 years. This allows the household to store food year round. The root is good for processing when you allow it to mature well by leaving in the soil for a long time to develop	3: Oke Dayo, Ajaokuta, Mbaatsua
Taste	This varies. Some consumers prefer sour *gari* ("that slaps you in the cheek"). *Gari* is sourer when it is fermented longer. There is little influence of variety on taste. The taste should not be sweet or sour. Taste should complement the soup	3: Ajaokuta, Mbanyom, Ikyugwer
Smooth, with few fibers	There should be no visible, thread-like bits in end products lsuch as *gari* and *akpu*. Fiber reduces the quality and marketability (preferably without the large, central fiber as they said in Mbanyom)	2: Ajaokuta, Mbanyom
Fine color	A neat butter or milky color. (*Akpu* should be white, while *gari* varies from ivory to butter colored). The food should not get darker during preparation	2: Ajaokuta, Ikyugwer
Resistance to drought	Cassava variety that can withstand the dry season and be planted at any time of the year. Allows labor scheduling and provides food year round	1: Oke Dayo
Quick cooking	Can be cooked in any season of the year without using much fuel. (Probably related to dry matter content. This is important because the women have to collect the firewood, and they have to burn a lot of it to make *gari*)	1: Ajaokuta
Heavy for *gari*	*Gari, akpu,* and *eba* that will rise and have weight. (Similar to swelling)	1: Ajaokuta
Long shelf life	The processed *gari* will not spoil when stored for 3 months; the *akpu* can stay for 3 days and still be good to eat. (Important because the women sell to traders from distant cities, so the *akpu* and *gari* have to travel well)	1: Ajaokuta

	Why this is important	*No. villages*
Smell	When fermented for *akpu,* the smell of agric is strong and to an extent offensive	1: Ikyugwer
Resistant to insects	Mealybugs	1: Ikyugwer
Medium stem height	About as tall as a person. Cassava that is too tall uses up its energy growing tall and the roots grow deep inside the soil, making it difficult to uproot	1: Ikyugwer
Swelling	Fewer roots will fill a basin of toasted *gari*. They will double in size when mixed with water. *Akpu* swells well. (Similar to "heavy for *gari*")	1: Ikyugwer
Dry matter	High dry matter. Too much water gives less processed food. The season affects most varieties. Roots harvested in rainy season have too much water, and during processing the root "dissolves" (becomes too mushy)	1: Mbaatsua

Northern men want early maturing varieties that resist mealy bugs, have many roots, and can stay underground without rotting. Other preferred traits are a mix of agronomic and processing qualities although men mention processing less than women do. Some men want more market access (Table 21).

Table 21: Traits preferred by men farmers in Northern Nigeria

	Why this is important	*No. villages*
Early maturing	Anything less than 1 year would be good, even 6 months would be better, so we don't just work, work. (So they don't have to weed as often).	4: Oke Dayo, Ajaokuta, Mbanyom, Ikyugwer
Insect resistant	Resistant to mealybug	4: Ajaokuta, Mbanyom, Ikyugwer, Mbaatsua
High yield	Up to 6 or 7 roots or 10 and very big	3: Ajaokuta, Mbanyom, Mbaatsua
Access to market	If you cannot sell it and the roots are getting bad it is a disincentive. "We want more market for cassava"	2: Oke Dayo, Ajaokuta
Stays longer in the ground	Even in a swampy area, for 2 years. "Some of the varieties after 2 years get a hole in the middle so that you can put your finger in it. We don't like that"	2: Ajaokuta, Mbanyom
Nontoxic, poundable	Cassava you can boil or even eat fresh, because someone here ate cassava raw and died. Gives good *gari* and good chips (*alibo*). One you can boil and mix with yam and sweet potato	2: Ajaokuta, Mbaatsua
Be good in all types of soil	A single cassava variety that can grow in any soil. "Because we do not have fertilizer"	2: Mbanyom, Mbaatsua
Edible, good for food	To mitigate hunger and to have more to sell. From a small area you can uproot a lot (i.e., early maturing, high yielding, and not toxic)	1: Oke Dayo
Starch, lots of it	Generally better for making food from it	1: Ajaokuta

	Why this is important	*No. villages*
The root should be dry and not fibrous	It swells up when you make it into food and if it gets fibrous quickly it is no good for *gari*	1: Ajaokuta
Ratooning	If a 5-month old plant has 2 stems, and you cut 1 for planting material, the 1 that you cut will bear roots with too much moisture and the *gari* will be bitter	1: Mbanyom
Good for diabetics	Some people with diabetes avoid cassava because of the starch	1: Mbanyom
Cattle resistant	A variety that Fulani cattle will not eat when they come through our village, one with bitter leaves, but with sweet roots	1: Mbanyom
Big, big roots	If you remove just a few plants, you get a lot	1: Ikyugwer
Less starch	Cassava with more starch makes stomach problems for the consumer	1: Ikyugwer
Resists storage pests	Small beetles on dried cassava chips (*alibo*)	1: Mbaatsua
Resists the spider	One that turns the leaves down (curls the leaves together). (Possibly cassava green mite)	1: Mbaatsua

In the South-South, women want cassava varieties stay in the ground for a long time, are easy to peel, early maturing, and high yielding, with a high pot yield (Table 22). Men grow less cassava than women. Men who grow cassava prefer to sell roots or hire women or get their wives to process and sell it for them. Women that make and sell cassava products have total control over the proceeds. Cassava is an opportunity for women, unlike some crops, such as palm oil, which are controlled by men.

Table 22: Traits preferred by women farmers in South-South Nigeria.

	Why this is important	*No. villages*
Easy to peel	The outer skin should not gum to the roots so much, so it will be easy to peel. Cassava is easy to peel during rainy season. Some varieties (e.g., Ewa ni Sheshe) are easier to peel than others. Soft skin and less water	5: Abija, Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
Early maturing	Matures in 6 months, or 8 to 10	5: Abija Duwang-Uyanga, Ikot Urom, Ikot Akpan Essien Ikot Akpan Ntia
High yielding	Big roots, as long as a person's forearm. As big as a 1.5 liter bottle of water. 10 roots per plant	4: Abija, Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
Swelling, pot yield	The cassava product should double its size after processing, e.g., to make much eba when cold or hot water is added to the *gari.* When prepared in boiling water, it gets thickened, holds more water, makes more *fufu*, and more money	3: Abija, Duwang-Uyanga, Ikot Akpan Ntia
Ability to store in the ground	Women prefer cassava varieties that can store well in the ground, without rotting. "Our bank is the ground"	3: Abija, Duwang-Uyanga, Ikot Akpan Ntia
Less water	To yield more *gari* or other processed product	3: Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia

Sour, fermented taste	"The taste of good *gari* will slap your jaw". Fermenting for longer (at least 2 to 3 days) makes for a sour taste, to complement the flavor of the soup. Some consumers like the sour taste and others don't	2: Abija, Ikot Akpan Essien
Big roots	Like a 1.5 liter water bottle	2: Ikot Akpan Essien, Ikot Akpan Ntia
Varieties matter less than seasons	Rainy season affects most varieties .When roots are harvested in the rainy season they have a lot of water. Very wet roots dissolve (turn mushy during processing)	2: Abija, Duwang-Uyanga
Starchy	Cassava roots processed the same day as they are harvested will have a lot of starch which makes the *gari* draw (stretch) like rubber or chewing gum. But after 2 or 3 days the *gari* and *akpu* draws and mold well without sticking to the palm of the hand	1: Abija
Nontoxic	A sweet variety will be easy to process into *akpu* because you don't need to worry about its poisonous bitter taste	1: Abija
Have early and late maturing varieties	They ripen at different times, spreading out the harvest window	1: Abija
Versatility in processing	We expect a variety to be able to produce many food products such as *gari, akpu, abacha*, flour, and others	1: Duwang-Uyanga
Resistant to disease	Resistant to rot or worms	1: Duwang-Uyanga
Taste	Not bitter	1: Ikot Urom
Resistant to pests and diseases	Termites and mosaic disease. Termites affects the stems and mosaic distorts the leaves	1: Ikot Urom
Heavy for *gari* and molds well	*Gari* that will not float when put in hot water. Heavier than water	1: Ikot Urom
Resistant to whitefly		1: Ikot Akpan Essien

Farmers want varieties that resist termite damage.

Men in the South-South want high yielding varieties that store well underground, tolerate poor soils, and are quick to mature. Other agronomic traits matter, but the men give less attention to processing (Table 23).

Table 23: Traits preferred by men farmers in South-South Nigeria.

	Why this is important	***No. villages***
High yielding	Many big, fat roots. (The emphasis is on big roots, as one man put it "1 or 2 or 3 roots, but big, as big as my forearm")	5: Abija, Ikot Urom, Duwang-Uyanga, Ikot Akpan Essien, Ikot Akpan Ntia
Stores well underground	Not be rotten. It should last a long time while it is in the soil. It should last for 2 years after planting	4: Duwang-Uyanga, Ikot Urom, Ikot Akpan Essien, Ikot Akpan Ntia
Tolerates poor soil	The variety should not select soil, but should grow well in any soil. We could make shorter fallows if we had a variety that did not need fertilizer	3: Duwang-Uyanga, Ikot Urom, Ikot Akpan Ntia
Quick maturing	One you can harvest in 3 to 6 months to have good population, and to use less land. If you plant in early March (with the first rains), in December the cassava will be mature	3: Abija, Ikot Urom, Ikot Akpan Ntia
Resistant to termites	Termites attack the cassava stem	2: Abija, Ikot Urom
Many roots	When you cut one stem, it has many roots	1: Duwang-Uyanga
Disease resistant	The cassava has a disease. The leaves get yellow and when you dig up the roots they have lines in them, marks that look ashy	1: Abija
Versatile processing	For *gari, fufu,* tapioca (*abacha*), chips, bread flour	1: Duwang-Uyanga
Nontoxic	One you can boil and eat	1: Duwang-Uyanga
Nutrient efficiency	To grow well. To grow up and have roots	1: Ikot Akpan Essien
Disease resistant	Not easily attacked by disease especially mosaic and root rot	1: Ikot Akpan Essien
Drought resistant	The stem should not easily dry up in the dry season	1: Ikot Akpan Essien
Resistant to the white insect	Possibly whitefly	1: Ikot Akpan Essien
Nontoxic	To cook and eat like pounded yam. To roast and eat. To eat raw, not to trouble the stomach	1: Ikot Akpan Ntia
Nontoxic leaves	So goats can eat it without dying. Less toxic leaves for animals	1: Ikot Akpan Ntia

Southeastern women want cassava that matures early, is easy to peel, keeps well in the ground, and has big roots. Most of the women's other criteria are for processing traits, such as white roots and swelling. Taste is important, but women recognize that flavor depends more on processing than on variety (Table 24).

Table 24: Traits preferred by women farmers in Southeast Nigeria.

