

Nigeria Country Report 2020

The African Seed Access Index

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TASAI
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LIST OF ACRONYMS:

CGIAR – Consultative Group on International Agricultural Research

DUS – Distinctiveness, Uniformity and Stability

ECOWAS – Economic Community of West African States

FMARD - Federal Ministry of Agriculture and Rural Development

HHI – Herfindahl-Hirschman Index

IAR – Institute for Agricultural Research

IAR&T – Institute of Agricultural Research and Training

ICRISAT – International Crops Research Institute for the Semi-Arid Tropics

IITA – International Institute of Tropical Agriculture

NACGRAB – National Centre for Genetic Resources and Biotechnology

NAQS – National Agricultural Quarantine Service

NARI – National Agricultural Research Institute

NASC – National Agricultural Seeds Council

NCRI – National Cereals Research Institute

NVRC – National Crop Varieties and Livestock Breeds Registration and Release Committee

NGO – Non-Governmental Organization

NSS – National Seed Service

SEEDAN – Seed Entrepreneurs Association of Nigeria

VCU – Value for Cultivation and Use

INTRODUCTION

The increased use of productivity-enhancing technologies, including mechanization, irrigation, fertilizer and improved seed, are critical to improving food and nutritional security across Africa. For field crops, a competitive formal seed sector is key to ensuring the timely availability of high-quality seed of improved, appropriate varieties at affordable prices for smallholder farmers. Improved seed can deliver state-of-the-art technology to farmers including higher yields, disease and pest resistance, climate change adaptation, reduced post-harvest losses, and improved nutrition. To deliver these benefits, The African Seed Access Index (TASAI) conducts seed industry assessments at the national level and uses the findings to encourage public policymakers and development agencies to create and maintain enabling environments that will accelerate the development of competitive formal seed systems serving smallholder farmers in Africa.

This report summarizes the key findings of the study conducted by TASAI in 2020 to appraise the structure and economic performance of Nigeria's formal seed sector. TASAI studies focus on the four grain and legume crops important to a country's food and nutritional security (the "four focus crops"). In Nigeria, these crops are maize, rice, sorghum, and soya bean. The cultivation of these four crops covers 74% of the country's harvested area¹ under cereals and pulses (FAOSTAT, 2020).²

OVERVIEW OF NIGERIA'S FORMAL SEED INDUSTRY

Like most other African countries, Nigeria's seed industry consists of two systems: the informal and formal sectors. This Country Report focuses almost exclusively on the formal seed sector.

The informal sector refers to a system in which seed is produced, maintained, and distributed through informal networks. These activities "tend to be decentralized and might revolve around local entrepreneurship, seed banking, community-based seed production, or seed villages" (McGuire & Sperling, 2016). In many cases, farmers keep seed from the harvest and exchange it with neighbors, relatives, and through rural markets. Seed from this system is of variable varietal purity, physical and sanitary quality.³ In Nigeria, a large percentage of farmers' seed requirements are met through the informal seed sector (NESG and FMARD, 2019).

The formal sector is a structured and regulated value chain for the production of improved seed varieties. This process involves many actors and institutions, from breeding varieties to the multiplication, processing, and distribution of certified seed. The different stages of improved seed production are regulated by governments based on approved regulations and standards. The sale of seed from this system takes place through limited distribution channels such as registered seed companies and agro-dealers. This system produces seed of the highest varietal purity, physical and phytosanitary quality. The National Seed Policy of 2015 (FMARD, 2015) and the 2019 National Seed Roadmap for Nigeria (NASC, 2020) provide the framework and the strategy for the growth of the formal seed sector.



1 This excludes areas where crops were planted but where no harvest has taken place, either due to damage (from pests or diseases) or crop failure (as a result of floods or drought).

2 FAOSTAT <http://www.fao.org/faostat/en/#data/QC>

3 See seed system definitions at <https://www.agrilinks.org/post/seed-system-definitions>



Table 1 lists the agencies in charge of various aspects of Nigeria's seed industry. The National Agricultural Seed Council (NASC) is a semi-autonomous agency of the Federal Ministry of Agriculture and Rural Development (FMARD) responsible for regulating the seed industry in Nigeria. The National Centre for Genetic Resources and Biotechnology (NACGRAB) was established, in part, to conduct research, gather data, and disseminate technological information on matters relating to genetic resources conservation and utilization.⁴ One of NACGRAB's core mandates is to serve as the secretariat of the National Committee on naming, registration and release of Crop varieties, Livestock breeds and Fisheries" as stipulated in the National Crop Varieties and Livestock Breeds (Registration etc.) Act 33 of 1987. National Agricultural Research Institutes (NARIs), centers of the Consultative Group on International Agricultural Research (CGIAR), and universities are responsible for variety research and development. In Nigeria, NARIs include the Institute for Agricultural Research (IAR) whose mandate is the genetic improvement of maize, cowpea, sorghum, cotton, sunflower, and groundnut, the Institute of Agricultural Research and Training (IAR&T) whose mandate is genetic improvement of maize, kenaf, and jute, and the National Cereals Research Institute (NCRI) whose mandate includes the genetic improvement of rice, soya bean, sugarcane, acha, and beniseed, among other crops. The NARIs and CGIAR centers in Nigeria - the International Institute for Tropical Agriculture (IITA), International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), and Africa Rice Centre - work in close collaboration with universities, e.g., Ahmadu Bello University, the Federal University of Agriculture, and Obafemi Awolowo University. The Seed Entrepreneurs Association of Nigeria (SEEDAN) is the umbrella body for seed companies and other key private seed sector players.

Table 1: Role of key players in Nigeria's formal seed sector

ROLE	KEY PLAYERS
Research and breeding	Institute for Agricultural Research (IAR), Institute of Agricultural Research and Training (IAR&T), National Cereals Research Institute (NCRI), universities, seed companies, Consultative Group on Inter-national Agricultural Research (CGIAR) centres
Variety release and regulation	National Agricultural Seeds Council (NASC), National Centre for Genetic Resources and Biotechnology (NACGRAB), National Crop Varieties and Livestock Breeds Registration and Release Committee (NVRC)
Seed production and processing	Seed companies, Community Based Organizations (CBOs), seed producer associations, IAR, IAR&T, NCRI
Education, training, and extension	Seed companies, NASC, State departments of agriculture, Non-Governmental Organizations (NGOs), rural agro-dealers, Seed Entrepreneurs Association of Nigeria (SEEDAN)
Distribution and sales	Seed companies, rural agro-dealers, NGOs, State and federal government programs

⁴ <https://www.nacgrab.gov.ng/>



METHODS

TASAI studies cover 22 indicators divided into five categories: **Research and Development**, **Industry Competitiveness**, **Seed Policy and Regulations**, **Institutional Support**, and **Service to Smallholder Farmers**), detailed in Table 2. In most TASAI studies, the bulk of the performance data reported comes from the year preceding the study ("the study year") because that is the year for which the most recent data are available. Accordingly, the data reported in this Country Report pertain primarily to 2019; however, whenever 2020 data are available, they are included in the report.

Table 2: TASAI Indicators

	Crop-specific	Impact on seed access
A RESEARCH AND DEVELOPMENT		
A1 Adequacy of active breeders	Yes	+
A2 Number of varieties released	Yes	+
A3 Number of varieties with 'special' features	Yes	+
A4 Availability of basic seed	Yes	+
B INDUSTRY COMPETITIVENESS		
B1 Number of active seed companies/producers	Yes	+
B2 Quantity of seed produced and sold	Yes	+
B3 Number of varieties sold and dropped	Yes	+
B4 Average age of varieties sold	Yes	-
B5 Market concentration	Yes	-
B6 Market share of state-owned seed company	Yes	-
B7 Efficiency of seed import/export processes	Yes	+
C SEED POLICY AND REGULATIONS		
C1 Length and cost of variety release process	Yes	-
C2 Status and implementation of national seed policy framework	No	+
C3 Harmonization with regional regulations	No	+
C4 Adequacy of efforts to eradicate counterfeit seed	No	+
C5 Use of government subsidies	No	+
D INSTITUTIONAL SUPPORT		
D1 Performance of national seed association	No	+
D2 Adequacy of seed inspection services	No	+
E SERVICE TO SMALLHOLDER FARMERS		
E1 Availability of agricultural extension services for smallholder farmers	No	+
E2 Concentration of agro-dealer network	No	+
E3 Availability of seed in small packages	Yes	+
E4 Seed-to-grain price ratio at planting time	Yes	-

To assess the progress of Nigeria's formal seed sector, the present Country Report draws comparisons with the findings of the 2018 TASAI Nigeria study (with performance data primarily from 2017). In addition, since TASAI has conducted similar studies in 20 other African countries, this report also draws relevant cross-country comparisons.

Using TASAI survey tools, data collection focused on three key seed industry players: seed companies, plant breeders, and representatives of government entities active in the country's seed sector. Of these, seed companies were the study's primary source of information. Data collection took place during the COVID-19 pandemic, which at times necessitated that in-person interviews - TASAI's preferred method - be replaced by remote data collection by phone or online calls. The researchers estimate that this impacted approximately 10% of interviews. In addition, certain parts of Nigeria experienced sporadic violence that posed a security risk to those traveling to the area. According to the local research team, this was mitigated by working with an enumerator who resided in the area.

For several indicators, TASAI supplemented quantitative data with industry satisfaction ratings, in which respondents were asked to rate various aspects of the seed sector in Nigeria on a scale of 0-100, color-coded as follows: 0-19.99% **extremely poor**, 20-39.99% **poor**, 40-59.99% **fair**, 60-79.99% **good**, and 80-100% **excellent**.

