

## Is there a space for medium-sized cassava seed growers in Nigeria?

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### ABSTRACT

Until recently, there has been little commercial sale of vegetatively propagated crop seed, except for potatoes (*Solanum tuberosum*). This is especially true in developing countries. However, a formal, commercial seed sector for cassava (*Manihot esculenta*) is emerging in Nigeria. In 2016, a project, Building an Economically Sustainable Integrated Cassava Seed System in Nigeria (BASICS), started to encourage village farmers to certify and sell cassava seed. A questionnaire survey of 30 cassava entrepreneurs across Nigeria in 2019 included some of those village-based growers as well as larger producers, including some who certified their planting material. In the long run, if there is a consistent demand for certified cassava seed, medium-sized producers may be able to satisfy some of that demand, especially if they have continued programmatic support; otherwise, these budding seed entrepreneurs may close down.

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## Introduction

### *Seed systems for cassava and other vegetatively propagated crops*

Until recently, there was little commercial sale of seed of vegetatively propagated crops (VPCs) in developing countries. Vegetative seed is bulky, perishable, and prone to carry diseases and other pests (Thiele 1999; Bentley et al. 2018; McGuire and Sperling 2016.) In spite of these challenges, VPC seed systems, including for cassava, are changing rapidly, and much of the seed is now purchased (Sperling, Boettiger, and Barker 2013).

True seed is easier to transport and sell than vegetative seed. For example, commercial vegetable seed was sold through the mail in the USA and other countries in the early twentieth century. Vegetable seed was light, dry, durable, and easy to send via the post (everything that vegetative seed is not). Farmers bought vegetable seed to get new varieties or because the vegetable seed was difficult to reproduce in the backyard garden. Hybrid

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maize (*Zea mays*) seed, in addition to higher yields, was developed in part to create a product that farmers could not reproduce themselves, creating an automatic market. Commercial seed in North America followed on earlier experiences by the public sector, such as agricultural universities, to breed open-pollinated varieties of maize that farmers could reproduce. With hybrid maize seed in the 1930s, produced by private companies, farmers had to buy the seed every spring (Kloppenborg 2005).

While Kloppenborg (2005) stresses the role of hybrid maize in the commercial expansion of the seed market, one VPC, the potato, has been on the seed market for a long time. For example, in 1875, Luther Burbank sold his Burbank Seedling potato (ancestor of the famous Russet Burbank) to James Gregory, an established Massachusetts seed merchant (Zimmer 2018, 50). Gregory and others were already selling seed potatoes widely through catalogs (Smith 2009). Seed potatoes were being certified as early as 1933 in the USA (USDA 1947).

In developing countries today, a commercial seed system is emerging to play a crucial role in distributing seed. Contemporary African seed enterprises are almost entirely for grains and pulses (Van Mele, Bentley, and Guéi 2011), with VPC commercial seed producers limited mostly to potatoes, e.g. in Kenya (Atieno and Schulte-Geldermann 2016). Except for the potato, most other VPCs do not enter the commercial seed system, especially in tropical countries.

However, there are some examples of commercial seed systems for cassava. In Southeast Asia, most cassava seed is sold locally by farmers, but there is also a robust cross-border trade. Cambodia has a three-month dry season, so traders truck in cassava stems from Vietnam. It is an informal, yet effective seed network, serving a wide range of farmers, while also inadvertently transmitting cassava diseases (Delaquis et al. 2018).

Sometimes cassava is traded to acquire new varieties. For example, in Nicaragua, there is less commercial trade in cassava varieties, as farmers usually provide their own planting material. However, in the 2000s, snack food manufacturers began providing new varieties from research to their farmer-suppliers, to ensure the factory's supply of desired varieties to make into cassava chips (Ospina 2016).