	Why this is important	***No. villages***
Early maturing	Within 6 months, or 9 months to 1 year	5: Amiri, Amala, Amugo, Nara, Oraifite
Easy to peel	Cassava with soft, wet skin is easier to peel. The dry skinned roots are harder to peel, but they make more *gari* and *fufu*. Skin texture depends on the season. Big roots are easier to peel, and less of the root is wasted	4: Amiri, Amala, Amugo, Nara
Stays well in the soil	Cassava that can stay up to 2 years and the root when harvested will not foam or be fluffy like bread. We plant many plots of cassava farm so we want them to provide storage so that we can have a steady food supply. Early maturing varieties do not keep well in the ground	4: Amiri, Amala, Amugo, Nara, Oraifite
Root size	The size of a 1.5 liter water bottle, as big as one's fore arm, or even one's full arm. Roots as big as the biggest yam. When one root is cut into pieces it will fill the basket	4: Amiri, Amugo, Nara, Oraifite
Taste	Taste depends on preparation. *Akpu* must be well cooked to have a good taste. If it is over cooked, it becomes elastic. *Abacha* needs a sweet taste	2: Amiri, Amugo
Color	To make pure white *akpu*. Depends on preparation and peeling. If the roots are not peeled properly, the *akpu* will be off white	2: Amiri, Amala
Swelling	A Quaker oats can full of *gari* should feed and satisfy three people if the *gari* rises in hot or cold water. The *gari* should double in size when mixed with water. The *akpu* should absorb much water	2: Amala, Nara
High starch content	We need cassava with much starch to make products such as *gari* and *akpu* that draw and swell	2: Amala, Oraifite
Low in fiber	Fiber reduces the product quantity because you have to sieve out the fibers to have a fine *gari* or *abacha*. Need a variety without the small string or thread-like bits after processing. The fiber makes it harder to slice *abacha* and also reduces the quantity of *gari* and *akpu*	2: Amugo. Nara
Reduce water content	Cassava with more water makes less of the finished product and a lower quality	2: Nara, Oraifite
High yielding	Harvesting about 2 or 3 stands of cassava and filling the basin with roots	1: Amiri
Ability to ratoon	Early bulking makes ratooning possible. (Ratooning means that farmers open up the soil, dig out some of the roots, and leave in enough to hold the plant in the soil) to have more seeds	1: Amala
Does not select soil type	Tolerates poor soils	1: Amugo
Resistant to grasscutters	Put bitter medicine in the cassava that will make the roots bitter or not palatable for grasscutters	1: Nara
Resistant to pests	Rabbits, squirrels and birds	1: Oraifite
Non-melting (firm- fleshed)	Need a variety that does not melt into the water during fermentation or disappear during cooking or toasting	1: Oraifite
Storability	We want the cassava variety that will stay well in the soil for up to 2 years	1: Oraifite

Southeastern men want fast maturing, high yielding cassava. They expressed a preference for low-starch cassava, for diabetes patients; someone from public health has done a good job

raising people's awareness about diabetes (Table 25). There is a creative suggestion for cassava that can stay well after harvest.

Table 25: Traits preferred by men farmers in Southeast Nigeria.

	Why this is important	***No. villages***
Fast maturing	To produce food in 6 months to 1 year. If it matures fast, it reduces costs because there is less weeding	4: Amiri, Amugo, Nara, Oraifite
High yielding	It must have many big roots, the size of a 1.5 liter water bottle	4: Amala, Amugo, Nara, Oraifite
Less starch	Diabetic patients cannot eat the starch. Many people suffer from diabetes especially aged people because of all the cassava they eat. Yield 35 to 40% less carbohydrates	3: Amiri, Amugo, Oraifite
Drought resistant	One that withstands hot weather and grows well during March, April, and May, the months which are the main growing season	2: Amala, Oraifite
Pest resistant	Suppresses ants, millipedes centipedes and termites	2: Amala, Amugo
High dry matter	Must not be very watery, to make *gari*. One without too much water	2: Amala, Nara
Good for *gari* and *fufu*	Is bright white, sweet to taste, swells up. One that gives more *gari*	2; Nara, Oraifite
One you can harvest and it will not spoil	Like yam	1: Amiri
A cassava you can use to make biscuits	A creative suggestion	1: Amiri
Less toxic varieties	That you can roast and eat	1: Amiri
More stems	To plant, for the planting material	1: Amiri
Markets	If you harvest a lorry load what they pay you will not pay your workers	1: Amiri
Resistant to mealybugs	We have not seen mealybugs for 3 years, but we think that they are still there	1: Amugo
Control weeds	Especially grass	1: Amugo
One that grows well in infertile soil		1: Amugo
High in starch	For *abacha*	1: Nara
The stick (above-ground part of the plant) must be plenty	Because the Fulani damage the farm. The Fulani cows came and ate the Vitamin A cassava that the people from the CMS left	1: Nara
Bitter leaves	We need some cassava that the red monkeys will not eat. Animals are supposed to eat weeds, not crops	1: Nara
Vitamin A	For improved eyesight from childhood	1: Oraifite
Resist grasscutters	And other pests, but especially to resist grasscutters	1: Oraifite
Disease resistant	Especially cassava mosaic	1: Oraifite
Nontoxic	Less cyanide. One you can eat like a carrot, so you can eat it when you are on the farm	1: Oraifite

Gender differences

We have seen in Chapters 1 and 2 that women want cassava that is easy to peel. Some men want more market for fresh cassava roots, but women already have a thriving market for their cassava products. We have also seen that women pay more attention in general to processing.

In this chapter we will see that the common cassava varieties are popular with men and women. Gender differences (varieties grown only by women or only by men) show up only with the uncommon varieties, and this may be due to sampling error. (E.g. if a variety is grown by only two people in a village, a man and a woman, the woman may attend the FGD, but not the man, or vice versa). In each village, the most frequently planted varieties are the same for men and women. As seen in Chapter 1, women and men grow the same varieties.

Gender and preferred traits

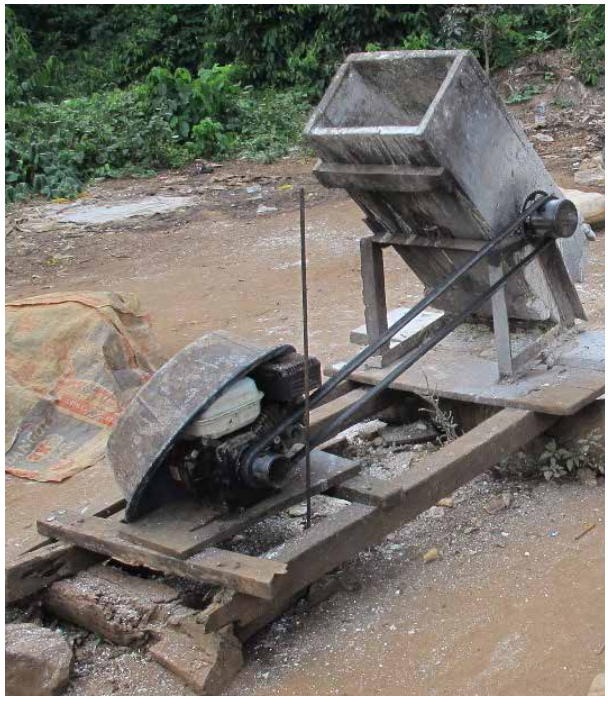
In Section 1.1 we saw that women and men prefer varieties that are fast maturing, high yielding, that keep well in the ground (see Box: Why women want varieties that can keep well in the ground). For processing, women farmers (and men as well), in all regions, generally want nontoxic varieties that are low in fiber and white when made as *fufu*. They want varieties that are low in moisture (although they know that all the roots are more moist in the rainy season and drier in the dry season).

Box: Why women want varieties that can keep well in the ground

Some women cultivate several small plots of land and like to harvest them a few plants at a time. Varieties that keep well in the ground can be harvested, processed, and sold any time women need money for expenses such as school fees, clothes for the family, medical bills, or food items that the household does not produce.

The cassava stored in the ground is collateralwhen borrowing money from people ("Lend me a bit of money and I will repay you when I harvest my cassava and make *gari*."). When there is cassava in the garden, there is food in the house all year round.

Sections 1.3 and 1.4 lists the traits farmers liked and disliked about each of the cassava varieties they grew. Those sections showed that men and women paid attention to agronomic and processing traits and that women and men saw more or less the same advantages with each variety.



Motorized cassava graters are common labor-saving devices in Nigerian villages.

The grater has a rolling drum with sharp teeth to shred the cassava roots.

A motorized grater on wheels can be taken from one farm to the next.

As we saw in Chapter 2, processing traits are crucial for women especially being easy to peel (which seem to be a real bottleneck for them, especially since grating is mechanized). Most varieties are similar for toasting and grating: the difference between

roots depends on their age (old ones are tougher) and season (roots are moister in the rainy season). For the men farmers, agronomic traits are more important than processing qualities. Some men, especially in the Southwest and in the North, would like to be able to market cassava as fresh roots, without having to process the crop at all.

In some communities, particularly in the Southeast and South-South regions, the women are more involved with cassava and know more about it than men. In some communities many of the men listed their occupations as retired civil servant, carpenter, driver, or other non-agricultural jobs (although it is common in Nigeria for men to take agriculture as a secondary occupation). The men rarely mention ease of peeling (which is the top, preferred trait for women), but men do have an idea that some processing traits are important (such as color). Women are keenly aware of processing and agronomic traits.

Processing traits are more important for women than for men

In all four regions, the men do pay attention to processing, but rank it as less important than agronomy (e.g., yield). In the Southwest, for example, men rank processing traits sixth (high dry matter content), eighth (stable color), ninth (swelling), and eleventh (lots of starch). Culinary traits such as vitamin A and edible leaves rank even lower. The other regions are similar: yield, quick maturity and good storage underground are at the top of the list. Occasionally, however, even men mention that some varieties produce leaves which are good to eat as vegetables.

The women, on the other hand, rank processing traits as the most important: being easy to peel is in the first place in three regions and in the second place in the other. Women want varieties that are nontoxic ("poundable," even though rural Nigerians no longer pound and eat much cassava without fermenting it). Color is also important: white for *fufu* (*akpu*) and *abacha* and sometimes for drinkable *gari* (stirred into cold water), while yellow is the ideal color for *gari* that is mixed with hot water to make *eba*. Dewatering fast, being moldable, swelling when mixed with water, and retaining its color in processing are all ranked highly.

However, the women realize that most of these traits depend on the season of the year or processing. For example cassava is easier to peel when it is young, and in the rainy season. Cassava mash is drier and hence easier to drain of water in the dry season (see Box: Pressing and toasting *gari*). Moldable *fufu* and *gari* (*eba*, actually) depend on being properly fermented and processed.

The women do also want the same key agronomic traits that men appreciate (high yielding, early maturing, and storable for a long time underground), but these are less important than simply being able to peel a large mound of cassava quickly so the women can get on with their many other daily tasks.

Most rural women process cassava. Sieving the fiber from the mash (right) and toasting the gari (left).

Box: Pressing and toasting *gari*

It can take all day to press the moisture from cassava on a rainy day.

Just after lunchtime, in the village of Afolu Ise in Ekiti State, in the Nigerian Southwest, almost every household is processing cassava. A few households have graters. A small gasoline engine turns a metal drum inside a box. People feed the raw, peeled, fresh cassava into the box where the roots are grated on the jagged surface of the drum. The moist, grated cassava pours out the bottom of the box where the customer collects it in a plastic pan. The miller charges ₦200 (approximately $1) for grating one large gunny bag of cassava.The varieties are often similar when being grated. When cassava has been in the ground for a long time, past the age of maturity, the roots are harder and take longer to grate. The younger ones are softer, regardless of the variety. In the rainy season all the roots hold more water and are softer.