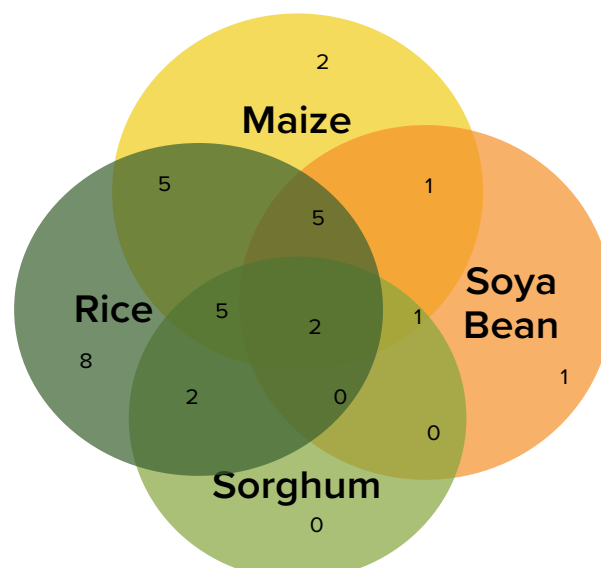
In 2019, the National Agricultural Seeds Council (NASC) registered 92 active seed companies that produced and marketed seed of at least one of the four focus crops. Of these companies, 68 produced maize seed, 69 produced rice seed, and 26 each produced sorghum seed and soya bean seed. The list of seed companies was obtained from the NASC and contained information on the estimated volume of seed production for each seed company. The seed companies surveyed by TASAI were selected to ensure that the aggregate volume of seed production by the seed companies included in the survey accounted for at least 80% of the estimated total seed production in 2019 (Table 3). A total of 56 seed companies were selected for the survey: 46 producing maize, 51 producing rice, 34 producing sorghum, and 34 producing soya bean (Table 3). The reason for the higher number of surveyed companies for sorghum and soya bean was that some companies produced and marketed seed of the two crops but had not registered with the NASC to work on these crops.

In addition to the seed companies, TASAI researchers also interviewed five public agricultural research institutions in the country that dealt with the four focus crops: the IAR, IAR&T, the IITA, the NCRI, and Obafemi Awololo University. The study also surveyed the three main government entities involved in the seed sector – the NASC, NACGRAB, and the National Agricultural Quarantine Service (NAQS).

Table 3: Breakdown of seed companies by crop

Crop	Number of registered seed companies in 2019	Number of seed companies surveyed	Production share of seed companies
 Maize	68	46	83%
 Rice	69	51	87%
 Sorghum	26	34	92%
 Soya bean	26	34	97%

Figure 1: Venn Diagram of active seed companies surveyed



RESEARCH AND DEVELOPMENT

NUMBER OF ACTIVE BREEDERS

A functioning seed system needs vibrant public and private breeding programs to develop improved varieties that respond to the farmer and consumer needs. The number of active breeders⁵ is indicative of the level of investment in research and development. In addition to tracking the number of active breeders working on the four focus crops, the study also measured the level of satisfaction reported by seed companies with the public breeding programs. The latter often reflects the ability of active breeders in public institutions to produce new varieties.

In Nigeria, all breeders are members of the Genetics Society of Nigeria. In 2019, the society had 134 members, of whom 52 were listed as engaged in the breeding of at least one of the four focus crops. However, the survey conducted by TASAI found only 38 active breeders for the four focus crops in 2019: 12 maize breeders, 9 rice breeders, 12 sorghum breeders, and 5 soya bean breeders (Table 4). This was an increase from the total of 24 active breeders in 2017: 11

maize breeders, 5 rice and sorghum breeders each, and 4 soya bean breeders. Despite the increase in the number of breeders, Nigeria's breeding programs are not funded adequately.

The seed companies rated their satisfaction with the adequacy of breeders as "good" for maize (75%), rice (68%), and sorghum (65%), and "fair" for soya bean (58%). The high ratings for maize, rice and sorghum reflect the ease with which seed companies access basic (foundation) seed. The lower rating for soya bean was likely due to the low number of active breeders. In addition, for the crops that were ranked highly, seed companies sourced their basic seed from NARIs and CGIAR centers, with which they work closely on variety development and maintenance. In total, for the four focus crops, Nigeria has three NARIs (IAR&T, IAR, and NCRI) and three CGIAR centers (Africa Rice, ICRISAT, and IITA). Furthermore, since 2018, when TASAI data was last collected in Nigeria, the number of breeders has increased notably for rice and sorghum. In addition, seed company satisfaction has increased for all four crops. This increase is due to two reasons: the recruitment of new breeders and the return of breeders who were away from their stations pursuing academic studies. The "good" rating in 2019 across the four crops is an improvement from the "fair" ratings for maize, rice, and sorghum, and "poor" rating for soya bean recorded in 2017.

⁵ TASAI studies define an "active breeder" as a breeder who is currently engaged in breeding/maintaining a variety or a breeder who had either developed and released at least one variety or was developing a variety of the crop of interest at the time of the TASAI study.

Table 4: Number and adequacy of active breeders in Nigeria

Crop	Number of public breeders	Number of private breeders	Total number of breeders		Satisfaction rating (out of 100%)	
	2019	2019	2017	2019	2017	2019
 Maize	9	3	11	12	58	75
 Rice	8	1	5	9	58	68
 Sorghum	11	1	5	12	42	65
 Soya bean	5	0	4	5	38	58
Total⁶	33	5	24	38	52	66

extremely poor poor fair good excellent

⁶ In some cases, the same breeder may work on multiple crops, so the total number of breeders may not equal the sum of breeders by crop.



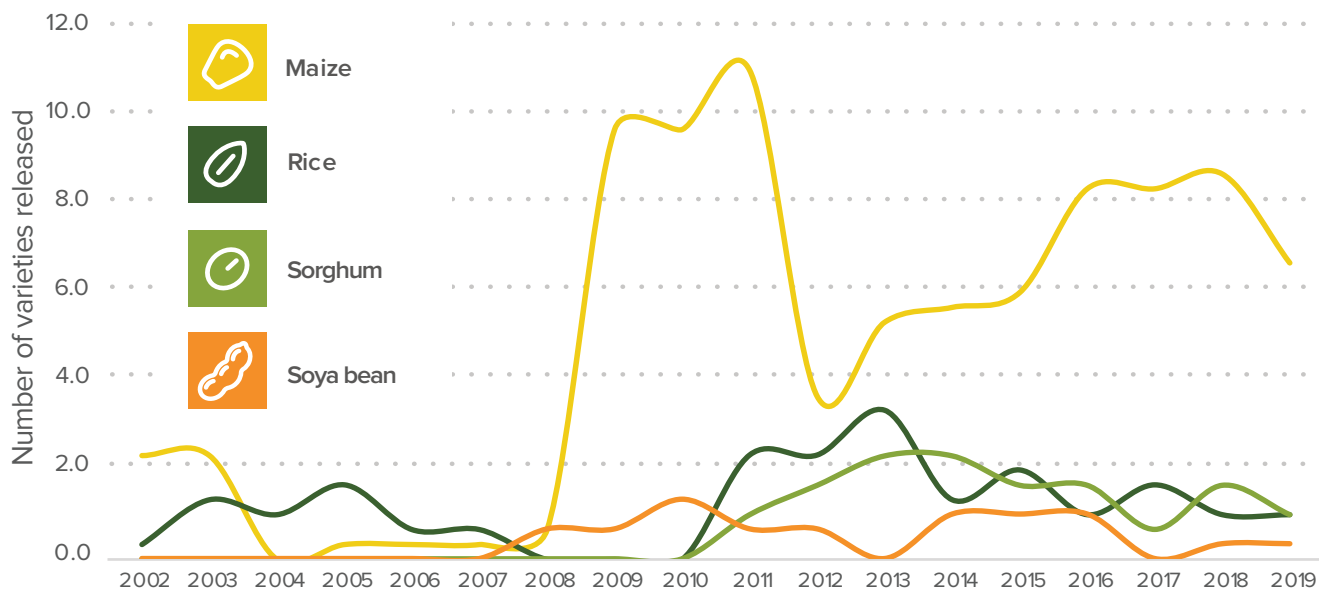
VARIETIES RELEASED IN THE LAST THREE YEARS

The number of varieties released in a given period is a good measure of the performance of the variety development and release system. This indicator (number of varieties released in the last three years) is crop specific, and the greater the number of varieties released in a country, the higher the chances of enhancing smallholders' access to improved seed. In addition to higher yields, new varieties often carry desired traits such as climate smartness, disease/pest resistance, and nutrition enhancements.

In Nigeria, a total of 137 varieties of the focus crops were released between 2000-2019 (Figure 2). The number of varieties released by crop was 92 for maize, 22 for rice, 15 for sorghum, and 8 for soya bean. The national variety catalogues list released varieties and their descriptions (NACGRAB, 2019).

Figure 2 illustrates the 3-year moving averages of crop varieties released between 2000 and 2019. Between 2017 and 2019 a total of 21 varieties were released: 14 maize, 3 rice, 3 sorghum, and one soya bean. However, in some years, no varieties of rice, sorghum or soya bean were released. Out of the total of 21 varieties released in the country between 2017 and 2019, only 2 sorghum varieties (released by IAR) were solely owned by the NARIs. The reason for the low number of releases varies by institution. IAR&T focuses on green maize, which is not very popular. The NCRI focuses on six crops, of which only rice is among the four focus crops of this study. The NCRI's resources for breeding work are shared among many cereal crops. The owners of the released varieties were private seed companies (10 out of the 21 varieties), the CGIAR centers such as IITA and Africa Rice (9 varieties), and the IAR (2 sorghum varieties). Figure 2 shows that in the last two years there was a downward trend in the number of maize and sorghum varieties released and stagnation in the number of rice and soya bean varieties released.

Figure 2: Trend in number of varieties released (3-year moving average)



VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics, for instance climate-smart, use-related (e.g., fast-cooking or nutrition-enhanced), or industry-demanded features. While acknowledging the increase in biotic stresses (pests, weeds and diseases) due to climate change, TASAI studies narrowly define "climate-smart features" as those that respond to extreme weather events, such as droughts, floods and frost, that affect current farming practices. Examples of the

common climate-smart features are drought tolerance, early maturity, or extra-early maturity. Between 2017–2019, out of a total of 21 varieties released, 7 had special features, listed in Table 5 (note that one variety may have multiple special features). Of the 14 maize varieties released between 2017–2019, 5 were drought tolerant, 1 was early maturing and 2 were extra early-maturing (70 – 75 days) varieties that perform well during short growing periods. One new maize variety had use-related features since it was biofortified with vitamin A. One sorghum variety was early maturing. None of the rice or soya bean varieties released had any special features.