In Africa, most documented experiences with the supply of cassava seed have involved donor-funded projects that distributed new varieties. Formal plant breeding for cassava in sub-Saharan Africa started in Nigeria in the 1970s at the International Institute of Tropical Agriculture, selecting for increased root yield and dry matter content, early harvest, tolerance to pests, and abiotic stresses (Okechukwu and Dixon 2008). Many of these varieties were later distributed formally. For example, in Nigeria and six other African countries, from 2008 to 2010, the UPoCA project distributed 50 new, disease-resistant varieties from research. Since farmers could receive

a few stems and then multiply their own seed for several generations, the project hired large-scale farmers (who thus became commercial seed producers, if they were not already) to grow large amounts of cassava seed, distributed to community seed gardens, which multiplied seed for smallholders (Okechukwu and Kumar 2016). From 2007 to 2012, in six East and Central African countries, the Great Lakes Cassava Initiative produced seed with more than 2000 farmer groups, which were organized and managed by three dozen community-based organizations to distribute cassava seed of new varieties (Walsh 2016).

In part, because there was not a formal system for retailing cassava planting material, previous projects in Africa specialized in distributing the seed of new cassava varieties, leaving multiplication and further seed distribution to the farmers. However, cassava seed systems are changing rapidly. A commercial seed system is evolving as entrepreneurs seize opportunities to connect new varieties from research to farmers, sometimes in collaboration with projects or processors.

### ***The cassava seed system in Nigeria***

Starting in 2016, the Building an Economically Sustainable Integrated Cassava Seed System in Nigeria project (BASICS – managed by the CGIAR Research Program on Roots, Tubers and Bananas, led by the International Potato Center) supported Catholic Relief Services (CRS) and the National Root Crops Research Institute (NRCRI) to encourage village seed entrepreneurs (VSEs). The experience showed that cassava farmers could produce seed profitably, at least if they had project support for capacity development. BASICS encouraged the VSEs to certify their seed and helped them to find markets. Many of the VSEs were smallholders. The model was so promising that it was adopted on a large scale by an unrelated project, Market Development in the Niger (MADE), also in Nigeria.

To be legal for sale in Nigeria, the seed must be certified by the National Agricultural Seeds Council (NASC), although enforcement is difficult with so many small and remote seed producers. In theory, certifying cassava seed is inexpensive, requiring just a nominal registration fee and three inspections costing only 1000 Naira (about 3 USD) per visit, but in practice, transaction costs can be high. There are three seed inspections during the season and NASC has little money for travel expenses, so the seed producers often have to pay the travel expenses for the seed inspector to come to the farm. BASICS has provided logistical support to seed inspectors in Benue State (in North Central Nigeria), and inspectors in and around Abia State (in the South East), so the BASICS VSEs have been certified. However, small producers may not be able to have their seed certified after project support ends. One

option being explored to reduce costs of certification is using local community-level third-party certifiers.

BASICS selected VSEs who had experience growing cassava. The VSEs had to demonstrate qualities of entrepreneurship and community leadership. They also had to have land that was near a road so that NASC certifiers could easily inspect it. BASICS facilitated 186 VSEs in five states, including 136 seed entrepreneurs in Benue with CRS and 50 VSEs in Abia, Akwa Ibom, Imo, and Cross Rivers with NRCRI. As of February 2019, 97 VSEs were still active in Benue State, while 44 were still active in the South East.

According to Nigerian law, there can be up to seven generations of seed: two of breeder seed, two of foundation seed, and three of certified commercial seed. This will help to bring down the costs since seed producers will not need to replace their seed every generation. Certification can also help to ensure that varieties are true to type, as seed in farmers' fields is occasionally of mixed varieties, and local errors regarding varietal names are common so that Nigerian farmers often do not know what cassava variety they are planting (Bentley et al. 2016, see also Thiele et al. *In press*).