After grating, the cassava goes into a woven plastic gunny bag, such as a used flour sack. People tie the bag tightly to squeeze out as much moisture as possible. The cassava mash then ferments. Here in the Southwest, people like a sour *gari*, so they ferment for four days. Fermenting for just two days gives a sweeter *gari*, which people in the Southeast prefer.

After fermenting, the remaining moisture is squeezed out of the mash. Some villagers have presses, which are simple, heavy metal frames, pounded into the ground like large staples. For a 60 Naira fee (about 30 cents), villagers have their mash pressed (dewatered). They pile the bags on top of one another, and put a wooden board over the top one. Then they put a large, hydraulic car jack on the board and jack it into the metal frame to force out the water. From time to time the press owner comes out and tightens the jack until the mash is squeezed. This can take two to three hours in the dry season, or all day in the rainy season.

The cassava variety makes little difference for the time it takes to press the mash. Pressing simply takes longer in the rainy season, in part because the roots are moister. The plastic gunny bag is just right for pressing. The bag lets out all the water and holds in the mash. Jute bags have a looser weave that lets some of the mash ooze out.

When the mash is dry enough, the customer takes it home and toasts it. Every woman in the village has much experience in toasting *gari*. Before she toasts it, the *gari* maker sieves the crumbly mash, picking out the big chunks of fiber and breaking the mash so it is fluffy, with about the consistency of moist sawdust. Differences between varieties are slight, but some processors toast yellow gari without adding palm oil.

Here the mash is toasted on a round, bowl-like metal pan over a hot wood fire. As the mash is toasted into *gari,* it turns from a creamy white to a light, buttery yellow, and is completely dry.

See video on pressing cassava http://www.agtube.org/en/content/pressing-cassava
Also available at https://youtu.be/P4t-umJSzkE.

Box: Toasting *gari*

While toasting a large batch of mash (grated, fermented cassava), Felicia Eruwa in the village of Akeredolu, Osun State, explained how most varieties will make nice *gari*, depending on how you treat them. She usually toasts an improved variety, "Agric".

Felicia and Johnny each stir a pan of gari on a hot fire.

The cassava is easier to peel on the day it is harvested. The secret to processing is to keep the cassava fresh. The household peels the cassava on the day it is harvested, grates it in a motorized grater, and ferments the mash for several days before pressing out the water.

Here in Osun State, the Yoruba people like their *gari* fermented for four days, but in Edo State where Felicia came from, people like less fermenting, just two days.

Consumers mix hot water with *gari* to make *eba*, which they eat as a dough or paste with sauce and meat. Consumers like an *eba* that swells. Felicia's teenage son Johnny explains that when *gari* is well toasted, and "not half done" (fairly toasted), it is dry and it swells when made into *eba*. So toasting the *gari* properly is more important than the choice of cassava variety. All or most cassava varieties make good *gari* if processed properly. Even the color is flexible. Felicia adds a bit of palm oil to her mash. The red oil gives the *gari* the buttery yellow color that many consumers prefer.

See video "toasting *gari*" http://www.agtube.org/en/content/toasting-gari.
Also available at: https://youtu.be/W_PHe1rpIY0

How to toast *gari*

You will need a hot, wood fire, covered with a steel pan. Place the mash next to the fire. Take a small basin-full of mash and spread it on the hot pan. To keep the mash from burning, stir it with a wooden paddle regularly. When the *gari* is completely dry it becomes slightly darker, and you can remove it and place it in a heap to cool.

All or almost all rural women process cassava, but grown men do so seldom if ever (although men sometimes operate the presses and graters, for a small fee). Men do know something about processing because, as teenaged boys, many of them helped their mothers to make *gari* and *fufu.* See Box: Toasting *gari.*

Lafun. Cassava can also be processed into *lafun*, by fermenting, drying, and pounding it. The pounding is to turn the dried cassava chips into *lafun* flour. The chips can be pounded by hand with a mortar and pestle or by a milling machine (see Box: Making *lafun*).

Box: Making lafun

Drying cassava into chips, or *alibo*, is a good way to preserve it. The chips are dried in the sun for several days until they are hard.

Drying cassava into chips, or alibo, is a good way to preserve it. The chips are dried in the sun for several days until they are hard

In the Tiv village of Mbanyom, Elizabeth is pounding the stiff, chalky lumps of dried cassava (*alibo*). She puts a handful of the dry chips into her wooden mortar, and crushes them by beating them repeatedly with the end of a pestle. The lumps break up into a flour-like powder. Sometimes people mix a handful of sorghum flour into the *lafun*, which will later be mixed with hot water to eat. According to Elizabeth, mixing with sorghum is to enhance the nutritional quality of the *lafun* meal.

In some parts of Yoruba land where *lafun* is eaten, cassava is not mixed with any other food.

See a video on pounding *alibo* (cassava chips) to make *lafun* flour http://www.agtube.org/en/content/pounding-alibo-make-lafun.
Also available at: https://youtu.be/dHJ-swZZcdE

Men and markets. Some men demand ways of marketing cassava fresh, without having to process it. Women are far less interested in selling raw cassava, because they do the processing. Selling the cassava as *gari* or *fufu* allows women to earn some money, an opportunity that they would lose if the roots were sold raw. See Box: Listening to what women don't say.

Box: Listening to what women don't say

What women don't say can be as important as what they do say. As we learned on this study.

In the Southwest and North, men grow much of the cassava and women detoxify it by making it into several products, especially *gari*. We expected to meet specialized processors, but nearly all women process cassava.

Women can sell *gari* in village markets to buyers, usually women, who bulk the product and take it to the cities.

The ready market. A man sells a motorcycle-load of cassava roots to a woman in Ajagbale village for 1500 Naira (about $5).

Gari is an unusual food because it is processed right in the villages, usually by women working alone (or in pairs), at home. In contrast, most of the world's stable foods are processed in the cities or even by consumers. It would be as if farm families in Kansas baked bread by the truckload in their kitchens and shipped it to stores in Los Angeles and New York.

To get cassava to transform into *gari*, Nigerian women grow some, get some from their husbands, and can buy roots in the village. Within four to five days they can turn the cassava into a bit of cash—which they can spend or keep.

In the villages across Nigeria the research team interviewed the men and the women separately. Some of the men told us that, among other things, they needed ready markets for cassava where they could sell the roots for good money. This may be a research need, although not necessarily for plant breeders.

In separate meetings, the women had plenty to say but they never mentioned markets.

If we had interviewed men and women together, the women would not have bothered to contradict the men when they asked for better markets.

The women did not ask for a ready market because they already have one. They can always carry a basin full of *gari* down to the village market and sell it. Even landless women can buy cassava and transform it to make a living, working at home.

Men and women may even have conflicting interests. Higher prices for raw roots might benefit men but could even harm the women who buy the roots as raw material to make *gari*, *fufu,* and *abacha*.

In Nigeria we see that women are quietly feeding the nation; they are happy with the market just the way it is. That is why women don't ask for ready markets. What women don't say can be as important as what they do say.

Insect damage in stored cassava chips.

Storage pests. One way to store cassava is to dry the roots as chips, or *alibo*. There is, however, a storage pest in the North, a beetle (possibly *Prostephanus truncatus*) which bores galleries (neat round tunnels) through the dried chips, quickly destroying the whole store.

Poundable means nontoxic. In the first few villages in the Southwest, farmers told the team that certain varieties were good because the roots could be boiled and pounded, like yam. Then Madu and Olaosebikan had the insight to ask when people had last eaten cassava that way. It turns out that most people haven't eaten pounded cassava since they were children. Some have never eaten it. Now people have yam to pound; cassava is most often made into *gari*. If you ask people what is good about a variety, they may respond with a memory of mom's cooking but not all varietal traits really matter.

An advantage for pro-vitamin A cassava. Many consumers prefer a buttery-colored *gari*. So far, farmers are interested in the pro-vitamin A cassava because it is yellow. This may allow village-level processors to make *gari* without adding palm oil, thus saving an expense. As Peter Kulakow points out, palm oil changes more than the color of *gari*. Oil affects the taste and texture as well. Still, most Nigerians prefer yellow *gari*, so a yellow cassava is not out of place.

Trait preferences of agro-industry. In the future, if more food manufacturers begin to use cassava as a raw material, these industrial processors will express demands for specific traits, such as higher starch content. See Box: Cassava starch processor.

Box: Cassava starch processor

IITA's Tahirou Abdoulaye (left) gets an inside look at Matna Foods Limited with Ayodeji Ibosiola, the Chief Operation Officer of the cassava starch processing factory.

Matna Foods, near Akure, in the Southwest, can't get enough cassava roots. Since 2001, this modern plant has been producing high quality, food-grade cassava starch for export and for local manufacturers. Matna prefers varieties such as TME-419 and White Lion which are high in starch. Varieties with 22 to 27% starch are best for this industry.

The company will buy cassava from any farmer, at the plant. The trucks are weighed before and after unloading, to determine the weight of the cassava. A lab technician selects a sample of roots, making sure that she gets representatives of each variety that the seller is bringing. She weighs the sample roots in a wire basket, and then weighs the roots again underwater, a method invented in ancient Greece by Archimedes in Sicily to determine the specific gravity of anything heavier than water (Weinberg, 2015). A computer program from modern China then calculates the moisture, dry matter, and starch content. Every truck load of roots supplied undergoes this process to determine the price of the roots and the amount paid to the supplier.

The plant also has a Production Unit that measures the tonnage of starch produced every day so the plant can compare the amount of starch estimated at the gate with the amount extracted by the factory. This cross-check shows that the computer is accurately determining the starch content of the fresh roots. The company pays farmers in cash on a sliding scale (more starch is rewarded). For example, they pay 10,000 Naira (about $30) per ton for cassava that is below 15% starch. For a starch content of 15 to 22% the price rises from 11,000 to 12,500 Naira and for 24% and above there is a premium price of 13,000 Naira per ton. Cassava is about 60 to 70% water.

The factory can work around the clock but it often employs only the day shift because of a lack of roots. Matna has 10 outgrowers (who were started out with stems from IITA). Matna gets 70% of its supply of roots from farmers, and would like to buy more. Matna is a ready market for farmers who want to sell cassava roots

However, connecting farmers and agro-processors will be influenced by commodity prices, transportation, and transaction costs. See Box: Understanding demand for markets.

Box: Understanding demand for markets

In our meetings in the Southwest, the villagers often started by voicing some sincere demands for problems we could not address, such as micro-credit and "ready markets." So when the villagers of Afolu Ise mentioned markets, we suggested Matna Foods, which the team had visited the day before. But the men of Afolu Ise were not interested. They said that the price offered by Matna was too low for them to make a profit. No doubt transport costs eat into the potential earnings.

We see from this that when people say they want "ready markets" they mean something like a higher market price, or a stronger demand for their fresh roots. It is always the men who ask for a market for fresh cassava. The women already have a ready market for their cassava products, such as *gari*. If the men were to find a more profitable market for their fresh cassava, it might deprive the women of one of the opportunities they have to make money.