Table 5: Number of varieties released that have special features

Feature	Description of feature	Number of varieties released 2017 - 2019				
		Maize	Rice	Sorghum	Soya bean	TOTAL
All varieties released 2017 - 2019		14	3	3	1	21
All varieties released with special features		6	0	1	0	7
Climate smart features	All climate- smart features	5	0	0	0	5
	Drought tolerant	5	0	5	0	10
	Early / extra- early maturing	3	0	1	0	4
Use- related features	All use-related features	1	0	0	0	1
	Nutrition- enhanced	1	0	0	0	1

NUMBER OF VARIETIES SOLD IN 2019

An increase in the number of varieties sold in a country often reflects an increased choice of varieties available to farmers. The seed companies surveyed sold a total of 50 maize varieties to farmers in 2019. Based on the number of seed companies selling a particular variety, the most popular maize variety was SAMMAZ 15 (sold by 78% of maize seed companies) followed by other SAMMAZ varieties, listed in Table 6. The Sammaz series was developed by the IAR. SAMMAZ 15 is very popular because of its tolerance to *Striga*⁷ infestation and its high average yield of 4.4 MT⁸ per hectare. SAMMAZ 14 is a medium-maturing Quality Protein Maize (QPM) variety, which is also tolerant to *Striga* infestation.

Seed companies sold 15 rice varieties to farmers in 2019. FARO 44 was the most popular variety and was sold by 86% of rice seed companies. FARO 44 is popular because of its high average yield of 6 MT per hectare, compared to the average yield for rice of 3 MT per hectare (Kamai et al., 2020). In addition, FARO 44 is an early-maturing variety, requiring only 90 days to reach maturity, and is not prone

to shattering. Other FARO varieties, all of which were developed by the NCRI, were likewise popular. Seed companies sold 13 sorghum varieties in 2019, the most popular of which were SK-5912/ SAMSORG 17 (sold by 53% of sorghum seed companies), CSR-01 (35%), and SAMSORG 45 (18%). SK-5912 is popular because of its tolerance to drought and *Striga* infestation. Of the eight soya bean varieties that were sold to farmers in 2019, the most popular was TGX-1448-2E, sold by 72% of seed companies, while TGX-1904-6F and TG X-1951-3F were each sold by 12% of all soya bean seed companies.

The popular varieties in 2019 were similar to the varieties sold in 2017. However, only a few of the 21 varieties that were released between 2017 and 2019 were among the popular varieties. This is not surprising given that it takes time to multiply and bulk certified seed for newly-released varieties. Further, studies show that most resource-poor farmers are risk averse, which slows the uptake of improved technologies.⁹ This is more prevalent in the case of high-cost inputs such as seed and fertilizer. The demonstration of the benefits of improved varieties improves their adoption.

⁹ See, for example, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/WPS_No_233_Technology_Adoption_and_Risk_Exposure_among_Smallholder_Farmers-Panel_Data_Evidence_from_Tanzania_and_Uganda_B.pdf and <https://link.springer.com/article/10.1007/s10584-015-1459-2>

⁷ *Striga* is a parasitic weed that sucks the nutrients out of crops like maize and sorghum. (<https://www.cimmyt.org/news/work-to-develop-high-yielding-striga-tolerant-maize-seed-is-bearing-fruit/>)

⁸ MT stands for metric ton throughout the report.



Table 6: Name and age of popular varieties sold

Crop	Number of varieties sold in 2019	Name of popular variety sold in 2019	% of companies selling the variety in 2019	Age of variety (years) in 2019
 Maize	50	SAMMAZ 15	78%	11
		SAMMAZ 14	36%	14
		SAMMAZ 17	27%	10
		SAMMAZ 16	18%	11
		SAMMAZ 27	18%	10
		SAMMAZ 37	18%	8
 Rice	15	FARO 44	86%	29
		FARO 59	24%	8
		FARO 61	14%	8
		FARO 58	14%	8
		FARO 52	12%	18
		FARO 60	12%	8
 Sorghum	13	SK5912/SAMSORG 17	53%	49
		CSR-01	35%	13
		SAMSORG 45	18%	3
 Soya bean	8	TGX-1448-2E	72%	27
		TGX-1904-6F	12%	11
		TGX-1951-3F	12%	5

AVERAGE AGE OF VARIETIES SOLD

In vibrant seed systems, farmers regularly replace old varieties with new ones. In many African countries, old varieties persist, despite the fact that newer varieties often outperform older varieties as they are bred for traits that respond to demands made by farmers, consumers, and industry. A lower average age of varieties signals higher rates of variety turnover. TASAI tracks the average age of varieties by crop.

Table 7 shows the average ages of varieties sold to farmers in 2019. The age of the variety is calculated based on the year in which the variety was released for commercialization. Due to a lack of data on volumes sold for each variety, the average ages are not weighted by volume.

In 2019, the most popular maize varieties were 14 years old (SAMMAZ 14) and 11 years old (SAMMAZ 15). Old varieties continue to be popular in Nigeria due to the low rate of commercialization of new varieties and the persistence of farmers' preferences. This is particularly clear in the case of rice, sorghum, and soya bean, where the most popular varieties are also some of the oldest on the market: the most popular varieties were 29 years old for rice (FARO 44), 49 years old for sorghum (SK5912/SAMSORG 17), and 27 years old for soya bean (TGX-1448-2E). There is no deliberate attempt by the public breeders to market the new varieties to farmers and seed companies. As a result, seed companies persist with the old varieties that they are used to.





Table 7: Number and age of all and popular varieties sold

Crop	Number of varieties sold in 2019	Average of all varieties sold		Average age of popular varieties ¹⁰
		2019	2017	
 Maize	50	9	7	11
 Rice	15	11	14	13
 Sorghum	13	25	31	22
 Soya bean	8	13	12	14

10 Popular varieties are based on Table 6

VARIETIES DROPPED OR NO LONGER MAINTAINED

A vibrant seed sector is expected to retire old varieties and discontinue varieties that fail to meet farmer needs as newer and better ones become available. This indicator tracks any variety dropped (i.e., no longer sold) by at least one seed company in the last three years.¹¹ The TASAI study tracks the dropped varieties, and for each dropped variety, we also capture the reason(s) why it was dropped.

Between 2010 and 2019, seed companies dropped 19 maize varieties, 11 rice varieties, 3 sorghum varieties, and 2 soya bean varieties. Since these varieties are still produced by some companies, they continue to be maintained by the research institutions. The most commonly cited reason for dropping a variety was low yield, reported by 75% of seed companies. Other reasons were low demand by farmers and susceptibility to diseases. The dropped varieties included different SAMMAZ varieties (SAMMAZ 14, 16, 17 and 34) and the KSV sorghum variety. Soya bean varieties TGX 1400-1E and TGX 1897 were dropped because they were prone to seed pod shattering during maturity.

SOURCES AND AVAILABILITY OF FOUNDATION (BASIC) SEED

Seed companies use basic seed to produce certified seed for sale to farmers. In many African countries, limited access to basic seed from public research institutions often limits the ability of seed companies to scale up production. The process to obtain basic seed varies from one NARI to another. For the case of IAR and NCRI, seed companies submit a written request for basic seed to the relevant research institution ahead of the planting season. The request must specify the

variety and quantities required by the company. In the case of the IAR, seed companies are expected to sign a binding contract with the institution. At the start of the cropping season, companies make a payment for the volume of basic seed that they require. When the companies collect the basic seed, they receive a receipt, tags for the seed packages and the SeedCodex labels.¹² In the case of some hybrid maize varieties, the seed company enters into an agreement with the breeder, which specifies the percentage of the value of the hybrid seed produced that the company will pay the breeder every year as a royalty.

The process to source basic seed from the NCRI is slightly different. The NCRI signs a memorandum of understanding with new buyers. All seed companies are expected to make a down payment of 50%, the receipt of which is presented together with the initial request. The balance of 50% is paid when the company collects the seed from the institute's store. Occasionally, the NCRI sells seed to companies that have not made an initial request. In such cases, the company may not receive the full quantity that was requested.

Sources of basic seed: Table 8 shows the public and private sources of basic seed for the focus crops in 2019. The main public sources were the IAR and NCRI, which collectively handled 71% of maize seed supply transactions, 63% of rice seed supply transactions, 80% of soya bean seed supply transactions, and 88% of sorghum seed supply transactions. The dominance of these two institutions is partly attributed to the fact that their mandate is to develop early generation seed and that they are located in the vicinity of the majority of seed companies (IAR in Kaduna state and NCRI in Niger state). Furthermore, these institutions have enjoyed being the sole sources of EGS in the country until recently when new EGS entities were accredited by the NASC. The other important sources of basic seed were the IITA, Africa Rice, and several seed companies. IITA GoSeed is a newly-established private entity that specializes in the production and commercialization of breeder and basic seed. Only one company sourced breeder and basic seed from IITA GoSeed in 2019.

¹¹ Note that this does not mean the variety is no longer on the market, as other companies may still sell it.

¹² These are explained in the section on efforts to eradicate counterfeit seed.



Table 8: Source of basic seed by crop, number of transactions, and percentage of total transactions (2019)¹³

Source of basic seed	Maize (n=55)		Rice (n=58)		Sorghum (n=33)		Soya bean (n=40)	
	Number of transactions	% of total	Number of transactions	% of total	Number of transactions	% of total	Number of transactions	% of total
Africa Rice	-	-	10	17	-	-	-	-
IAR	39	71	2	3	29	88	22	55
ICRISAT	-	-	-	-	2	9	-	-
IITA	12	22	3	5	-	-	7	18
IITA GoSeed	-	-	1	2	-	-	-	-
NCRI	-	-	35	60	-	-	10	25
Other (incl. NASC)	4	7	7	12	1	3	1	3
Total	55	100	58	100	33	100	40	100

¹³ Note that *n* refers to the number of transactions, not the number of companies.