Until recently, Nigeria's formal seed system concentrated on maize, rice (*Oryza sativa*), and legumes. These were distributed by mid-scale Nigerian enterprises and by the Agricultural Development Projects, agencies run by each individual state government. The government had less interest in certifying cassava seed (Bentley et al. 2011). In the past decade, that has changed, and the Nigerian government does want commercial seed producers to register. Demand for cassava seed in Nigeria has been stimulated by a burgeoning market for cassava roots. The demand for cassava roots has increased for at least two reasons. First, food manufacturing has boomed in Nigeria in recent years. Industry buys large quantities of cassava to make products like starch, flour, and alcohol. Second, village-level cottage industries continue to grow and to process most of the cassava in Nigeria. These cottage industries, mostly operated by women, have long produced foods (especially *gari*, a coarse, flour-like starchy food), which can be stored or sold across long distances. Traders are now buying much more *gari* and other cassava products to sell in Nigerian cities.

Given the challenges of producing cassava seed, the burgeoning demand for it, and the new government interest in it, in this paper, we ask: what is the potential for village level and medium-sized producers to organize themselves into an evolving, commercial seed system? Such questions may be of interest for those working on cassava or other VPCs in other tropical countries.

## **Definitions**

Seed systems can be formal or informal or commercial or noncommercial. Formal seed is regulated by the government and usually includes some form

of certification. Informal seed is managed by farmers themselves. In this paper, “commercial” means seed grown primarily for sale and does not include stems that farmers sell opportunistically, on a small scale, after harvesting cassava roots. Noncommercial cassava seed is the by-product of root production. The seed may be given to neighbors or planted by farmers themselves on another field. While it is possible for the commercial seed to be informal (like the large volumes traded in Southeast Asia cited above – Delaquis et al. 2018), here we look mostly at formal, commercial cassava seed producers. This paper asks: What does it take for commercial cassava seed producers (formal or informal) to continue, in a sustainable, small- or medium-sized business?

## Method

In March 2019, the study team conducted a questionnaire survey of 30 cassava seed producers (see survey instrument, [Appendix 1](#)). Because of distance, time constraints, and security concerns, we were not able to visit all of the interviewees on their farms. Two farmers, who lived in the Ibadan area, met the team on the campus of the International Institute of Tropical Agriculture (IITA), where BASICS is headquartered. We were able to visit one farmer at his home.

We conducted telephone interviews with 12 seed producers in Ondo, Oyo, Ekiti, Rivers, and Delta States. We started with a list of seed producers, provided by colleagues at MADE and IITA. These seed growers were generally the most highly skilled seed producers who were interested in producing certified commercial seed.

The team interviewed 10 seed producers at the CRS office at Makurdi, in Benue, and five seed producers at the NRCRI campus in Umudike, Abia State. In Benue State, CRS staff coordinated with the Caritas and Justice and Peace Commissions to interview seed producers at the CRS office in Makurdi, in Benue State.

All of the interviewees were purposefully selected as people who were interested in producing and selling cassava seed. They demonstrated this interest by traveling to the interview sites or by patiently answering our questions during the telephone interviews.

## Results

### *General characteristics of cassava entrepreneurs*

Most of the 30 cassava entrepreneurs are currently producing cassava seed. All are interested in producing cassava seed.

We classify cassava entrepreneurs into three types:

1) Small-scale, formal producers: especially the VSEs, most of whom are connected to BASICS through CRS. Most of them are in Benue State. Our question is, can these small-scale, commercial farmers continue to produce formal seed with little or no project support?

2) Large-scale, informal producers: especially those connected to NRCRI or IITA, including some who are connected to BASICS. Some of these are leaders of farmer organizations. Most are in the southwest or the southeast of Nigeria. Our question is, can these large, commercial producers be brought more closely into the formal seed system?

3) Small-scale, informal, and some others, including a mix of large- and small-scale producers. Some do not produce seed, but want to. We ask if these informal, often small-scale farmers could become commercial seed producers, with a little help from the formal sector?

During the questionnaire survey, we asked the cassava entrepreneurs what kind of support they needed. They said they wanted new cassava varieties as they are released (reflecting the popularity of varieties from research). The entrepreneurs also asked for help finding markets (suggesting that it is easier to produce cassava seed than to sell it). The surveyed farmers rarely mentioned training needs, even though courses on marketing or seed certification, for example, might be useful for them.