Cassava mash in a sack. The moisture has to be pressed out of the mash to make gari, so drier roots are easier to drain, or "dewater". This is the local method of pressing.

Planting materials and seed dissemination pathways

Most of the farmers, women and men, are growing improved varieties and do not use more because of a lack of access to the seeds. When growers get a new improved variety, the farmers plant the material, and evaluate it, and usually plant it on a larger scale. Improved varieties tend to replace local varieties. A village may grow one kind for 30 to 50 years. Many improved varieties arrived from the ADPs in the 1980s. There have been more recent efforts to introduce improved varieties since about 2010, often involving ADPs and sometimes IITA and NRCRI. Very recently, since about 2012, some ADPs no longer have the resources to distribute cassava planting materials. Farmer do acquire new varieties, including those that are improved, from other farmers or (less frequently) from local markets, although these local seed systems generally move planting material short distances (within the village or to neighboring communities). As improved varieties move through local seed systems the names may become lost and the stems may be mixed with various other kinds.

Access to improved cassava varieties

Many improved varieties arrived in the 1980s (and a few in the 1970s), often through the ADP of the State Governments. Some villages have received planting material since the 1980s while others have not. Some have received sporadic access to new varieties from faith-based organizations or NGOs (e.g., Sasakawa Global 2000). Since about 2010 or 2012 there has been some distribution of improved varieties, including Vitamin A cassava. Some of the ADPs are still able to distribute planting material; others could do so if they were better resourced (see Box: Stalled extension).

Box: Stalled extension

Even by public-sector standards the ADP office building was run down. The air conditioners were covered in dust and the doors were propped open with building blocks, in the hope of catching a breeze. The carpet was stained where a large puddle had formed on the floor, under the leaking roof. The extension officer, who asked not to be named, said that the staff had been on half-salary for eight months but had not been paid at all since January. There were no funds at all for operations. “We are grounded,” as he put it.

Until about 2012, the ADP had some seeds to distribute to farmers but now there was nothing the extensionists could do for farmers. The agency no longer teaches farmers and no longer reaches them with improved varieties. Even if a commercial farmer visits the office to ask for seeds, the extension agents refer him to another commercial farm, or to IITA and NRCRI, to buy stems. The smallholders cannot look to the ADP as a source for planting material.

In some of the other States the situation is similar, and in others the extensionists are still paid and still have operating funds. It is remarkable that people come to work at ADPs when they are not being paid, but many still do. They are loyal employees who would like to be more productive.

By contrast, some States do invest in seeds. Titilayo Adewumi, the Women in Agriculture officer for the ADP in Ondo State, said that the ADP there does have stems of improved varieties which outgrowers produce. When farmers come in looking for seeds, the ADP can connect the potential customers with the outgrowers.

Farmers are eager to get new varieties, to experiment with them. If an agency brings samples of new varieties to villages at planting time, farmers will plant and evaluate the varieties. See Box: First roots. Please also see the Box: We share.

Box: First roots

In the village of Ikyugwer, in Benue State, in the North, Oliver was happy to take his visiting social scientists to see his Vitamin A cassava. He had received 200 stems in 2015 through the local BNARDA (Benue State Agricultural and Rural Development Authority), i.e., the Benue ADP.

Oliver is carefully evaluating Vitamin A cassava. It takes farmers a year or two to test a new variety.

First, Oliver went to his stand of 200 stems, next to some of his other varieties, such as Agric, an improved variety which the villagers received in 2005 and have grown ever since. He reached into the soil and dug up a root without disturbing the rest of the plant. Oliver broke the root open and admired its bright, canary-yellow flesh. Oliver thought that to make *gari*, he might mix it half-and-half with Agric (which has a white root) and even without adding palm oil, the blend would make a pale yellow product that customers would like. The Vitamin A variety had passed its first test: the root quality looked good.

Next, Oliver went to see two stems he had received earlier from BNARDA, which he had planted slightly before the other 200. It was nearly lunch time and Oliver was in a hurry to get back to the village. He quickly uprooted one of his two cassava plants and admired the roots. He was pleased with their number and size. The vitamin A variety had passed its second test: it was high yielding.

On our way back to the village, Oliver darted off the path to leave the yellow roots in the kitchen, which is where they will meet their third test. If this new variety behaves as well in the kitchen as it does in the field, Oliver will break the stalks into pieces and share them with his neighbors.

Adoption of improved varieties can be quite rapid. People in Ajagbale village in the Southwest acquired a white variety perhaps as recently as 2014, from ADP and IITA. All the farmers are now trying it so they can sell the cassava to a starch processor (Matna Foods—see Box: Cassava starch processor).

Box: We share

Emmanuel (left) and Mary (far right) share a stem of pro-vitamin A cassava with the neighbors.

Farmers love to experiment; trials of new crop varieties are especially popular but cassava takes longer to test than some crops. In 2015, the Catholic Mission gave a handful of pro-vitamin A cassava stems to Mary Ntia and her husband Emmanuel Ntia. They took the new cassava home to their village of Ikot Akpan Ntia, in Akwa Ibom State, South-South Nigeria. The community is so remote that extension agents have not been there in years.

The couple planted their pro-vitamin A cassava and at the end of the rainy season harvested a few plants, admired the large roots, and replanted the stems intercropped with maize in a full-sized garden. This garden experiment will allow Mary and Emmanuel to see how the cassava performs under normal field conditions.

The couple will also test the cassava's processing qualities, once they get enough roots to ferment and toast as *gari*. They also want to see if the cassava stays well underground. Ideal varieties can wait and be harvested a year or more after maturity. This is crucial in the humid tropics, where there are few long-term techniques for food storage.

Emmanuel dug up one of the older plants. After showing off the large, yellow roots to his visiting social scientists, Emmanuel hospitably invited them to take the stems home. When the visitors demurred, an elderly couple stepped forward. They had been quietly watching and they were keen to start experimenting with pro-vitamin A cassava, so Emmanuel handed them the harvested plant. The old couple would cut the stems into pieces and plant them. "This is what we do," Emmanuel said as he handed over the stems, "we share the stems with our neighbors."

When a new cassava variety enters a community, farmers grow the variety, share the planting material with others and evaluate the cassava for at least two years, until they feel that they know it. Then farmers will keep sharing and multiplying the new variety. If the new variety fails to meet farmers' standards, they will quietly abandon it. So far, most improved varieties find a place in farmer's fields and gardens.

Table 26 shows that men and women in all four regions rely mainly on sharing with each other and on purchase when they cannot supply enough planting materials from their own farms. Many farmers have little or no direct access to improved varieties from the formal sector, and improved varieties are not trickling very fast through the informal sector. New varieties are best distributed early in the rainy season. Some people have recently received vitamin A varieties in the dry season, and the plants died.

Table 26: Access to cassava seeds by women and men in Nigeria.

Community	***Women***	***Men***
Southwest	Mostly they share. Some buy	They share and never buy
North	They share. Only one village knew of buying	The men share. In 3 villages a few buy stems
South-south	They share and buy	Same as for women
Southeast	They buy from farmers and in the market and sell to one another. They also share	Same as for women

Farmers buy bundles of cassava stems in the market, like the ones on top of this mini-van, ready for the trip home to the farm. Village market in Imo State, Southeast Nigeria.

Bundle of stems. The standard measure is 50 stems per bundle.

Southwest. Many people in the Southwest received early improved varieties around the 1980s, and started receiving improved varieties again only after 2010 (Table 27). In some communities (Erin Oke and Ilesa) people were not able to track recent improved varieties properly. Sometimes when several improved varieties are introduced at once, people get them mixed up.

Table 27: Access to improved cassava varieties by women and men in the Southwest.

Community	*Women*	*Men*
Akeredolu	Received Agric over 20 years ago from IITA, OAU and ADP. Received Vitamin A cassava 2013-14 from OAU	White stem came in 1970s from a Professor at OAU. A project with IITA brought a truck-load of varieties including TME 419 in 2015
Erin Oke	Received no varieties for 30 years then one woman got Vitamin A from ADP in about 2014 and she will share it with the others	Received Agric from ADP in 2011. One man mixed it with his other stems. The others collected it from his farm and are not sure if they got Agric or not
Ilesa	Received varieties from ADP 20 years ago, TME 419 from ADP in 2011, and Yellow Cassava from LGA chairman in 2013. IITA brought varieties in 2013-14	IITA brought 2-3 varieties in 2013, but did not tell farmers the names and the varieties got mixed up with the others. (Some of these varieties are not on the list of varieties the farmers mentioned to the team.) Yellow Cassava came in 2013 with IITA and LGA. Others such as 419 came earlier from ADP
Ajagbale	Received Agric over 30 years ago. Lately received White Cassava from ADP and Vitamin A from IITA	White cassava came in 2014 from ADP and IITA
Afolu Ise	Received Agric over 10 years ago	Received Vitamin A from Ama Jaro, a private company in 2015 in the dry season. Of 600 stems 300 survived. The variety is still being evaluated

North. Northern farmers have had sporadic access to improved varieties, especially since about 2000 (Table 28). They often search out new varieties when they travel or source varieties from neighbors.

Table 28: Access to improved cassava varieties by women and men in the North.

Community	*Women*	*Men*
Oke Dayo	Some women who went for immunization training received an improved yellow or vitamin A variety. What they call Oko Iyawo here is an improved variety	An NGO at a clinic gave a yellow variety to two men. The farmers are poorly linked to ADP. They received an improved variety they call Oko Iyawo in about 2005
Ajaokuta	Some women bring back new varieties when they travel to their home villages (all across Nigeria) but have received none from agencies. They have an Agric variety	In about 2005, the ADP brought a new variety but the root was too woody “turns to stick” and people **stopped growing it**. They have grown Agric since the 1980s but got it by their own efforts
Mbanyom	The women collect new varieties when they travel outside the village. They received Agric over 10 years ago	Received BNARDA cassava some time between 1991 and 2005
Ikyugwer	Women received Vitamin A cassava from ADP In about 2015. They want to receive more varieties but at planting time, when the stems survive more easily. Received Agric from ADP	Men received the Supi variety in 2014 from BNARDA and Vitamin A in 2015. They received Agric variety in 2005 from ADP. They got Akpu from ADP in about 1987; they think it is improved. They also get varieties from neighboring farmers
Mbaatsua	Received a new variety from BNARDA, called “BNARDA”	Received some varieties from BNARDA, also called “BNARDA” in about 2000, which may have included TMS 30572 or 555 (according to ADP), but the farmers don’t know the names. The men also received a variety called BNARDA in 2014, indirectly, from friends and neighbors

Farmers have a real interest in trying new cassava varieties. Improved varieties can be spread spontaneously, hand-to-hand, although this is not necessarily the quickest or most systematic way to distribute them.

In the South-South there has been some recent access to improved varieties from NGOs and faith-based organizations (Table 29). Farmer in some villages have had access to some early improved varieties since the 1980s or late 1970s. During the 2000s, access increased, especially through the ADP. All five villages had at least some access, especially to a recent, popular variety called Give Me Chance. When farmers received many improved varieties all at once it can be difficult to keep their identity straight (as in Duwang-Uyanga).

Table 29: Access to improved cassava varieties by women and men in the South-South.