Seed companies' assessment of the availability of basic seed: Survey respondents provided a satisfaction rating on the overall availability of basic seed in the country. As shown in Figure 3, overall, seed companies rated the availability of basic seed as “excellent” for maize (84%) and rice (80%) and “good” (79%) for sorghum and soya bean. This rating is an improvement since 2017, when the ratings were 74% for maize, 72% for rice, 71% for soya bean, and 79% for sorghum.

Availability of basic seed by organization: Seed companies were asked to rate each source organization on the aspects of quality, quantity, timeliness of delivery, and the overall availability of basic seed from the particular organization, listed in Table 9. The overall rating of the availability of basic seed across the four crops was “excellent” (above 80%). Specifically, ratings on the quality of basic seed ranged from 83% to 88%. The ratings of the quantity of seed ranged from 85% to 91%, indicating that most companies had received the quantities requested. Finally, ratings on the timeliness of delivery ranged from 88% to 97%. The high ratings indicate that, across the four crops, seed companies in Nigeria are satisfied with the three aspects and the overall availability of basic seed.

Figure 3: Overall satisfaction rating of availability of basic seed

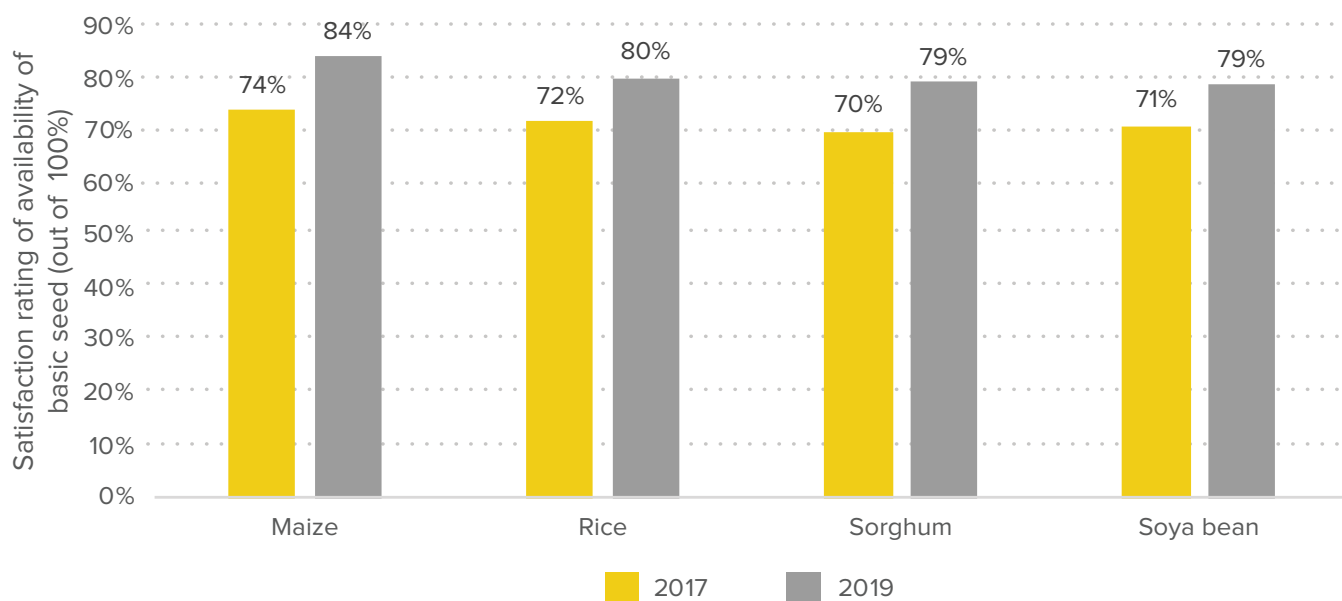


Table 9: Satisfaction rating of the quality, quantity, and timeliness of basic seed received by source organization (2019)

Crops		Africa Rice	IAR	ICRISAT	IITA	IITA GoSeed	NCRI	Other seed companies	Overall
Maize (n=55)	Quality *	-	88	-	85	-	-	85	87
	Quantity **	-	87	-	83	-	-	75	85
	Timeliness ***	-	100	-	83	-	-	75	95
Rice (n=58)	Quality *	91	90	-	70	90	86	81	86
	Quantity **	90	100	-	100	100	89	100	91
	Timeliness ***	90	100	-	100	100	100	86	97
Sorghum (n=33)	Quality *	-	88	93	-	-	-	50	87
	Quantity **	-	86	100	-	-	-	100	88
	Timeliness ***	-	93	100	-	-	-	-	91
Soya bean (n=40)	Quality *	-	86	-	95	--	71	50	83
	Quantity **	-	91	-	86	--	80	100	88
	Timeliness ***	-	100	-	86	-	80	-	90

*Quality of basic seed (opinion).

**Quantity of basic seed (% that received quantities requested)

***Timeliness of basic seed (% that received basic seed on time)

extremely poor poor fair good excellent

INDUSTRY COMPETITIVENESS

NUMBER OF ACTIVE SEED COMPANIES

Competition breeds excellence: the presence of more active seed companies increases competition and creates incentives for companies to innovate and improve service delivery. A vibrant seed sector depends on a robust private sector in which seed companies invest in developing, producing, processing, and marketing improved varieties to farmers. This section tracks the number of registered seed companies that produced and marketed seed of one or more of the focus crops.

According to the NASC database Nigeria had 314 registered seed companies in 2019. Of these, 106 companies were active in the production and marketing of certified seed. Of the 106, 92 produced and marketed certified seed of at least one of the four focus crops. Table 10 shows the breakdown of registered active seed companies by crop in 2017 and 2019. The number of active seed companies in 2019 (92) was slightly lower than the number of companies active in 2017 (106). The reduction was the result of the NASC delisting seed companies that were either inactive or did not meet quality standards.

Table 10: Breakdown of active seed companies

Crop	No. of active seed companies in 2017	No. of active seed companies in 2019
 Maize	71	68
 Rice	87	69
 Sorghum	27	26
 Soya bean	26	26
Total	106	92

GENDER IN MANAGEMENT OF SEED BUSINESSES

TASAI also tracks the number of women in management and ownership positions in seed companies. The 56 seed companies surveyed reported a total of 127 management positions, including positions such as managing director, assistant managing director, farm manager, finance manager, production/operations manager, and marketing manager. Table 11 shows how women are represented in management positions among the 56 seed companies surveyed in 2019. The figures range from 4% to 14%, showing that at present, women's participation as owners and/or managers of seed businesses in Nigeria is low.

Table 11: Gender in seed business management (2019)

Gender indicator	Number	%
Women in management positions (n=127)	18	14
Companies where management consist of at least 50% women (n=56)	7	13
Companies with female top manager (n=56)	2	4
Companies with female owner (n=56)	7	13





PRODUCTION AND SALE OF CERTIFIED SEED

To measure the overall size of a country’s seed sector, TASAI tracks the volumes of seed produced and sold for the four focus crops. The data is presented as aggregate quantities (in MT) of certified seed sold in the data collection year, as reported by active seed companies. Table 12 shows aggregated data for seed production and sales for 2019. Specifically, Column 1 shows that the 92 registered seed companies produced a total of 50,720 MT of maize seed, 37,386 MT of rice seed, 6,332 MT of sorghum seed, and 6,585 MT of soya bean seed. Columns 2 and 3 focus on the 56 companies surveyed by TASAI and show the volumes of certified seed produced reported to the NASC and TASAI. While there were no significant differences between the respective figures for maize and rice seed, the data for sorghum and soya bean show notable differences due to both over-reporting and under-reporting.

According to the NASC, the reason for seed companies’ over-reporting production volumes is that the companies are hoping to be noticed by the regulator as capable of selling seed to government programs, as the NASC often has a say in the choice of beneficiaries for government interventions. A comparison of production data by individual companies revealed that a total of seven soya bean-producing companies and eight sorghum-producing seed companies over-reported their seed production by at least 100%. According to the NASC, the main reason for the under-reporting is to cut down on the company’s costs of seed inspection and certification. Specifically, 10 sorghum seed companies and 12 soya bean seed companies reported to TASAI that they sold seed in 2019, however, these sales were not recorded by the NASC, implying that that some of the seed sold seed to farmers was neither inspected nor certified.

Table 12: Seed production and sales (2019)

Crop	Seed production in MT by all 92 seed companies (NASC data)	Seed production in MT by 56 surveyed seed companies (NASC data)	Seed production in MT by 56 surveyed seed companies (TASAI data)	Seed sales in 2019 in MT by 56 surveyed seed companies (TASAI data)
 Maize	50,720	42,002	40,424	24,738
 Rice	37,386	32,392	32,787	19,093
 Sorghum	6,332	5,808	3,478	1,779
 Soya bean	6,585	6,371	3,610	2,890

MARKET CONCENTRATION

Competition among seed producers tends to benefit farmers via lower prices, wider choices, increased innovation, and better customer service. To assess the level of industry market concentration, TASAI uses seed sales data for each crop, as reported by seed producers, to calculate the market share of the four largest firms, also known as four-firm concentration ratio (CR4), and the Herfindahl-Hirschman Index (HHI).¹⁴

In 2019, for all four crops, the top four companies were not very dominant in their respective seed markets. The market share of the top four companies (CR4) accounted for 62% of the maize seed market, 61% of the sorghum seed market, 49% of the soya bean seed market, and 46% of the rice seed market (Figure 4). This implies that the level of concentration in these markets is low. The market shares of the top four companies in 2017 were similar for the maize (63%), and sorghum (65%) seed markets, higher in the soya bean market (59%), and lower in the rice (37%) seed market.