The cassava seed entrepreneurs are listed in [Table 1](#) by type of contact (IITA, CRS, etc.), state, with an indication of their size and whether they are VSEs, and if they produce certified seed. They all said they were willing to register with the seed certification agency. Most of the certified seed producers are VSEs (who had seed certified with project support). Some of the large seed producers are not certified. However, the large- and mid-sized seed producers, who are not certified, do have contacts with the seed certification agency, NASC.

The three IITA contacts are large-scale growers in the southwest, who are well connected: i.e. one is a former civil servant and one is active in a farmers' association. None of them has certified their seed, but they are willing to do so. The IITA Business Incubation Platform (BIP) contacts are in the southwest. They include some large growers, who produce informal seed, with one exception, a farmer who says she produces certified (and foundation) seed. The MADE contacts tend to be smallholder VSEs who have not certified their seed. They are located in Ondo, Rivers, and Delta States ([Table 1](#)). The CRS contacts are all in Benue and tend to be smallholders. Most are VSEs producing certified seed. The NRCRI contacts tend to be large-scale, certified VSEs.

### ***Classification of cassava entrepreneurs***

The 30 interviewees are overwhelmingly keen to produce or continue producing certified seed. Some lost stems because of lack of market. To protect the privacy of the interviewees, we identify each one with a serial number, that begins with

**Table 1.** Cassava seed producers contacted.

Entrepreneur	State	Type	Certified	Notes
<b>IITA</b>				
<b>contacts</b>				
NCE-1	Oyo	<b>Large</b>	No, but knows of NASC	Chairman of a farmers' association
NCE-2	Oyo	<b>Large</b>	No, but knows of NASC	Former IITA
NCE-3	Kogi	Not seed producer	No, but knows NASC well	Has enough land to plant more cassava
<b>MADE</b>				
<b>contacts</b>				
NCE-4	Ondo	Small, VSE	No, but knows of NASC	Min Ag
NCE-5	Ondo	<b>Mid-size</b> , VSE	No, but knows of NASC	Processor
NCE-6	Rivers	VSE	No, but knows of NASC	Input dealer
NCE-7	Rivers	Small, VSE	No, but knows of NASC	
NCE-8	Ondo	Small, VSE	No	
NCE-9	Ondo	Small, VSE	No	
NCE-10	Delta	Small, VSE	No, but knows of NASC	
<b>BIP</b>				
<b>contacts</b>				
NCE-11	Oyo	Small	No	College lecturer
NCE-12	Oyo & Osun	<b>Large</b>	Yes	Produces foundation seed
NCE-13	Ekiti	Small	No	
NCE-14	Oyo	<b>Large</b>	No, but knows NASC	
NCE-15	Oyo	Small	No	
<b>CRS</b>				
<b>contacts</b>				
NCE-16	Benue	Small, VSE	Yes	
NCE-17	Benue	Not VSE	No, but knows NASC	Processor
NCE-18	Benue	Small, VSE	Yes	
NCE-19	Benue	Not seed producer	No, but knows NASC	
NCE-20	Benue	Small, VSE	Yes	
NCE-21	Benue	Small, VSE	Yes	
NCE-22	Benue	Small, VSE	Yes	
NCE-23	Benue	<b>Large</b> , not VSE	No	Chairman of a farmers' association
NCE-24	Benue	Small, VSE	Yes	
NCE-25	Benue	Small, VSE	Yes	E-market
<b>NRCRI</b>				
<b>contacts</b>				
NCE-26	Akwa Ibom	<b>Large</b> , VSE	Yes	
NCE-27	Abia	<b>Large</b> , VSE	Yes	Ex-NRCRI, input dealer, MADE seed producer
NCE-28	Imo	<b>Mid</b> , VSE	Yes	Processor
NCE-29	Imo	<b>Large</b> , VSE	Yes	
NCE-30	Akwa Ibom	Small, VSE	No, but knows NASC	

NASC: National Agricultural Seeds Council

VSE: village seed entrepreneur

IITA: International Institute of Tropical Agriculture

BIP: Business Incubation Platform

CRS: Catholic Relief Services

NRCRI: National Root Crops Research Institute

MADE: Market Development in the Niger Delta.