Community	***Women***	***Men***
Abija	They have three improved varieties	Received an improved variety, Eshi Ukom, in 1980s. ADP brought an improved variety, Better Life, in about 2014. It may be a variety released in the 1980s
Duwang-Uyanga	They have Five Five and Six Months. In about March, 2016 one woman bought a bundle of Vitamin A cassava and one of TME 419 from ADP	Received Five Five in about 1985. ADP brought Three Three in 1989. They have Six Six (Six Months). One man bought 20 bunches of improved cassava from ADP. Sasakawa (an NGO) distributed some varieties in 2014, including 419, but no one is sure what all the varieties are
Ikot Urom	Only one woman is planting “Give Me Chance.” They get their varieties from other farmers, not from organizations	They received Give Me Chance at some time between 2006 and 2013. One woman got a variety from ADP and one man got 50 stems from another farmer who is in a registered group. The others do not know the name of the varieties. No other organizations have shared new cassava varieties recently
Ikot Akpan Essien	Received Six Months some time ago. They got Vitamin A and other varieties but could not remember the names. The ADP agent provided the names as MR-8082, TMS 01368, and TME 419	Received Black Stem from “the Government” in 1978, but are not sure if it is improved or not. They have had Give Me Chance since about 2012. ADP brought Vitamin A cassava in 2015 to a few people. One local man bought Six Months in 2014 from another farmer, not from an organization
Ikot Akpan Ntia	Received Jumbo from another farmer (they think it is improved, but it may not be). They have Okpo Imo	A few people got Vitamin A cassava in 2015 from the Catholic Mission. They got Give Me Chance from farmers outside the village. Received Okpo Imo in about 2005 from the ADP but are dis-adopting it because it does not tolerate poor soil. They got some varieties, but don’t know which ones, from people who came to do a survey in November or December, 2015

In the Southeast, people seem to have less access to improved varieties than in other regions (Table 30). They don't always know if a new variety is improved or not but they do grow some new varieties, including improved ones. They buy more stems than in other regions, often going to the weekly market and buying mixed bundles of unknown varieties. Women grow cassava in the Southeast and the men are now starting to grow more as well. Cassava has been in the custody of women, so they know more about it, and may have more varieties. The village of Oraifite was an unusual case. Many of the local people were university-educated and said that they had been receiving IITA varieties since the 1980s. Since then, the villagers have grown these varieties, but their favorite was still a local variety, Ndu Ka N'ala, which was high yielding and early maturing.

Table 30: Access to improved cassava varieties by women and men in the Southeast.

Community	*Women*	*Men*
Amiri	They received Agric in about 2005 and Saint Paul from the Catholic Mission in about 2000 (it may or may not be improved) also 2 Vitamin A stems from the CMS survey, 2015	They are not sure if they have improved varieties or not. The ADP agent says that Nwanyi Ocha is NR-82
Amala	They have an old improved variety (from "50 years ago") they call Nwaocha AGRIC. They have had an improved variety, Try and See, since about 2005	They received Try and See about 2003, possibly from ADP and In 2005 the one they call Nwa Ochanke from ADP. CMS survey left 2 stems of Vitamin A cassava, that died
Amugo	They have several improved varieties from about 2000 to 2007. Onu Tanjele, since 2000, may be improved. Ere Egolu Igwe, probably improved, since 2000, and One with God which they say they have grown for 70 years but the extensionist says it is TMS 30555. The CMS survey gave them two stems of Vitamin A that died	They mentioned an improved variety, Ome Nwangwa, which they received from ADP in the 1990s. They know that some people got Vitamin A cassava from the 2015 CMS survey. The men say that Onu Tanjele is an old variety from before the war
Nara	They grow at least one improved variety and several new ones. The women thought some of the other new varieties were improved, but the ADP agent says that they are not	They grow an improved variety from the 1980s, White Cassava, and received some Vitamin A stems from the CMS survey
Oraifite	They have some older improved varieties, e.g., Canopy which they received from Ibadan in the 1990s (however, the men say it is local). They received Onu Anwuru and an Agric from Local Government in the 1990s and Vitamin A from LGA Agric Department in 2015	The men say they received Onu Anwuru from Umudike (NRCRI) in 1970s. They are growing several improved varieties including White Stem which they started to get from IITA in 1980s, Vitamin A from ADP since 2012

Access to cassava seeds

Buying cassava stems is not common, but it does occur. Generally each household produces its own cassava stems (See Box: My own stems). If people need more stems they can usually get them free from a neighbor who has just harvested a field. If people have lost their cassava to drought or if they want to expand their fields they may need more stems but usually can get them for nothing. Most people never buy cassava stems.

Box: My own stems

Pastor Egwu and three helpers quickly unloaded a truckload of improved cassava stems by the roadside near Ilesa, in Osun State. The Pastor, who is also a farmer, is closing one field and opening another, so he is bringing stems from his old field to his new one. Even someone who needs a lot of stems once in a while can often supply them himself. The Pastor knew that some people sell cassava stems, but it must be arranged beforehand.

Men and women get access to seeds differently. At the Cassava Growers' Association in Ilesa, Osun State, the women explained that since they grow less

cassava than the men (and process more), they are likely to run out of stems sooner. The men can leave a part of their field unharvested, saving the stems for planting time. The women may not always be able to do so, but they can "buy a cassava farm," meaning that they buy the standing crop in the field, harvest it for the roots, but also keep the stems. The women said, "It's our trick." The men may not even realize that they are selling seeds when the women buy the standing crop. The men in those villages may have larger fields and so be less likely to run out of stems. According to the CMS, women's gardens are smaller than men's (IITA, 2015). See also Box: A market for planting material.

Box: A market for planting material

The village of Abija, in Cross River State, in the Nigerian South-South, produces cassava along with maize and other food crops. Cash crops include cocoa and palm oil. Cassava is still important to eat and to process and sell, but may be a bit less important for cash than in some of the other study communities, where it was the main cash crop.

Less cassava means that there is a smaller supply of stems in Abija and while stems may still be free much of the time, people also sell them. So paradoxically, in areas where cassava is less important, there may be more of a seed market because supply is smaller and hence less reliable.

Where cassava is a bigger crop, the farms produce so many stems and so often that there is no market for them. This helps to explain why in the Southwest we saw a couple of communities where men did not buy seeds, but women did, because they grow less cassava and are more poorly linked to growers than men. (However, Southwestern men do have non-market ways of distributing seeds; sometimes a man tells his friends and neighbors when he is about to harvest so they could come and fetch some stems).

However, even in communities where some people buy seeds, the most common way to acquire planting material is to use stems from one's own garden or to ask permission to collect stems from the fields of neighbors who have just harvested. Getting stems from neighboring farmers lowers transaction and transportation costs. Some farmers received stems of improved varieties in the dry season of 2015 and the plants died.

People who grow lots of cassava have lots of stems, and less cause to buy planting material. Men in the Southwest and in the North, for example, grow much cassava and have less reason to buy seeds. Where oil palm or another crop is a major cash crop, farmers grow less cassava, run out of seeds sometimes, and have to buy. Where people do buy seeds in the weekly market, the varieties can be all mixed up together.

In the Southwest, men and women prefer to produce all of their own stems. When they cannot produce enough on their own farms, women and men first try to borrow from neighbors (Table 31). There was a gender difference in some communities, where men said they never, ever, bought stems, but women said they often did. Sometimes the women "bought a farm" (i.e., bought a crop of cassava standing in the field), often from a man. The women harvested the field, kept the roots, and planted the stems..

Table 31: Access to seeds by women and men in the Southwest.

Community	***Women***	***Men***
Akeredolu	Women usually get stems free from neighbors or from other farmers. Sometimes women buy stems from other farms along the road to Ilesa for ₦200 ($1) a bundle or in small amounts from one another. They know that the ADP sells stems	The men never buy stems and say they have never heard of it. The men produce their own stems or get them free from neighboring farmers who have just harvested
Erin Oke	One woman bought stems when she lost all her cassava to drought 3 years ago. Women know they can buy stems from ADP (a female ADP officer lives in their village). But women usually get stems free	The men never buy stems, but get them from their neighbors who are harvesting
Ilesa	The women know of one man who bought stems from ADP. Sometimes women "buy a cassava farm" from a man, meaning they buy the crop standing in the field, and harvest it for the roots and stems, to get planting material. Generally the women collect stems for nothing from friends and neighbors and usually buy stems only to expand the farm. They know of a commercial farm, Zenabab, where stems are sold. The chairman of the Cassava Growers' Association sometimes sells stems	One person bought TME-419 stems from the ADP in 2012 to plant a large farm. One other person bought stems once from Zenabab farm. Men can buy stems from their neighbors. Most of the time, they produce their own stems. They can preserve seeds by keeping part of the field unharvested until planting time or by cutting bundles and keeping the stems in damp places by the river
Ajagbale	The women only share cassava stems with one another and never buy them	No one buys stems, except for the husband of the ADP agent, who traded 2 bags of fertilizer for a pick-up load of TME 419 stems (for the high yield, even though other farmers in the village dis-adopted TME 419)
Afolu Ise	The women have never heard of selling stems. They get stems free from neighbors	Nobody buys stems. Men go to their neighbor's harvested fields and pick up the stems

In the North, by far the most common way to get stems is to grow them oneself, or to get them free from neighboring farmers, usually those who have just harvested their cassava and have stems left on the ground. Some people buy cassava stems "along the road," i.e., from the little roadside stalls. In the North and Southwest, some people have been forced to buy stems because herders have allowed their cattle to graze on and destroy cassava fields (Table 32).

Table 32: Access to seeds by women and men in the North.

Community	*Women*	*Men*
Oke Dayo	Don't know of anyone selling stems. The women produce planting material and get it from neighbors	Because Fulani cattle are destroying cassava fields, a few men have started to buy bundles for ₦200 -₦250 ($1- $1.25) from other farmers who have stems. The men had heard of a person who planted a large field with machinery and bought stems, but they usually produce their own seeds
Ajaokuta	Women know of local markets where they can buy: FFN market (name in Ajaokuta Steel Town that emerged from the camping of human and material resources of Fougerolle Construction Company), Akere Market, and Gidan Bassa. They can also buy bundles at stalls along the Lokoja road for ₦250- ₦500 ($1.25 - $2.25). The women share with one another and produce some planting materials. Sometimes they have to buy planting material when Fulani cattle eat their crops	The men buy from other farmers or at the Akere Market if they are short, usually because Fulani cattle have eaten their cassava. The men can also ask permission from a neighboring farmer to take stems
Mbanyom	The women have never heard of buying stems. When the women need stems, e.g., when the Fulani cattle have destroyed their fields, stems can be collected from other farmers	Men buy from their neighbors when they need material to plant. Almost any variety can be traded. Sometimes the men need stems when the cattle have eaten their fields
Ikyugwer	The women have never heard of buying stems. They exchange stems with one another	Men get stems free from nearby farmers, from people who are harvesting
Mbaatsua	They have never heard of buying. They share stems with one another	The men get stems from their neighbors. When a man sees a variety he admires, he asks the neighbor for stems so he can try it

In the South-South, people produce their own stems and exchange planting material with neighbors, but there is also more buying and selling of stems there than in the Southwest or the North (Table 33).

Table 33: Access to seeds by women and men in the South-South.