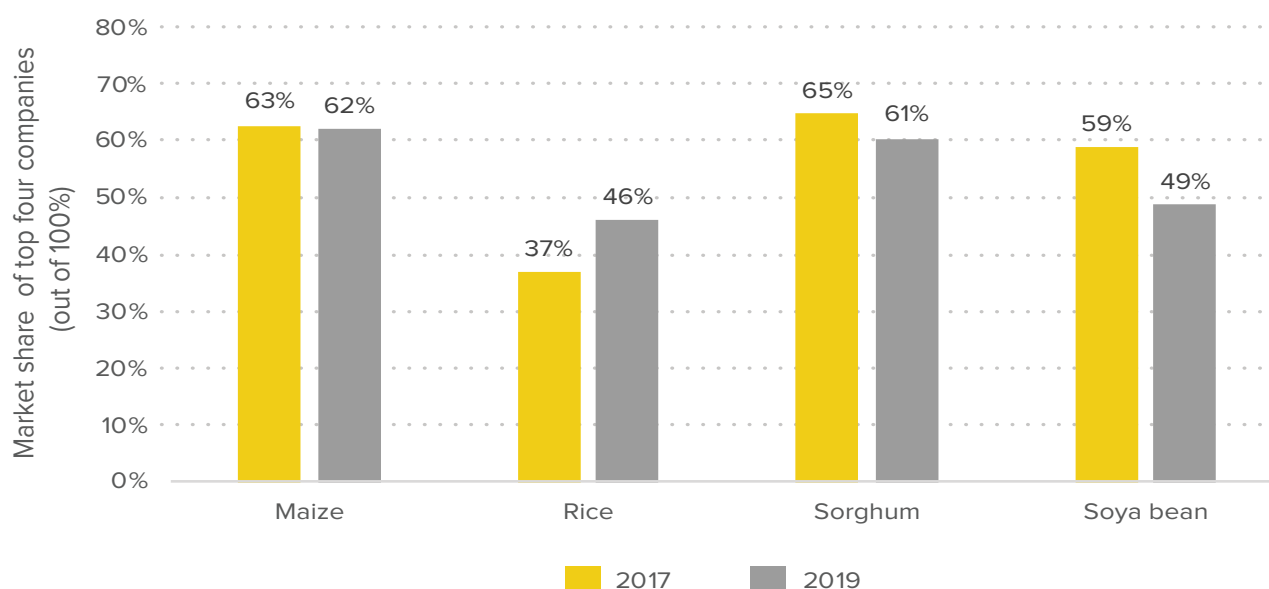
¹⁴ The HHI is a measure of market concentration and is calculated by squaring the market share of each firm competing in a market, and then adding up the results. It ranges from close to zero for perfect competition to 10,000 for monopoly. The scale for HHI scores, ranges from extremely low to extremely high levels of market concentration: less than 1,000 is **extremely low**, 1,000-1,999 is **low**, 2,000-2,999 is **moderate**, 3,000-3,999 is **high**, and greater than 4,000 is **extremely high**, i.e., monopoly or near monopoly.

In the case of HHI, the lower the score, the more competitive the market. In 2019, the HHIs per crop were 1,736 for sorghum, 1,090 for maize, 964 for soya bean, and 700 for rice (Table 14). Combined with the “top four” market share data, the HHI scores indicate that the markets for all four crops were either competitive or very competitive, with no single company dominating the market. Instead, there were many seed companies, each accounting for a small market share. The level of competitiveness is similar to that of 2017, when market concentration for all crops was either low or very low.

Table 14: HHI scores

Crop	HHI (2017)	HHI (2019)
 Maize	1,441	1,090
 Rice	552	700
 Sorghum	1,337	1,736
 Soya bean	1,239	964

Figure 4: Market share of top four seed companies



MARKET SHARE OF GOVERNMENT PARASTATAL

In some countries, public entities are still active players in the marketing and sale of certified seed. Public seed companies can play a critical role in meeting farmer demand for varieties that private seed companies deem less profitable. In

addition to seed production, public companies may support other national objectives, such as university training and research. However, state-owned companies may benefit from preferential treatment, less stringent enforcement of regulations, access to competitor information, and indirect production subsidies. Collectively, these privileges can result in unfair competition against purely private seed companies. In Nigeria, there was no government parastatal involved in the production and marketing of certified seed for the four crops in 2019.

SEED SALES TO DIFFERENT CATEGORIES OF BUYERS

The TASAI study tracked five different categories of seed buyers in 2019: government institutions, agro-dealers, farmers who bought seed directly from seed companies, NGOs, and other buyers. Figure 5 shows that, across the four crops, no single category of buyers accounted for more than half of seed sales. Government institutions were the main buyers of rice seed (42%). There was no dominant buyer of maize seed. For sorghum, seed sales to farmers accounted for 38% of seed sales, followed by sales to government institutions and agro-dealers. Agro-dealers were the most dominant channel for soya bean seed (35%), followed by direct sales to farmers (26%).

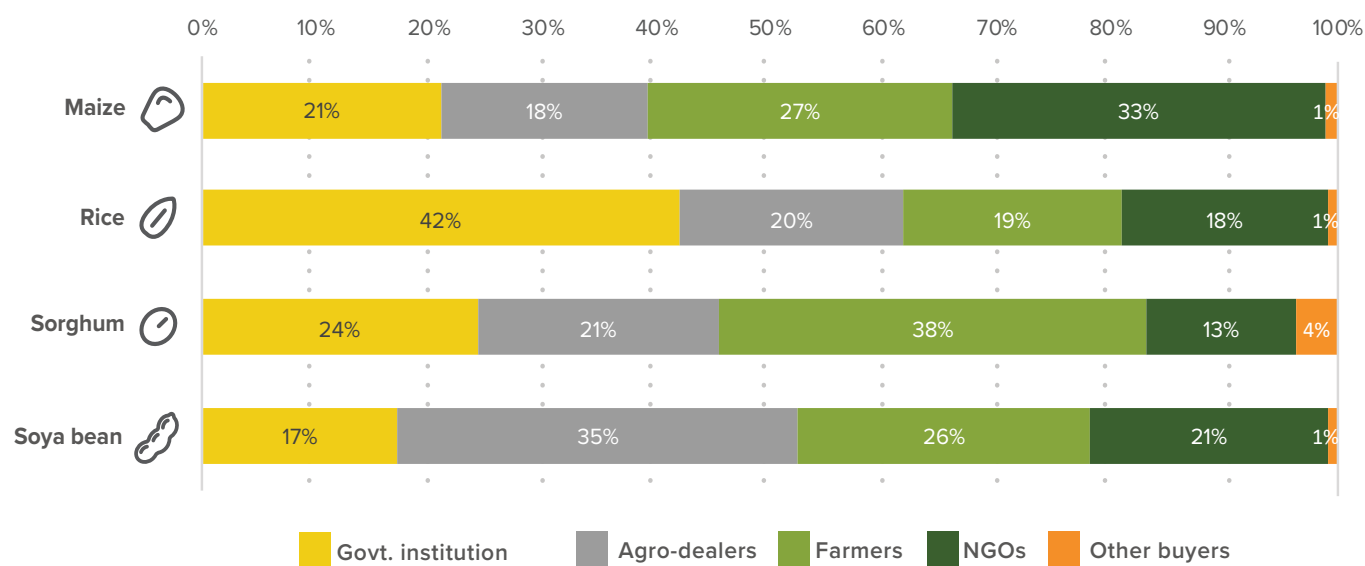
SEED IMPORT AND EXPORT PROCESS

Efficient seed import and export processes extend the seed market beyond national borders. While seed companies benefit from an expanded market, farmers can access a wider range of varieties from across the region.

The length of the import process in days is measured as the sum of the number of days used to obtain import documentation (import permit, phytosanitary certificates, and an International Orange Certificate¹⁵, if applicable) and the number of days to clear seed at the border. It excludes transportation time.

¹⁵ The International Orange Certificate is issued by a laboratory accredited by the International Seed Testing Association (ISTA) when both sampling from the seed lot and testing of the sample are carried out by the same laboratory.

Figure 5: Seed sales by category of buyers (2019)





Seed importation is regulated by both the NASC and the NAQS. To import seed, a company submits an application to the NASC. The application should contain the following information: source country, crop/variety name, seed class, and quantity to be imported. In addition, the importer also submits the company's certificate of registration, seed license certificate, and letter of reference from a bank. If the application is approved, the applicant completes a seed importation form and pays the prescribed fees. The NASC then issues an import approval which the applicant submits to the NAQS, which issues an import permit. In 2019, according to the NAQS, Nigeria imported 2.4 MT of seed for the four crops (Table 15). Most of these imports were sourced from outside of Africa. Cote d'Ivoire was the only source of seed from the ECOWAS region. According to the NASC, the import process takes between four and eight days. This period tallies with that reported by seed companies - three to seven days to obtain an import permit and one day to clear the seed at the border point of entry.

In 2019, one company exported 200 MT of maize seed, 30 MT of sorghum seed, and 80 MT of soya bean seed to Ghana. The company did not provide information on the duration of the export process. However, the Seed Entrepreneurs Association of Nigeria (SEEDAN) estimates that the export process takes between three and six weeks. According to the NAQS, only 2.5 MT of seed was exported from Nigeria in 2019 (Table 16). These are the exports for which the NAQS issued export permits, implying that the seed company that exported seed did not have an export permit. According to the NAQS, all the exports were destined for countries in West Africa.