Nigerian cassava entrepreneur (NCE). These entrepreneurs are motivated to produce seed by the promise of higher profits. Some of the Benue entrepreneurs may have more land that could be brought into seed production. For example, NCE-24 is growing about 1 ha of seed but has 25 ha of land. The questionnaire did not ask respondents their total farm size (although some volunteered that information).

The 30 entrepreneurs are classified into four groups: F, 1, 2, and 3 (Table 2):

- Group F (want to produce foundation seed, i.e. a higher level, the seed that is used to produce certified seed). They are all large scale. Two of them are in the southwest and two in the southeast, including three who are certified and two VSEs. The one who is not certifying employs a former IITA employee as his farm manager and could certify his seed.

**Table 2.** Cassava seed producers ranked by readiness to produce certified seed.

Entrepreneur	State	Type
<b>F. Want to produce foundation seed</b>		
NCE-12 <b>certified</b>	Oyo & Osun	<b>Large</b>
NCE-14	Oyo	<b>Large</b>
NCE-26 <b>certified</b>	Akwa Ibom	<b>Large, VSE</b>
NCE-29 <b>certified</b>	Imo	<b>Large, VSE</b>
<b>1. Ready to produce certified seed</b>		
NCE-1	Oyo	<b>Large</b>
NCE-2	Oyo	<b>Large</b>
NCE-3	Kogi	<b>Large</b> (potentially)
NCE-5	Ondo	<b>Mid-size, MADE VSE</b>
NCE-27 <b>certified</b>	Abia	<b>Large, VSE</b>
NCE-28 <b>certified</b>	Imo	<b>Mid, VSE</b>
<b>2. Could produce certified seed</b>		
NCE-4	Ondo	Small, VSE
NCE-7	Rivers	Small, VSE
NCE-8	Ondo	Small, VSE
NCE-9	Ondo	Small, VSE
NCE-10	Delta	Small, VSE
NCE-16 <b>certified</b>	Benue	Small, VSE
NCE-18 <b>certified</b>	Benue	Small, VSE
NCE-20 <b>certified</b>	Benue	Small, VSE
NCE-21 <b>certified</b>	Benue	Small, VSE
NCE-22 <b>certified</b>	Benue	Small, VSE
NCE-23	Benue	<b>Large, not VSE</b>
NCE-24 <b>certified</b>	Benue	Small, VSE
NCE-25 <b>certified</b>	Benue	Small, VSE
NCE-30	Akwa Ibom	Small, VSE
<b>3. Would need more support</b>		
NCE-6	Rivers	VSE
NCE-11	Oyo	Small
NCE-13	Ekiti	Small
NCE-15	Oyo	Small
NCE-17	Benue	Not VSE
NCE-19	Benue	Not seed producer

VSE: village seed entrepreneur

MADE: Market Development in the Niger Delta.



- Group 1 (ready to produce certified commercial seed) includes three in the southwest, one in Kogi, and two in the southeast (i.e. none in Benue). They are large-scale producers. Only two are currently certifying, but the others should be able to certify with relative ease.
- Group 2 (would need some help to produce certified seed commercially). These entrepreneurs are all across the country, but mostly in Benue. The bulk of CRS VSEs fall into this group. They certify but are limited in size. Some may have enough land and motivation to expand seed production.
- Group 3 (could produce certified seed with substantial help). These are mostly small-scale producers who do not produce certified seed.

The five entrepreneurs interviewed at NRCRI (NCE-26 through 30) are among the most promising. Two want to produce foundation seed and two are in Group 1, ready to produce certified commercial seed.