Community	*Women*	*Men*
Abija	They buy stems and share with one another. The also buy from farmers from Mbabe along the Ogoja Road	Some buy from farmers in neighboring communities. They share seeds with one another
Duwang-Uyanga	They buy from other farmers in the village and from farmers along the Uyanga Road. They get most of their seeds from friends, neighbors, and their own farms	They buy stems of any variety from ADP and from fellow farmers. Sometimes they need to buy when they harvest stems from their farm and these rot. They also share stems with neighbors
Ikot Urom	They buy and share with one another and use stems from their own farms. One woman sells stems. They also produce their own stems and share with their neighbors	They share with one another, but they do buy from other farmers as well, e.g., those from neighboring villages, to get varieties, but also sometimes just to get enough
Ikot Akpa Essien	They share with one anoher and they buy when they need a variety or to get enough planting material	They have bought Utut and Six Months to get the varieties. They share with one another, but do not always have enough stems so sometimes they have to buy them
Ikot Akpan Ntia	They share stems and produce their own. Sometimes they have to buy stems to get enough planting material	They bought Okpo Imo from the ADP to get the variety. Usually they produce their own stems or share with one another

In the Southeast, people share stems but they also buy them from other farmers and from the market. They buy stems more in this area than in other regions. This may be because cassava fields are smaller, so it is easier to run out of planting material by the start of the rainy season. In some communities, e.g., Amugo in Enugu in the Southeast, improved varieties are flowing through the system, even if there is little contact with the formal seed sector (Table 34).

Table 34: Access to seeds by women and men in the Southeast.

Community	*Women*	*Men*
Amiri	They share and sell to one another and buy stems in the market	They buy from opther farmers and from the local market and claim not to share stems with one another
Amala	They buy and share with one another	They buy stems in the market and from farmers
Amugo	They buy and sell and share stems with one another	They buy stems in the market and from each other and they share stems with their friends
Nara	They started buying stems 2 years ago. They also share with one another	They have just started to buy stems from others
Oraifite	They buy and sell and share with one another	They buy from the market, often bundles of mixed and unidentified varieties

Dis-adoption of cassava varieties

Dis-adoption is mostly of old varieties, dis-adopted because they are low yielding, late maturing, did not control weeds, fell over in the wind, were too toxic, etc. They were replaced by improved varieties.

Improved varieties are not always the favorites but are usually high on the list of popular varieties for men and women in each region. There is little or no dis-adoption of improved varieties (see Table 35).

Table 35: Adoption and dis-adoption of improved cassava varieties by gender and region.

Community	*Women*	*Men*
Southwest	Most villages adopted. No dis-adoption	They all adopted and never dis-adopt
North	They use improved varieties and never dis-adopt	Same as for women
South-South	All or most use improved varieties and never stopped	Same as for women
Southeast	They use improved varieties, but are not entirely sureof their identity. Most dis-adopted varieties are local	They think they are using improved varieties and dis-adopting local ones

Seeds of a variety can be lost. If people get something new and everyone plants it, they may lose the planting material for an old variety without really meaning to do so, or without realizing it until it is too late. There's no place to store seeds and planting material is also very perishable, so they collect seeds from neighbors. If they harvest all their cassava in the dry season they have to get seeds from somewhere else, when the rains start.

Adoption and dis-adoption of improved cassava varieties

There is little evidence that improved varieties are ever dis-adopted in the Southwest (Table 36).

Table 36: Adoption and dis-adoption of improved varieties by gender in the Southwest.

Community	*Women*	*Men*
Akeredolu	Everyone adopted. No one dis-adopted	Everyone adopted. No one dis-adopted
Erin Oke	Everyone adopted. No one dis-adopted	Everyone adopted. No one dis-adopted
Ilesa	Everyone adopted. No one dis-adopted	Everyone adopted. No one dis-adopted
Ajagbale	Vitamin A did not survive the dry season (should be distributed during rainy season)	Everyone adopted. Dis-adopted TME 419
Afolu Ise	Most use Agric and never dis-adopted	Everyone adopted. No one dis-adopted

No one, or hardly anyone, is dis-adopting improved varieties in the North (Table 37).

Table 37: Adoption and dis-adoption of improved cassava varieties by gender in the North

Community	*Women*	*Men*
Oke Dayo	The women think Oko Iyawo is improved but they are not sure. One woman stopped planting it because it does not keep well underground. In 2015, they started to evaluate a new variety, probably Vitamin A	The men think they are using improved varieties, such as Oko Iyawo. They have never dis-adopted
Ajaokuta	No dis-adoption	The men have never dis-adopted. One man is even conserving the woody variety because it matures in 5 months
Mbanyom	All the women use Agric and no one dis-adopted	All the men plant improved varieties. No one dis-adopted
Ikyugwer	The women think that they are using improved (“good”) varieties. No one dis-adopted	All the men plant improved varieties. No one dis-adopted
Mbaatsua	All the women plant improved varieties. No one dis-adopted	All the men plant improved varieties. No one dis-adopted

In the South-South, farmers are not quite sure which varieties are improved but most people think that they are planting at least some improved varieties and have not dis-adopted them (Table 38).

Table 38: Adoption and dis-adoption of improved varieties by gender in the South-South.

Community	*Women*	*Men*
Abija	All think they are using improved varieties and have not dis-adopted	They are not sure which varieties are improved. They think they are using improved varieties and have never dis-adopted
Duwang – Uyanga	They think they are using improved varieties and have not dis-adopted	Everyone uses improved varieties
Ikot Urom	Only one has used Give Me Chance. The others have not had access to improved varieties	About half have used Give Me Chance. None have dis-adopted
Ikot Akpan Essien	They are all planting Six Months and none have dis-adopted	Most have tried Six Months. Those who have not adopted have not had access to the planting material. No one has dis-adopted
Ikot Akpan Ntia	All are still using improved varieties	They grow several improved varieties. All farmers grow them. No one dis-adopted but some are losing interest in Okpo Imo because it does not tolerate poor soils

In the Southeast, women and men are planting improved varieties (Table 39).

Table 39: Adoption and dis-adoption of improved varieties by gender in the Southeast.

Community	*Women*	*Men*
Amiri	They are dis-adopting local varieties and one possibly improved variety, St. Paul	They think they are using improved varieties but are not really sure
Amala	They think they are all using improved varieties and not dis-adopting	They use improved varieties and have not dis-adopted
Amugo	They plant improved varieties and have not dis-adopted	They all adopted improved varieties and did not dis-adopt
Nara	They all use improved varieties. They dis-adopted Onu Cutex, a new variety that may be improved, because it was low-yielding	They use and have not dis-adopted improved varieties. They are also abandoning Onu Cutex; this is new to them but may be local
Oraifite	They use improved varieties and have not dis-adopted	They use improved varieties and have not dis-adopted

Improved varieties are rarely dis-adopted

Most villages have never abandoned an improved variety. Farmers are gradually abandoning local varieties in favor of those that are improved. In future, as new improved varieties are released, they may begin to replace the older improved varieties. The local varieties are abandoned because they are late maturing, poor yielding, begin to rot quickly underground, or do not control weeds well.

In the Southwest, in Ajagbale, for example, farmers are abandoning some local varieties, usually for explicit, agronomic reasons. Ege pupa (red cassava) is low yielding and late maturing. This is also one of the few communities where people say they are discontinuing TME-419. Although some people are still planting it because of its high yield, the others say it falls over in the wind. It may also be facing stiff competition from the starchy white cassava (Table 40). Note that many of the abandoned varieties are mentioned only in one community, and may have been rare to begin with. Few improved varieties are abandoned.

Table 40: Dis-adopted cassava varieties in the Southwest.

	Why abandoned	*Mentioned by*	*Notes*
Oko Iyawo	Stores poorly underground. Low yielding	Women in Akeredolu, and Afolu Ise. Men and women in Erin Oke and Ilesa	Local variety (once widespread)
Ayeke	Late maturing and low yielding. Displaced by Agric	Women and men in Akeredolu	Old, local variety
Tomude	It is being dis-adopted because it has a poor yield and only 1 or 2 roots	Men in Akeredolu, women in Erin Oke	Local variety
Aboyade	It was late maturing. You had to wait 3 years to get a good yield, but it did store well underground	Men in Akeredolu	Local variety
Bola Ige	Abandoned in favor of improved varieties	Men in Ilesa	Possibly early improved variety introduced about 1979
White Cassava	It does not control weeds	Men in Ilesa	Local variety
Black Cassava (Ege Dudu)	It is late maturing. “Other, better varieties made us stop planting it”	Women in Ajagbale	Local variety
Ege Oleke	It is low yielding and has few roots	Men in Ajagbale	They had grown it since 1996
Ege Pupa (Red Cassava)	It takes 3 years to form reasonable roots. The yield is poor and it takes a long time to yield	Men in Ajagbale	Local variety
TME 419	It falls when there is a heavy breeze and then it stops growing	Men in Ajagbale	Early improved variety
Agric	It rots after 1 year	Women in Afolu Ise	Improved variety
Ege Elese Adiye	Farmers now have better varieties. Only 1 person still plants it	Women in Afolu Ise	Local variety
Gboko-gbala	As it grew, the branch would touch down and take root, like a separate plant, so it could take over your whole farm	Men in Afolu Ise	Local variety
Ege Oniyan	It was very late maturing	Men in Afolu Ise	Local variety

In the North, farmers have probably only dis-adopted local varieties. The abandoned varieties were too toxic, too slow to mature, or yielded too little (Table 41).

Table 41: Dis-adopted cassava varieties in the North

	Why abandoned	***Mentioned by***	***Notes***
Malam Bida	It has so much cyanide it can kill people	Women in Oke Dayo	Old variety, probably local
Obalo Kene	It takes 2 years to mature	Men in Oke Dayo	Local variety
Rekia	Roots were too small	Men in Ajaokuta	Probably local variety
Aneko	Too slow, too fibrous	Men in Ajaokuta	Probably local variety
Odongbo	Late maturing	Women in Mbanyom	Local variety
Akpu Aii	Yields poorly, too fibrous	Men in Mbanyom	Local variety
BNARDA	The community stopped growing some of the varieties, those that were too fibrous or poor yielding	Men in Mbaatsua	The men kept many of the improved varieties introduced around 2000, but do not know which they dis-adopted, because the varietal names were long numbers and difficult to remember

In the South-South, most of the dis-adopted varieties were local but a few were old, improved varieties, which farmers had grown for years and were starting to abandon in favor of newer ones. Varieties are discarded for being poisonous, too watery during processing, or because they rot easily (when stored underground), or are poor yielding (Table 42).

Table 42: Dis-adopted cassava varieties in the South-South.