Table 15: Overview of seed imports (2019)

Crop	Main country sources of imports	Volume of imports (MT)	Time to import seed (in days)	
			Time to obtain import permit (in days)	Time to clear seed at the border (in days)
 Maize	USA, Spain	0.5	3-7	1
 Rice	Argentina, Mexico, South Africa, Philippines	1.5	3-7	1
 Sorghum	Sudan, Cote d'Ivoire	0.1	3-7	1
 Soya bean	USA	0.3	3-7	1

Table 16: Overview of seed exports (2019)

Crop	Main destination countries for exports	Volume of exports (MT), NAQS data	Volume of exports (MT), seed company data
 Maize	West Africa	1.0	200
 Rice	West Africa	0.2	0
 Sorghum	West Africa	0.7	30
 Soya bean	West Africa	0.6	80



SEED POLICY AND REGULATIONS

LENGTH OF VARIETY RELEASE PROCESS

Plant variety release is the process by which new varieties undergo various tests for yield, Value for Cultivation and Use (VCU), and Distinctness, Uniformity, and Stability (DUS). Varieties that perform satisfactorily in these tests are approved for release by the National Crop Varieties and Livestock Breeds Registration and Release Committee (NVRC). A vibrant seed sector has a functional and consistent variety release system that is well understood by its stakeholders. Lengthy and/or costly variety release processes can limit the number of released varieties, adversely affecting farmer choice. Lengthy variety release processes also mean longer lags between the emergence of new threats to crops - such as pests, disease, and extreme weather - and the availability of varieties that mitigate these threats. The length of the variety release process is calculated from the date the variety is submitted to the variety release committee to the date when it is approved for release. The calculation does not include the time the breeder spends developing the variety.

In Nigeria, the NVRC under the National Centre for Genetic Resources and Biotechnology (NACGRAB), handles the variety release and registration process (NACGRAB, 2016). The members of the NVRC include representatives from the FMARD, the Federal Ministry of Science and Technology, NACGRAB, the NASC, universities, the Genetic Society of Nigeria, the Agricultural Research Council of Nigeria (ARCN), and the National Biotechnology Development Agency (NABDA). In addition, NARIs appoint a focal person for a specific crop. To submit a variety to the NVRC, the breeder first conducts both DUS and VCU tests on the variety under development. VCU and DUS consists of on-station and multi-location tests. The on-station trial is conducted within the premises of the research institution in accordance with guidelines set out by the International Union for the Protection of New Varieties of Plants. The multi-location trials last for two years and are conducted on at least 10 testing sites, across different agro-ecological zones. The VCU tests are conducted for one year on farmers' fields, to collect information on farmers' perceptions about the candidate varieties. A sub-committee of the NVRC visits one of the sites to evaluate the performance of the varieties. Once the tests are completed, the breeder submits the results to a technical committee of the NVRC. If approved, the variety is released and registered for commercialization.

According to public breeders, the average duration from application to the time when the variety was released was 19 months. However, according to seed companies, the average duration of the variety release process was 50 months, somewhat longer than the duration measured in 2017, which was 43 months. The length of Nigeria's variety release process in 2019 exceeds that of other countries studied by TASAI. The process in most countries ranges between

36 and 24 months.¹⁶ The lowest lengths are reported in Zimbabwe (18 months) followed by South Africa and Uganda (20 months). As indicated in Table 17, the breeders surveyed rated the variety release process as "good" in 2019 (67%) and 2017 (70%).

Table 17: Average length of variety release process

Indicators	2017	2019
Average length of variety release process (in months)	43	50
Satisfaction with variety release process (out of 100%)	70%	67%
Interpretation of satisfaction	Good	Good

Despite the reasonably high rating, breeders noted several challenges facing the variety release process. The NVRC only convened one committee meeting per year, as a result of which varieties were only released once a year. This was mainly due to a lack of financial resources to convene more meetings and the fact that only few varieties are nominated by breeders for release to the committee. When there are many nominations for release, the committee may opt to delay meeting until the end of the year.

COST OF VARIETY RELEASE PROCESS

In well-functioning seed systems, the costs of releasing a variety should not be so high as to disincentivize variety releases altogether. The NVRC has not set any costs for variety release. According to the breeders, the average total cost for the variety release process was US\$ 18,280. The breakdown of these costs was US\$ 5,530 for DUS tests, US\$ 13,712 for VCU tests, and US\$ 1,069 for other costs. The VCU and DUS costs were high because they were conducted at multiple sites across the country. In addition, the other costs include the logistical costs pertaining to NVRC members conducting at least one inspection visit to the sites.

TASAI findings from other countries show that the costs of variety release in Nigeria are significantly higher than those in other African countries. For example, in 2020, the cost of releasing a variety averaged US\$ 3,000 in Kenya (Mabaya et al., 2021a) and US\$ 7,031 in Mali (Mabaya et al., 2021b). However, the cost of variety release in Nigeria is lower than the cost in Ghana, which was on average US\$ 41,668 (Mabaya et al., 2021c).

¹⁶ For these reports, please see <https://tasai.org/publications/>



STATUS AND IMPLEMENTATION OF NATIONAL SEED POLICY FRAMEWORK

Well-functioning formal seed sectors have effective coordinating institutions that work well together, following rules and procedures stipulated in clearly defined and regularly updated legal instruments. In Nigeria, the National Seed Policy of 2015 (FMARD, 2015) is the sector's policy instrument providing overall guidance for seed sector development. The policy provides a framework for the different stages in the seed value chain, namely crop research, seed production, seed quality assurance, and seed marketing and distribution. The policy designates the NASC as the principal institution charged with the implementation of the policy.

The main legal instrument governing the seed sector is the National Agricultural Seeds Council Act (Federal Republic of Nigeria, 2019). This Act established the NASC in part to “regulate and control the registration of released varieties, protect the farmers from the sales of poor-quality seeds, facilitate the production and marketing of high-quality seeds in Nigeria, and provide legal backing for official testing certification, sales, importation, exportation and use of seed”. The Act allows for the appointment of seed inspectors, paving way for the deployment of private or authorized seed inspectors to complement NASC seed inspectors. In addition, the Act provides the foundation for a separate legislation to protect the rights of plant breeders in a section dedicated to Plant Protection and Plant Breeders' Rights.

Furthermore, the NASC Act is in conformity with the ECOWAS seed regulations (ECOWAS, 2008). The Act recognizes the West Africa Catalogue of Plant Species and Varieties as a complement to the National Seed Catalogue. In addition, the Act establishes a seed sector support fund.

QUALITY AND ENFORCEMENT OF SEED REGULATIONS

Seed regulations give structure to the formal seed sector. The TASAI study assesses stakeholder perspectives on various aspects of seed regulations, including whether they are supportive to the growth of the seed sector, the role stakeholders play in their design and implementation, stakeholders' awareness of the laws and regulations, the presence of an enforcement agency, the costs of regulation, and the effectiveness of punitive measures.

The NASC is the agency charged with the implementation of the national seed policy and the NASC Act. However, the implementation of variety release and registration is shared with NACGRAB, since the NVRC is expected to recommend the registration and release of varieties to the NASC. This duality of functions needs to be rationalized legally.

Implementation of ECOWAS regulations: The study assessed four key aspects of seed sector regulations that are required for complete harmonization with ECOWAS regulations: i) setting up of a national seed committee, ii) instituting a decree for seed import and export, iii) updating the national variety catalogue and recognizing the West Africa Catalogue of Plants and Species as the repository of all varieties approved in the ECOWAS region, and iv) creating a seed sector support fund.

Nigeria has yet to comply with the first requirement, as the national seed committee has not yet been established. With regard to instituting a decree for imports/exports, some progress has been made, as the NASC Act does define the requirements and processes for seed importation and exportation. However, since there were no seed imports and only two export transactions for the four crops in 2019, it is difficult to ascertain, based on the TASAI study, whether these requirements are being implemented.

According to NACGRAB, the National Seed Catalogue is updated every three years. As of February 2021, the variety catalogue on the NACGRAB website¹⁷ only listed variety releases up to 2018. The NASC Act of 2019 acknowledges the West Africa Catalogue of Plant Species.

The final requirement is the creation of a functioning national seed support fund. The fund has been established by the NASC, in accordance with the NASC Act of 2019. According to the Act, the NASC is tasked with the establishment and management of a seed sector support fund in partnership with public, private, and development partners. This fund is expected to bridge the gaps that may exist in the NASC's funding needs (NASC, 2019). However, according to the NASC, the fund is not yet operational.

Seed companies rated the government's enforcement of the Nigerian seed regulations “good” at 79%. This was slightly lower than the “excellent” rating (84%) reported in 2017. The decline in the ratings from 2017 to 2019 coincides with the enactment of the NASC Act of 2019. While the NASC Act facilitates the streamlining of the implementation of the seed Act, which is good for the seed sector in general, it punishes those who do not follow the regulations. For example, in 2020, the NASC deregistered seed companies that were either inactive, or did not meet the requirements outlined in the NASC Act. Another example of the Act's implementation is the improvement in seed certification (field inspection and certification) services. Part VI –Section 15 Sub-Section 4 of the NASC Act provides that the Council may authorize private bodies to undertake quality control and seed certification on its behalf under its supervision. Between 2019 and 2020, the NASC worked with institutions like the National Cereal Research Institute (NCRI) and Catholic Relief Services (CRS) to strengthen seed quality control by initiating arrangements for private seed field inspection and certification. A third example pertains to counterfeit seed. Part IX of the NASC Act outlines specific violations of the law, including the marketing of seed that has not been certified, seed marketing by an unlicensed seed company, and mislabeling or altering labels on seed packages. In addition, in 2020 the NASC rolled out

17 https://www.nacgrab.gov.ng/images/Varieties_Released_Catalogue.pdf



two digital initiatives to address this problem, SeedCodex and the Seed Tracker. Both tools enhance the traceability of packaged seed by authenticating its source. The NASC is governed by a governing board. The board approved the NASC Strategic Plan (NASC, 2019). In 2020, the board met five times, of which four were regular meetings and one was an emergency meeting.

EFFORTS TO ERADICATE COUNTERFEIT SEED

Counterfeit seed (also known as fake seed) threatens the seed sector in two important ways. First, it reduces farmers' confidence in certified seed due to cases in which farmers unknowingly plant inferior quality grain labeled as certified seed. Second, it threatens the success of efforts to increase the adoption of improved varieties because farmers are not sure of which seed is genuine. TASAI tracks the number of cases of counterfeit seed reported by seed companies and the government in the data collection year, and asks seed companies to report their level of satisfaction with government efforts to eliminate counterfeit seed.