### ***Gender and age***

As seen in [Table 3](#), although the entrepreneurs were mostly men, there were eight women, including one who wants to produce foundation seed and another who is ready to produce commercial seed. While ages range from the 20s to the 70s, there are several younger entrepreneurs, including two who want to produce foundation seed. The group that is ready to produce certified seed is made up of mature people.

### ***Educational and professional backgrounds***

Most of the cassava entrepreneurs are well educated (many studied agriculture or business at university). They all speak English; they all have mobile phones and most are connected to social media via e-mail or Facebook. Even though they are all farmers, most also have other jobs or business (e.g. civil service, trading), suggesting that they have business skills that could be useful in the seed business.

Results given in [Table 4](#) show that 27 of the 30 interviewees have at least some tertiary education, including two Ph.Ds. Quite a few studied agriculture, agricultural economics, business administration, or accounting, i.e. they have educational backgrounds that would help to run a seed business, although one person each also studied criminology, materials engineering, electrical engineering, and theology. The people in Groups F and 1 are especially well educated (and tend to have education more closely related to agriculture and business).

There is a wide range of business and professional experience among these entrepreneurs. All or almost all are farmers. Four are also educators, including

**Table 3.** Nigerian cassava entrepreneurs by gender and age.

Entrepreneur	Gender	Decade of birth
<b>F. Want to produce foundation seed</b>		
NCE-12	Female	1990s
NCE-14	Male	1990s
NCE-26	Male	1960s
NCE-29	Male	1950s
<b>1. Ready to produce certified seed</b>		
NCE-1	Male	1960s
NCE-2	Male	1960s
NCE-3	Male	1940s
NCE-5	Male	1980s
NCE-27	Male	1960s
NCE-28	Female	1960s
<b>2. Could produce certified seed</b>		
NCE-4	Male	1990s
NCE-7	Female	1970s
NCE-8	Female	1960s
NCE-9	Female	1980s
NCE-10	Male	1960s
NCE-16	Female	1980s
NCE-18	Male	1960s
NCE-20	Male	1970s
NCE-21	Female	1980s
NCE-22	Male	1960s
NCE-23	Male	1940s
NCE-24	Male	1950s
NCE-25	Male	1950s
NCE-30	Female	1950s
<b>3. Would need more support</b>		
NCE-6	Male	1960s
NCE-11	Male	1990s
NCE-13	Male	1970s
NCE-15	Male	1940s
NCE-17	Male	1970s
NCE-19	Male	1960s

two who own private schools and two others are teachers. Seven are civil servants, active or retired, including an extensionist. There are four market traders, two input dealers, and four food manufacturers, and at least four people are active in farmers' associations.

### ***Farm size and volume of seed production***

As shown in Table 5, the entrepreneurs who are in the top groups are the largest producers, i.e. with the most land in cassava. They are also the ones with the most production (i.e. who sold the most bundles, figures for their best or most recent year). The only anomaly is NCE-3, who has not produced cassava seed; however, he has a 1000-ha farm and he knows NASC well and he has produced certified seed of other crops.