	Why abandoned	***Mentioned by***	***Notes***
Ebeingbede	Too poisonous. Low yielding	Men and women in Abija	No other community reported growing it
Don't Worry	It rots and is low yielding	Women in Abija	
Better Life	It is poisonous	Women in Abija	Improved
Panya	It takes 3 years to mature. "If you don't have enough land, you suffer"	Men in Abija	This may have been a useful variety in past generations when there was more land, and when slow maturing varieties provided a reassuring food supply
Eri	It does not tolerate poor soil	Men in Abija	In the past, fertile land could be cleared from the forest
Red Cassava	It is poisonous	Women in Duwang Uyanga	This may be a complex of varieties; not all may be toxic
Oko-Iwa	Not sure	Women in Duwang Uyanga	Probably replaced by better varieties
Okpo Ekong	It is too watery and too difficult to process	Women and men in Duwang Uyanga	Processing takes too much time, money, and energy
Six Six	Much of it rots	Men in Duwang Uyanga	Improved
White Cassava	Too watery	Women in Ikot Urom, Ikot Akpan Essien, and Ikot Akpan Ntia	Probably a complex of varieties
Awacha	Roots and stems are too short	Men in Ikot Urom	
Panya	Poor yielding	Women and men in Ikot Akpan Essien	When a variety starts to decline in popularity it loses its critical mass. Some people who would like to grow it no longer can do so because no one else is able to share seeds with them
Nwa Ikot	Poor yielding	Women and men in Ikot Akpan Essien	
Atiak Akpan	It does not always survive the dry season	Men in Ikot Akpan Essien	
Okpo Imo	Unclear	Women in Ikot Akpan Ntia	
Okpobo	Displaced by other varieties	Women in Ikot Akpan Ntia	
Ukara Idem	Unclear	Women in Ikot Akpan Ntia	

Southeast. Some local varieties in the Southeast were replaced by improved ones. Varieties are abandoned for being low yielding or late maturing. Some were also too susceptible to attacks by grasscutters, monkeys, or other vertebrates (Table 43).

Table 43: Dis-adopted cassava varieties in the Southeast

	Why abandoned	***Mentioned by***	***Notes***
Onu Anwuru	Susceptible to disease, late maturing, low yielding	Women in Amiri and in Amala	
Saint Paul	Rots in the ground. Good for making *gari*, but not *fufu*	Women in Amiri	
Oti Okpo	Displaced by improved varieties	Women in Amiri	
Panya	Lack of planting materials	Women in Amiri	A variety needs a critical mass of farmers
Nwa Ekere	Low yielding and late maturing	Women in Amiri	
Afu Di Aku N'anya	Late maturing	Men in Amiri. A few people still plant it	The variety is OK, but Amiri has many others
Long John	Low yielding, late maturing	Women in Amala	
Nwa Groundnut	Low yield and late maturing	Women in Amala	
Iwa	They are not sure why they lost it	Men in Amala, women in Amugo	Men in Amala would like to have the variety back
Otu Pam	Low yielding	Women in Amugo	Few people still plant it
Onu Tanjele	Poor yielding on infertile soil. Leaves are toxic to livestock	Men in Amugo	Not grown much
Police Cassava	Devastated by grasscutters. Rots after 1 year. Still being planted around the homestead and backyard	Women in Nara	A variety may be dis-adopted as a field crop but live on in gardens near home
Ochinwerere	Replaced by White Cassava	Women in Nara	
Ohu Pam	It has small roots	Women in Nara	
Onu Cutex	If planted too deep it produces a woody growth instead of roots	Women and men in Nara	
Ekpe Calabar	It has small roots and a thick skin, so when you peel it you lose too much of the root	Men in Nara	Peeling problems lower the economic yield
Omeiri	Prone to attacks by monkeys, spoils during processing	Men in Nara	
Nwanyibiaoka	Replaced by improved varieties	Women in Oraifite	
Akpu Red	Devastated by rabbits, squirrels, and birds	Women in Oraifite	
Canopy (Okanenu)	It must be planted at wide spacing so people plant only a few stands, not a whole field	Men in Oraifite	Canopy is partly rejected but finds a new niche at field edges where it has enough room

Improved varieties rank fairly high

When the team asked the farmers to rank their favorite varieties, the men and women generally ranked improved cassava fairly high. Except for one very remote community in the South-South which receives no extension visits, all the study villages grow at least some improved varieties. Although some local have been lost (see Section 5.2), farmers still grow many local varieties (Tables 44 through 51).

In Ilesa, the research team met with farmers from the Cassava Growers' Association, who are in contact with IITA. Note how many of their favorite varieties are improved cultivars (Tables 44 and 45). This suggests that farmers like and grow improved varieties if the community has good access to them.

Table 44: Ranking of cassava varieties by women in the Southwest.

Akeredolu	***Erin Oke***	***Ilesa***	***Ajagbale***	***Afolu Ise***
1. White Cassava	1. Black Cassava	*1. Agric Black*	1. Oko Iyawo	1. Ege Ogbomosho/ Medongo
2. Idileru	2. Idileru	2. TME 419	*2. Ege Fifun (White Cassava)*	2. Ege Pupa
3. Black Cassava	3. Tomude	*3. Yellow Cassava*	3. Ege Olowo Oyinbo	*3. Agric*
4. Vitamin A Cassava	4.Oko Iyawo	*4. Agric White*	4. Ege Pupa	4. White Cassava
5. Agric	*5. Vitamin A Cassava*	5. Oko Iyawo	*5. Agric*	5. Ege Pupa

Based on farmers' perceptions, improved varieties are listed in italics.

Table 45: Ranking of cassava varieties by men in the Southwest.

Akeredolu	***Erin Oke***	***Ilesa***	***Ajagbale***	***Afolu Ise***
1. White Stem	1. Black Cassava	*1. Agric*	1. Oko Iyawo	*1. Agric*
2. Agric, Black Cassava	2. Idileru	2. TME 419	*2. Agric*	2. Ege Pupa
3. Oko Iyawo	3. Oko Iyawo	*3. Yellow Root*	*White Cassava: it is too soon to tell*	3. Ege Obgomosho
4. Idileru	*4. Agric*	4. Idileru		*4. Idileru**
5. Tomude	5. Tomude	*5. IITA*		5. Oko Iyawo
		6. Oko Iyawo		6. Ege Igbira
		7. Bola Ige		
		8. White Cassava		

Based on farmers' perceptions, improved varieties are listed in italics.
*The men in Afolu-Ise claimed that the "Idileru" they grow is an improved variety.

The differences between the regions are real. Each region has its own, unique varieties. The differences between the genders may be more apparent than real. For example, in one village, the women's favorite variety may be a few notches down on the men's list, and vice versa. This may be because we asked people to rank their favorite varieties. Yet "favorite" is a subjective word. It could mean the most common cassava variety, the tastiest one, the highest yielding, or the most promising of the new varieties. In the future, it might be better to go through the list of varieties one by one and simply ask the group members to raise their hands if they grow that particular variety. The results would be objective, replicable, and save some heated discussion.

Table 46: Ranking of cassava varieties by women in the North.

Oke Dayo	***Ajaokuta***	***Mbanyom***	***Ikyugwer***	***Mbaatsua***
1. Oko Iyawo*	1. White Cassava	*1. Agric*	*1. Akpu*	*1. Akpu*
2. Pakimesi	2. Red Cassava	*2. Akpu*	2. Dangbo	2. Dan Warri
3. Obalo Kene	3. Oko Iyawo	3. Oko Iyawo	*3. Agric*	3. Atakalogo
4. Dolowolojo	*4. Give Me Chance*	4. Yanyume Wuhe		4. Yanyume Wuhe
	5. Agric	5. Atakalogo		*5. BNARDA*
		6. Dan Warri		

Based on farmers' perceptions, improved varieties are listed in italics.
*The extension officer said that in this village, this variety was a TME, i.e., a landrace accession collected by IITA.

Table 47: Ranking of cassava varieties by men in the North.

Oke Dayo	***Ajaokuta***	***Mbanyom***	***Ikyugwer***	***Mbaatsua***
1. Oko Iyawo*	1. White Cassava	*1. BNARDA*	*1. Akpu*	*1. Akpu*
2. Malam Bida	2. Oko Iyawo	2. Dan Warri	2. Dangbo	2. Dan Warri
3. Mesi	3. Egbodagbate	*3. Akpu Apupu*	*3. Agric*	*3. BNARDA*
4. Obalo Kene	4. Red Cassava	4. Dangbo		4. Yanyume Wuhe
	5. Ejigolo			5. Panya
	6. Agric			6. Imande
				7. Yakpe

Based on farmers' perceptions, improved varieties are listed in italics.
*The extension officer said that in this village, this variety was a TME.

Table 48: Ranking of cassava varieties by women in the South-South.

Abija	*Duwang-Uyanga*	*Ikot Urom*	*Ikot Akpa Essien*	*Ikot Akpan Ntia*
1. Eshi Ukom	1. Ndat Okpo (Red Cassava)	1. Enwenwe Okpo (Black Cassava)	*1. Six Months*	1. Eka Erong
2. Ewa ni Sheshe (Red Cassava)	*2. Five Five*	2. Abeghe Tighe or Adadara Okpo	2. Okpo Utut	2-3. Abeghe Tighe
3. Ewani Pipi	*3. Six Months*	*3. Give Me Chance*	3. Ndadara Okpo (Red Cassava)	2-3. Eka Uyai
4. Better Life	4. Panya		4. Obubut Okpo (Black Cassava)	4. Jumbo
5. Belombelom	*5. Nko Etan*			
6. Don't Worry				

Based on farmers' perceptions, improved varieties are listed in italics.

Table 49: Ranking of cassava varieties by men in the South-South.

Abija	*Duwang-Uyanga*	*Ikot Urom*	*Ikot Akpa Essien*	*Ikot Akpan Ntia*
1. Eshi Ukom	*Five Five* 419 Panya Akpu	1. Enwenwe Okpo (Black Cassava)	1. Utut (same as Okpo Utut)	1. Eka Erong
2. Don't Worry	*Three Three* Ndat Ndat Okpo (Red Cassava) *Six Six* Afia Okpo (White Cassava)	2. Abeghe Tighe	*2. Six Months*	2. Okpo Jumbo
3. Better Life	Ipong Imenke Okpo Ekong	*3. Give Me Chance*	*3. Enwenwe Okpo (Black Cassava)**	3. Okpo Ofon
4. Red Stem		4. Okpo Kobo	4. Afia Okpo (White Cassava)	4. Eka Uyai
5. Panya ma Pipi		5. Ndat Ndat Okpo (Red Cassava)	5-7. Ndat Ndat Okpo (Red Cassava)	5. Enwenwe Okpo
6. Ebeingbede		6. Afia Okpo (White Cassava)	*5-7. Give Me Chance*	6. Ndadara Okpo (Red Cassava)
			5-7. Oto Okon Tian	

Based on farmers' perceptions, improved varieties are listed in italics.
*Black Cassava in Ikot Akpa Essien is probably an early improved variety. Black Cassava from the other villages may be local.

Table 50: Ranking of cassava varieties by women in the Southeast.

Amiri	*Amala*	*Amugo*	*Nara*	*Oraifite*
1. Ndu Ka N'ala	*1. Nwa Ocha*	*1. Onu Tanjele*	*1. White Cassava (Akpu White)*	1. Ndu Ka N'ala
2. Nkporo Oji	2. Nwa Jenny Abaka	2. Otu Pam	2. Agada Gbachiruzo	2. Canopy*
3. Afu Di Aku N'anya	*3. Try and See*	*3. One with God*	*3. Onu Cutex*	*3. Akpu Ocha/ Akpu White*
4. Canopy	4. Ishi Okpuru Gi Na Oke	4. Nwanyi Ocha	4. Agbogho Nwagu	*4. Agric*
5. Nwa Ocha (Nwanyi Ocha)		*5. Ere Egolu Igwe*	*5. Agric*	

Based on farmers' perceptions, improved varieties are listed in italics.
*Canopy may be improved as well.