Of the 56 companies surveyed, eight (14%) reported a combined total of 36 cases of counterfeit seed in 2019. This number was close to the 34 cases reported in 2017 (Table 18). Seed companies noted that the main sources of counterfeit seed were agro-dealers, general seed merchants, and, to a lesser extent, seed companies. In contrast to the 36 cases of counterfeit seed cases reported by seed companies in the TASAI study, the NASC only received one report in 2019. The NASC opines that seed companies do not report cases of fake seed, because in some cases, they are the source of the fake seed. The NASC reckons that some seed companies resort to selling grain as seed, when they do not have adequate supplies to meet the demand for certified seed.

The NASC's first step in the fight against counterfeit seed was to establish the Seed Inspectorate Department. This department is now well-staffed and is engaged in sensitizing farmers, and has conducted surveillance and market raids. In addition, the NASC has also introduced two digital tools to tackle the problem. The first tool, SeedCodex, entails the digital coding and labelling of certified seed. These codes are placed on the seed package under a scratchable veneer. Once the veneer is scratched, the code becomes visible and can be sent to a designated phone line through a text message. The sender receives a confirmation of the authenticity of the seed in the package. SeedCodex is currently being implemented with cassava and will be rolled out to other key crops. The second tool is the Seed Tracker™¹⁸ which tracks seed from production to inspection and finally harvesting. As indicated in Table 18, seed companies reported "good" levels of satisfaction (74%) with government efforts to address the challenge of counterfeit seed. Their satisfaction is slightly higher than what was reported in 2017 (70%).

Table 18: Number of cases and satisfaction with government efforts to address counterfeit seed

Indicators	2017	2019
Numbers of cases of counterfeit seed reported by seed companies	34	36
.....		
Satisfaction with government efforts to address counterfeit seed (out of 100%)	70%	74%
Interpretation of satisfaction	Good	Good

USE OF GOVERNMENT SUBSIDIES

Seed subsidies are intended as a short- or medium-term measure to encourage farmers to adopt improved crop varieties. The design and execution of subsidy programs, in terms of the scale, targeting, distribution arrangements, and payment systems, may contribute to the development of the seed market in positive ways or it may be disruptive to market forces. The Federal Ministry of Agriculture and Rural Development did not implement any seed subsidy program in 2019.



18 <https://seedtracker.org>



INSTITUTIONAL SUPPORT

QUALITY OF THE NATIONAL SEED TRADE ASSOCIATION

Well-functioning national seed trade associations play a key role in representing the interests of the industry and engaging with the government. The membership of the national seed associations includes seed companies, seed associations, and at times agro-dealers.

The Seed Entrepreneurs' Association of Nigeria (SEEDAN) is an umbrella association of seed companies. SEEDAN was formed in 1992 and received its official certificate of registration in 2012. The association currently has 73 members, and 44 out of the 56 seed companies surveyed were members of the association. The secretariat only has one staff member, who reports to a 15-member board. The board only has one female member (Table 19).

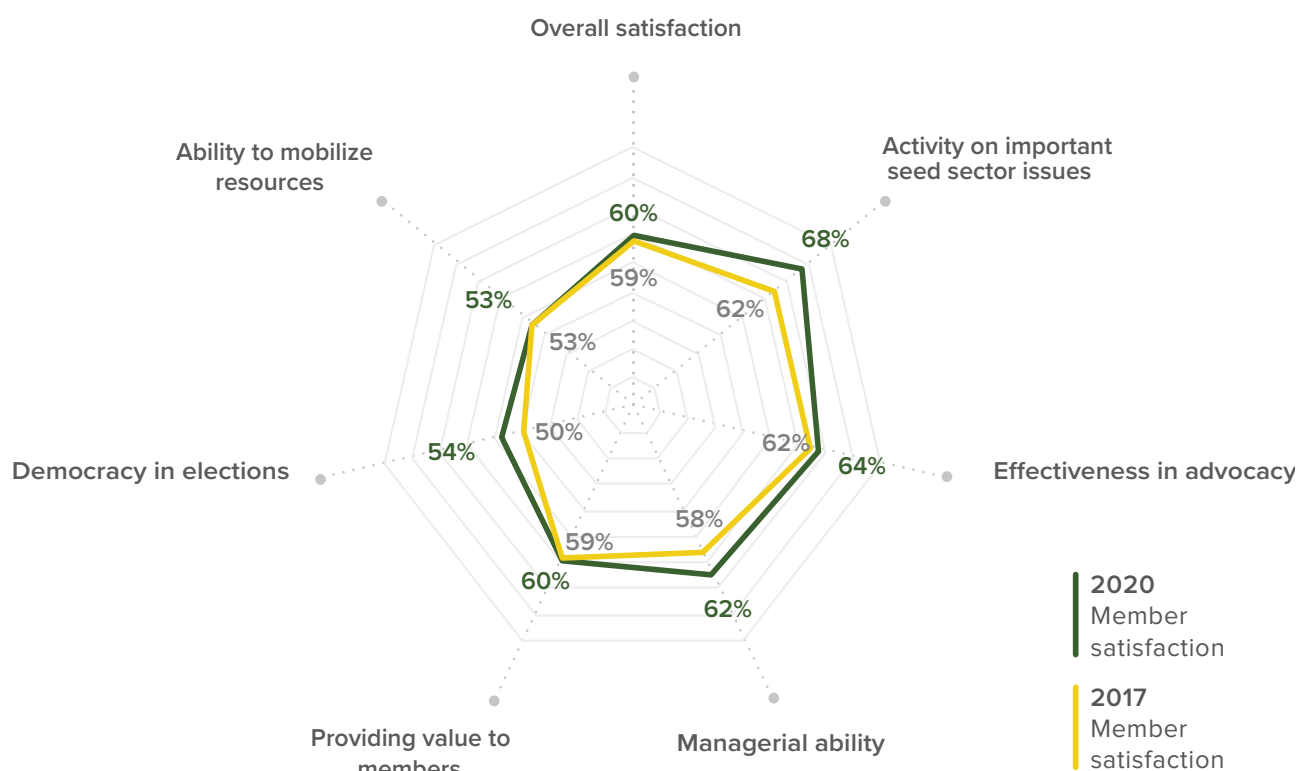
Table 19: Gender composition of SEEDAN (2020)

Indicators	Number of women	Total number (staff /board)	% of women
SEEDAN secretariat	0	1	0%
SEEDAN board	1	15	7%

Respondents were asked to rate the association's performance against seven performance indicators, presented in Figure 6. Seed companies rated the overall performance of SEEDAN as "good" at 60%. Activity on important seed sector issues was rated most highly (68%). Ratings on the provision of value to members, managerial ability, and effectiveness in advocacy were rated "good" and ranged between 60 and 64%. Members were least satisfied with democracy in elections and the ability to mobilize resources, which were rated "fair" at 54% and 53%, respectively. These low ratings are understandable because, since its formation, the association is yet to mobilize resources to set up a functional secretariat. In addition, SEEDAN has not held any leadership elections since 2008: while there was a handover of leadership in 2013, there were no elections.

Figure 6 compares the performance ratings SEEDAN received in 2017 and 2020. The ratings given by members have not changed significantly in this period, with the difference in ratings ranging between 1% and 6%. In both 2017 and 2020, SEEDAN received the lowest ratings for its ability to mobilize resources and democracy in elections. These two challenges have persisted over the years. In fact, many non-members also cited the need for the democratization of the association, along with the need for increased mobilization of resources, as reasons for not joining SEEDAN.

Figure 6: Members' opinion of SEEDAN's performance



ADEQUACY OF SEED INSPECTORS

Seed inspection services ensure that certified commercial seed meets regulatory quality standards. Adequate inspection services require sufficient numbers of well-resourced inspectors. TASAI tracks the number of inspectors, and information pertinent to their effectiveness, such as the availability of resources and the use of (new) digital tools. In Nigeria, seed inspection is the mandate of the NASC, which employed 60 public seed inspectors (53 men and 7 women) in 2019/20. Although the number of public inspectors increased from 50 in 2018, seed companies' rating of the adequacy of public inspectors dropped from "excellent" (84%) in 2018 to "good" (73%) in 2020 (Table 20). The drop in satisfaction is due to the retirement of several senior seed inspectors, who have been replaced by less experienced new hires.

In some cases, seed companies reported the production of seed that was either not certified or was rejected by the NASC. Second, the NASC opines that some of its field officers may have under-reported production data. The reason for under-reporting by the seed companies is to reduce costs of inspection (field inspections and purchasing of certification tags). This implies that some of the seed sold by seed companies is neither inspected nor certified. It is then not surprising that in 2020, the NASC withdrew the operating licenses of 103 seed companies that were either inactive or did not conform with seed quality standards.

Table 20: Number and rating of the adequacy of public inspectors

Indicators	2018	2020
Number of NASC seed inspectors	50	60
Seed industry satisfaction with NASC inspectors (%)	84%	73%
Interpretation of satisfaction	Excellent	Good

SERVICE TO SMALLHOLDER FARMERS

ADEQUACY OF EXTENSION SERVICES

Well-functioning agricultural extension services are critical to the successful adoption of improved seed by smallholder farmers. TASAI tracks the average number of agricultural households served by one extension officer. The lower this ratio, the better access farmers have to expert information and advice on how to access and use improved seed and other relevant agricultural technologies. This indicator tracks number of extension officers by sector (public and private) and gender; it is not crop-specific.

According to the Director of the Federal Department of Agricultural Extension in the Federal Ministry of Agriculture and Rural Development, the government does not have accurate data on the number of agricultural extension officers in the country due to a lack of coordination between the federal and state levels. However, the Department estimates that there are 14,000 extension officers, of whom 6,000 were from the public sector and the remaining 8,000 were privately employed. The government plans to strengthen the coordination mechanisms between the federal- and state-level agricultural institutions, NGOs, and private entities that offer extension services.

Only 25 (45%) of the surveyed seed companies employed extension officers in 2019, a number lower than the 34 seed companies surveyed that employed extension officers in 2017. The 25 seed companies employed a total of 188 officers (146 male and 42 female) as indicated in Table 21. In both years, seed companies' rating of the adequacy of extension services was "fair": 55% in 2019 and 59% in 2017.