**Table 4.** Nigerian cassava entrepreneurs by education and other businesses.

Entrepreneur	Education	Other business
<b>F. Ready to produce foundation seed</b>		
NCE-12	B.Sc. Agric. Econ., M.Sc. Business Admin.	Has two farms
NCE-14	B.Sc. from a US university	Mining & outdoor advertising
NCE-26	Agric. & Public Admin.	Owens a primary and secondary school
NCE-29	Studied agriculture	Professional farmer
<b>1. Ready to produce certified seed</b>		
NCE-1	Village school	Cassava specialist. Active in farmers' association
NCE-2	Univ. animal husbandry	Also keeps livestock
NCE-3	B.Sc., Ph.D. Econ. Develop.	Retired civil servant
NCE-5	Studied economics	Food processing, is in Cassava Growers' Assoc.
NCE-27	B.Sc. in Agric.	Input dealer, ex-NRCRI staff
NCE-28	Business Management	Civil servant, food manufacturer
<b>2. Could produce certified seed</b>		
NCE-4	Ph.D. Agric. extension	Extensionist, MinAg
NCE-7	Agric. Ed. & Community Develop.	Buying & selling agric. products
NCE-8	Studied to be a teacher	Buying & selling agric. products
NCE-9	Business Admin.	Trader, makes bags
NCE-10	B.Sc. Criminology	Sells & installs electronic equipment
NCE-16	Accounting	Civil servant
NCE-18	Studied Agric.	Retired civil servant
NCE-20	Accounting	Secondary school teacher
NCE-21	Accounting	Shopkeeper, baker
NCE-22	Animal Sci., Public Admin.	Pastor, event manager, rears chickens
NCE-23	Secondary school	Chairman, Benue Initiative for Agric. Dev.
NCE-24	Agriculture	Retired civil servant. Has large citrus orchard
NCE-25	Marketing	Professional farmer
NCE-30	Secondary school	Owens a school, palm oil mill, is market trader
<b>3. Would need more support</b>		
NCE-6	Materials Engineering	Agro-chemical dealer
NCE-11	B.Sc. Agric. Technology	College lecturer
NCE-13	Electrical Engineering	Has a piggery
NCE-15	Business Management	Cassava specialist
NCE-17	Theology	Owens gari factory
NCE-19	Accounting	Retired civil servant

NRCRI: National Root Crops Research Institute.

In Nigeria, no single cassava variety accounts for more than 6% of the seed planted. A single variety (TME 419) has emerged as the favorite for commercial root production because it is high yielding, is high in starch, and matures rapidly. Demand for TME 419 dominates the cassava seed trade. Demand for this variety is strong even though it has been available for several years. Several of the popular modern varieties, including TME 419, are

**Table 5.** Nigerian cassava entrepreneurs by size of operation.

Entrepreneur	Size <sup>a</sup>	Production (bundles)
<b>F. Ready to produce foundation seed</b>		
NCE-12	40 ha of breeder and foundation seed	25,000
NCE-14	25 ha cassava (could expand)	1000, willing to sell more
NCE-26	25 ha, can plant 1000	9000 in 2019
NCE-29	12 ha	10,000
<b>1. Ready to produce certified seed</b>		
NCE-1	50 ha cassava	10,000 in 2019
NCE-2	10 ha seed	50,000 or more (buys and sells)
NCE-3	10 ha roots (could expand)	0
NCE-5	5 ha stems, 30 total cassava	2000 in 2018
NCE-27	25 ha cassava, over 35 total	9000
NCE-28	3.5 ha	820
<b>2. Could produce certified seed</b>		
NCE-4	2 ha	1000
NCE-7	1–2 ha, 21 ha farm	700
NCE-8	5 ha	0
NCE-9	1 ha	200
NCE-10	5 ha (could expand)	450
NCE-16	2 ha, can plant 5 ha	200
NCE-18	2 ha	68
NCE-20	2 ha, can plant 5 ha	600
NCE-21	1.3 ha	200
NCE-22	1 ha	420
NCE-23	>20 ha roots and stems	Many (free distribution)
NCE-24	1–2 ha, 25 ha farm	500
NCE-25	4	1000
NCE-30	1.1	34
<b>3. Would need more support</b>		
NCE-6	0	0
NCE-11	2.4 ha	0
NCE-13	10 ha	260
NCE-15	4 ha roots	0
NCE-17	Is buying 10 ha	0
NCE-19	4–5 ha	0

<sup>a</sup>Unless otherwise specified, "size" means hectares in cassava stems.

released landraces. Demand for modern varieties has been low, and turnover has been slow in part because (until recently) breeders were not paying sufficient attention to farmer and consumer demand for traits in the product, e.g. yield, and in the seed, e.g. long, straight stems of cassava (Thiele et al. [In press](#)).