Table 51: Ranking of cassava varieties by men in the Southeast.

Amiri	*Amala*	*Amugo*	*Nara*	*Oraifite*
1. Ndu Ka N'ala	*1. Nwa Ochanke*	*1. Ome Nwangwa**	*1. White Cassava*	*1. Yellow Root*
*2. Nwanyi Ocha**	2. Nwa Jenny	2. Otu Pam	2. Nwa Opokopo	2. Ndu Ka N'ala
3. Panya	*3. Try and See*	3. Nwanyi Ocha	3. Agada Gbachiruzo	*3. Nwanyi Ocha*
4. The rest are all the same	4. Onu Anwuru Oku	*4. Onu Tanjele*		*4. Onu Anwuru*
	5. Onye Ocha	5. Onu Uhie		*5. White Stem (same as Akpu Ocha)*
	6. The others			6. Okanenu
	7. Iwa			

Based on farmers' perceptions, improved varieties are listed in italics.
*Nwanyi Ocha may be the same as Nwa Ocha, and Ome Nwangwa may be synonymous with One with God. It may be NR-82.

Conclusion

Women and men farmers in all regions generally expressed a preference for cassava varieties that are high-yielding (big roots, many roots), early maturing (ideally in six months—if possible) and can stay in the ground, unharvested, for a long time (for at least a year after maturity).

Women producers are especially interested in cassava that is easy to peel. Men ignore this trait because peeling is a woman's job. The women realize that most or all processing traits (including peeling) are related to the age of the roots, season of the year, and processing techniques, and have little to do with the variety.

Nigerian consumers and processors (who are mostly women) prefer white roots to make *fufu*. However, many processors add palm oil to *gari* during processing so that the eba will be yellow. Improved, Vitamin A-rich roots are yellow so, as they become more common, consumers and processors may accept these varieties for making *gari*.

While there may be some demand for different types of varieties (e.g., white and yellow), rural women and men in all regions of Nigeria expect most of their varieties to be useful for making many types of food products. If the household makes *gari*, *fufu,* and *abacha*, they would like cassava that is good for all three. Fortunately, most cassava varieties (even the improved) do seem to suit the farmers' processing and culinary needs. The demand for ready markets, especially by men in the Southwest and North, is not shared by the women, who already have ready markets for their cassava products.

Women and men farmers in all regions generally expressed a preference for early maturing varieties, to make money faster but also to reduce the number of times that they need to weed. Late maturing varieties may also be important, so that households can have cassava to harvest all year round. The farmers know that cassava stored in the ground is their "food bank", and they want varieties that can be harvested in phases, a year or more after they are mature. Nigerian cassava farmers may need a mix of early maturing and late maturing/durable varieties so as to have roots all year round.

Women and men farmers in all regions generally expressed a preference for improved varieties, especially because they are high yielding. Bigger roots are easier to peel, because they have a high ratio of volume (edible root) to surface area (peel), even though few local people explicitly made this connection.

Women and men farmers in all regions may be looking for a basket of cassava types. For example, most varieties should be early maturing, but varieties that stay well in the soil for

two years or more are also highly desirable. Both genders in all regions expressed a demand for non-bitter (poundable) cassava, but some communities (in all regions) are under pressure from Fulani cattle and might also want some bitter varieties that cattle will not eat. Women and men farmers in all regions want some varieties that are high in starch and some that are low in starch. Varieties with yellow roots may find a place alongside white varieties. In other words, demands for some different traits may not be contradictory but complementary, because a household or a community needs some different types of cassava.

This study found few cases where farmers were aware of improved varieties they had dis-adopted. Women and men in all regions could describe the improved varieties that they continue to plant. A few early improved varieties (such as Bola Ige in the Southwest) have been replaced by more recent improved varieties. It is however possible that some improved varieties were dis-adopted and then forgotten, because the varietal names were long serial numbers which the farmers (and visiting anthropologists) cannot remember. For example, if the formal sector releases five varieties, called, say, 30572, 30555, 35055, 35057, and 37055, and the farmers call them all Agric, they will confuse the varieties and may not be able to recall all of them.

Seed systems

There is great scope to improve the delivery of cassava varieties. Women and men farmers in all regions generally like improved varieties, and are eager to try new ones. Female and male farmers in all regions generally lack access to the planting material of the improved varieties that already exist. Women and men farmers in all regions still cultivate most of the improved varieties that have reached the villages. In other words, farmers have not adopted more improved cassava because they have never received the seeds.

The formal seed production and distribution sector (e.g., ADP, RTEP, Local Government Councils, etc.,) is generally under-resourced, with limited capacity to multiply and distribute the planting material of improved varieties. The informal sector does distribute improved varieties but not very effectively or efficiently. This situation could be remedied with strategic support, funding, and adequate oversight of the sector. Appropriate seed laws and regulations will need to be followed.

Improved varieties often replace local cultivars. Those farmers who grow less cassava often need to replenish their planting material from a neighbor's field. If a new variety comes to a village and people begin to plant it in preference to a local one, farmers may lose a local variety before they are aware that it was threatened. If improved varieties were to become more widely grown in Nigeria, it might threaten the survival of local varieties, which are valuable as sources of genetic diversity. IITA can provide support by collecting and preserving landraces.

Recommendations

Breeding objectives

All new, improved varieties should be high-yielding, even in poor soils. Plants should have many roots, especially big ones.

All (or most) improved varieties should be early maturing.

All improved varieties should be able to remain in the soil for at least a year after reaching maturity.

There is demand for white roots and for yellow roots. Both colors serve different market niches. There are also niches for varieties with high and low starch content.

Processors, most of whom are women, need cassava that is easy to peel.

Men and women in all regions express a demand for non-bitter cassava varieties. Paradoxically, most of these communities process all of their cassava in a way that eliminates toxins (e.g., by making *gari*).

There is also demand for some other traits, not so often expressed, including cassava that resists attacks by cattle and other vertebrates, and some that resists mealybugs (especially in the North), termites, grasshoppers, and other insect pests, and for varieties that resist drought or wind damage.

A variety labelled with a long serial number has no name at all, and farmers will rename it, adding to the confusion over which variety is which. Labelling also helps; the farmers remember “Four One Nine”, because (they said) the seeds came in bundles with the name printed on it. Four One Nine is also an easy name to remember in Nigeria, where 419 also often means “frauds” and “con artists.”

Seed systems

Distribute relatively small amounts of planting material to farmers when sharing improved cassava varieties. Fifty stems may be enough for farmers to try the variety. If the variety performs well, the farmers will share it with others.

When seeds of improved varieties are being distributed, include a note in the bag with the name of the variety. Make sure the name is easy to remember, to aid in tracing the variety later. Short, simple names in local languages may be appropriate for varieties distributed at the regional level. Short, simple names in English may be better for varieties aimed at the national level. (This study found that farmers readily remembered easy English names like “Give Me Chance” or “Try and See.”) The note can include any key management recommendations, a

Taking home one stem of a variety to test. Farmers avidly experiment with crop varieties.

brief description of the variety, and a phone number that people can call with questions or comments, to gather some follow-up information. See Zoundji (2016) for an account of how West African farmers called researchers after finding a note in a DVD of agricultural videos.

Once breeders are ready to release a variety they could even generate interest in the variety by involving farmers in the selection of a name.

It may not be necessary to distribute the improved cassava seeds in villages. Mini-packs can be distributed in weekly markets, using the Going Public method (Bentley et al., 2003). Collect the name, address, and phone number of each person who receives a mini-pack, for M&E later.

The beginning of the rainy season is the best time to distribute planting material. That is when the cassava stems are most likely to survive.

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Annexes

Annex 1. Interview guide for the focus group discussions

1. Review list of varieties (local and improved) grown in the community from the previous CMS. Ask the group if the list is complete and correct. If not, edit the list. Make sure to ask for any improved variety which may have been dis-adopted.
2. What is the meaning of the name of each variety?
3. For each variety: what is good about this variety? (Capture keywords) WHY?
4. For each variety: what would you improve? (Capture keywords) WHY?
5. For varieties that were dis-adopted: why was each one dis-adopted?
6. Rank the varieties.
7. What are the traits that you prefer in cassava varieties? For example, what would you like to see in new cassava varieties?
8. What do these traits mean? Please explain each trait in more detail.

Section on planting material

9. Has anyone in this village received any new varieties of cassava in the last several years? When? Please tell us how you got those varieties.
10. In the last several years has anyone in the village bought cassava stems? What variety was it? Who did you buy it from? Why did they buy the stems?
11. Have any projects or agencies shared new cassava varieties with you? Who were they and when did they come? What was the variety?
12. Who do you go to when you need or want a new cassava variety?
13. Do you ever buy stems of varieties that you already have? Who do you buy the stems from?
14. Do you produce all of your own cassava stems? Or do you ever need to buy stems (or get stems from somewhere else?) and if so, why?
15. Do you know or have you heard of anyone selling cassava stems?

Adoption and dis-adoption

In this group, how many have ever used improved cassava varieties?
Ask those not using, why not?
How many are still using?
Of those who stopped, why not?

Annex 2. The study villages

Region	State	LGA	Village and Enumeration Area code	Language of community
Southwest	Osun	Ife East	1. Akeredolu 252211	Yoruba
Southwest				Writing and preparation
Southwest	Osun	Oriade	2. Erin Oke 251021	Yoruba
Southwest	Osun	Ilesha West	3. Ilesa 251212	Yoruba
Southwest	Ondo	Owo	4. Ajagbale 22311	Yoruba
Southwest	Ekiti	Ise Orun	5. Afolu 24931	Yoruba
North	Kogi	Kabbabunu	6. Oke Dayo, Kabba 11321	Yoruba (some Hausa and English)
North	Kogi	Ajaokuta	7. Ajaokuta Steel Camp 11713	English
North				Travel
North	Benue	Makurdi	8. Mbanyom 12311	Tiv
North	Benue	Gwer East	9. Ikyugwer 121121	Tiv
North	Benue	Buruku	10. Mbaatsua 12811	Tiv
South-South	Cross River	Boki	11. Abija 41631	Boki
South-South	Cross River	Akamkpa	12. Duwang-Uyanga 411231	Efik
S-South	Cross River			Visit with processors near Akpanbuy
				Writing and preparation
South-South	Akwa Ibom	Ukanafun	13. Ikot Urom 421221	Anaang
South-South	Akwa Ibom	Essien - Udim	14. Ikot Akpa Essien 42921	Anaang
South-South	Akwa Ibom	Oruk Anam	15. Ikot Akpan Ntia 421351	Anaang
Travel				
Southeast	Imo	Oru East	16. Amiri 33621	Igbo
Southeast	Imo	Ngor Okpala	17. Amala 332221	Igbo
Southeast				Writing and preparation
Southeast	Enugu	Nkanu West	18. Amugo 321131	Igbo
Southeast	Enugu	Nkanu East	19. Nara 32921	Igbo
Southeast	Anambra	Idemili South	20. Oraifite 311441?	Igbo