## Discussion

There is a group of commercial seed producers in Nigeria who respond to demand for seed. Some have certified their seed, but others have experience

selling large volumes of uncertified seed. They live in an institutional environment that includes research agencies, projects, and food processors.

Future demand for commercial cassava seed may depend on the availability of new varieties since this is what cassava farmers say they want. However, demand for some existing varieties like TME 419 remains strong after several years. Future demand may depend on more people getting into large-scale commercial cassava farming. If these growers of cassava roots cannot or do not want to produce seed, they may need large amounts of seed all at once.

The farmers are eager to produce seed, but their biggest concern is being able to market it, profitably. An intervention that worked to broker information between seed suppliers and seed users could play a useful role in fomenting the commercial seed sector.

Technically, only certified seed can be legally sold in Nigeria. Widespread distribution of uncertified seed is tolerated in the informal sector, especially when a few bundles of stems are moved short distances. But as the trade becomes bigger, with trucks moving stems across the country, cassava seed is becoming more visible, and certification will be increasingly required for commercial seed production. Commercial seed mass distributed across a wide area reaches many people, so there is a great benefit to planting material that is of high quality, e.g. disease-free, of known varietal provenance, and higher-yielding varieties.

However, quality control can be lighter for seed produced closer to farmers, where the cassava stems stay in the local area: this seed is fresher, and diseases are less likely to be spread across large areas. Quality control is more important for seed that is produced earlier in the production chain because this seed is reproduced many times and reaches more farmers. Any genetic or disease problems may impact a large area, so certification is more important for large-scale commercial seed producers. Further down the chain, there can be less quality control (to save on expenses, and because there are fewer consequences of poor seed quality). Smallholders selling a few bundles of seed to their neighbors can be allowed to operate with little or no outside quality control.

To answer the question we posed in the title of this paper, there may be a space for medium-sized cassava seed growers in Nigeria, if projects or government can help to keep that space open. The VSEs, for example, are able to produce seed of acceptable quality for certification but may lack the contacts to certify it and sell it on their own. If demand for commercial cassava seed continues to grow in Nigeria, medium-sized entrepreneurs could sell seed, especially if seed regulations are relaxed (so that all seed does not have to be certified). If seed certification is enforced for cassava, then the entrepreneurs who sell it will most likely be larger growers, not because they can produce cassava seed any better than smallholders, but because they have good contacts with the seed certification agency and with large-scale buyers across the country.

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## Appendix 1. Survey instrument

Date  
Code



- (1) Name
- (2) Year of birth
- (3) Gender MALE FEMALE
- (4) Location
- (5) Phone
- (6) E-mail
- (7) Other contact info (e.g. other social media, e.g. Facebook, WhatsApp?)
- (8) Have you heard of BASICS? YES NO
- (9) Have you heard of IITA? YES NO
- (10) Have you heard of NASC? YES NO
- (11) Main occupation
- (12) Current size of seed operation (hectares?)
- (13) Stem yield
- (14) Importance of stem production (% sales stems and % roots)
- (15) Number of years growing cassava
- (16) Number of years selling cassava stems
- (17) Number of bundles sold
- (18) Number of clients
- (19) Distance to furthest customer
- (20) Why do farmers buy from you?
- (21) Varieties dealt in
- (22) Varieties you want to deal with?
- (23) When was the last time you bought cassava stems?
- (24) How do you replace your cassava? (When you need to change your cassava, where do you get your stems from?)
- (25) How do you find out about new varieties?
- (26) Interest in producing foundation seed or commercial seed
- (27) A. Do you currently produce certified cassava seed? YES NO B. How willing are you to work under NASC certification?
- (28) Motivation. Why do you want to become a certified seed producer?
- (29) Needs. What support do you need to become part of formal system buying foundation seed to produce commercial seed for sale? (If respondent says “training” ask for specific topics).
- (30) Background (education, business)