Due to the paucity of data on the number of agricultural extension officers, it is difficult to estimate the ratio of extension agents to agricultural households. According to a 2016 study, the ratio of extension workers to farmers was estimated to be 1:5,000-10,000 (DigitalGreen, 2017). According to the director of the Department of Agriculture and Extension in 2020, one extension worker was working with 5,000 farmers.¹⁹ In this report, we have taken 1:7,500 as the mid-point between 1:5,000 and 1:10,000. This ratio is significantly higher than in most African countries, meaning that, on average, Nigerian farmers have a harder time accessing extension services than their counterparts in other African countries. Figure 7 offers a comparison with countries where the TASAI study has been conducted²⁰ and shows that Nigeria lags quite far behind with respect to the number of farmers served by one agricultural extension officer.

¹⁹ <https://www.icirnigeria.org/nigeria-has-no-data-on-population-of-extension-workers-farmers-director/>

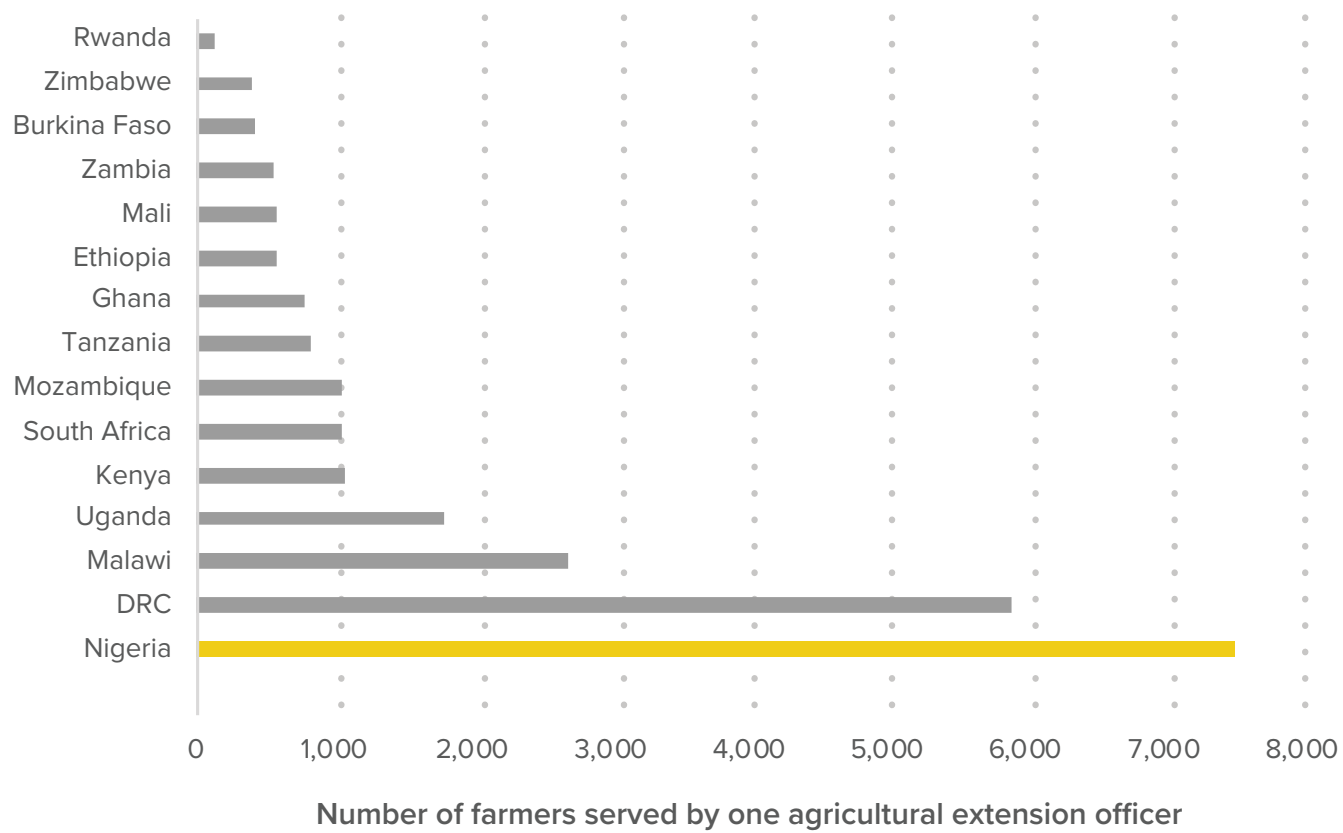
²⁰ For the respective country briefs please see <https://tasai.org/publications/>

Table 21: Number and adequacy of agricultural extension services

Indicators	2017	2019
Number of seed companies employing extension officers	34	25
Number of public extension officers	7,000	6,000
Number of private extension officers (seed companies)	360	188 (146 male and 42 female)
Number of private extension officers (other actors)	-	8,000
Total number of extension officers	7,360	14,188
Seed industry satisfaction with extension officers (%)	59%	55%
Interpretation of satisfaction	Fair	Fair



Figure 7: Number of farmers served by one extension officer (study years range from 2016-2021)



CONCENTRATION OF THE AGRO-DEALER NETWORK

Agro-dealers play a key role in Africa’s seed distribution systems, connecting seed producers to individual farmers, especially in hard-to-reach rural areas. They are often the main point of sale for certified seed. A higher concentration of agro-dealers means that smallholder farmers have greater access to improved seed. TASAI tracks the number of agro-dealers and, where possible, disaggregates registered from non-registered agro-dealers. This indicator is not crop specific.

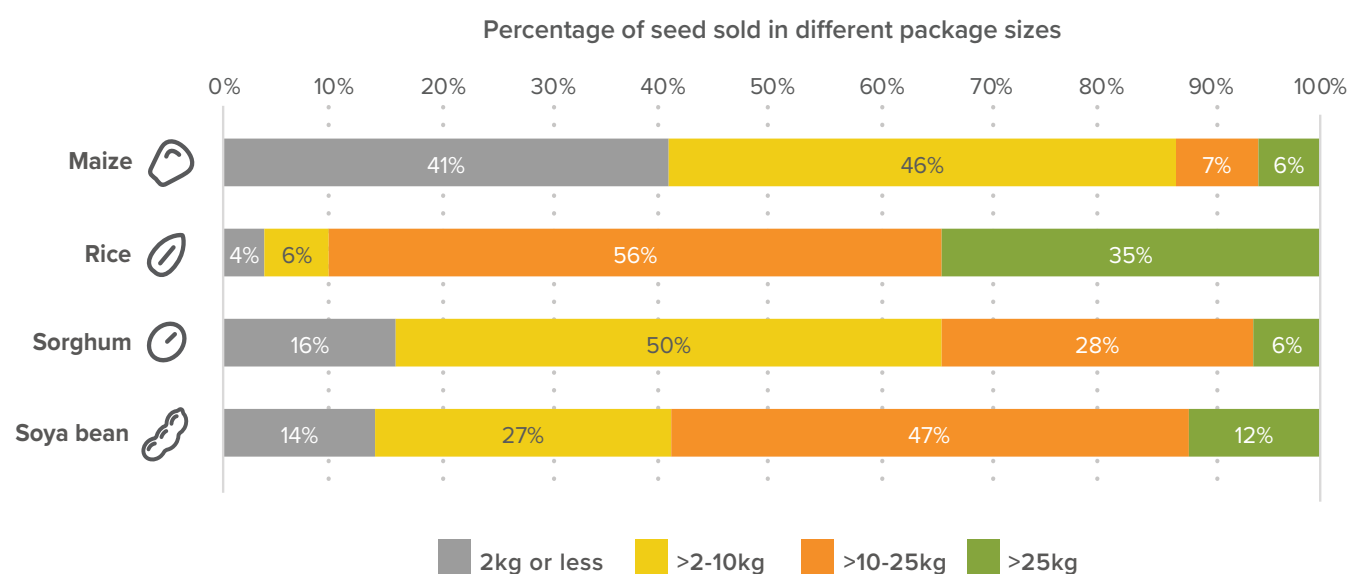
Article 19 of the NASC Act requires all seed operators to be registered by the NASC. In 2020, the NASC had 21 seed sellers in its registry, a slight change from the 20 registered seed sellers recorded in 2018. However, farmers across the country are served by agro-dealers, entities that sell a broad range of agricultural inputs, including seed, and the government does not have a registry of all of them. Seed companies surveyed reported working with an average of 27 agro-dealers. The highest number of agro-dealers working with a single seed company was 480. Seed companies were not satisfied with the network of rural agro-dealers. They rated their satisfaction as “fair” at 51%.

AVAILABILITY OF SEED IN SMALL PACKAGES

Because most farmers in Sub-Saharan Africa operate on a small-scale, making seed available in small, more affordable packages is a good way to increase adoption rates of certified seed. TASAI tracks the percentage of seed sold in different package sizes, i.e., 2 kg and below, 2-10 kg, 10-25 kg, and above 25 kg.

Figure 8 shows the percentage of seed sold in different packages for the four crops. Seed package size is a function of the quantity that a farmer requires per ha. Nearly half of the maize seed (41%) was sold in small packages of 2 kg or less. The other prominent package size for maize seed was between 2 kg and 10 kg, accounting for 46% of seed sold. In contrast, very low volumes of seed for the other crops were sold in small packages (less than 2 kg): 16% for sorghum, 14% for soya bean and 4% for rice. Most of the rice seed (90%) was sold in packages of at least 10 kg. This is because rice is planted by broadcasting, which requires a large amount of seed for a small area. The reason for small packages for maize seed is twofold: firstly, seed is mostly planted on small plots, and secondly, large seed companies are gradually moving away from selling seed to the government as a main buyer and are resorting to selling seed directly to farmers, who prefer small packages.

Figure 8: Percentage of seed sold in different package sizes (2019)



SEED-TO-GRAIN PRICE RATIO

The seed-to-grain price ratio at the time of planting is a good measure of affordability of improved seed. This data point is important as many smallholder farmers end up making a choice between purchasing seed from the formal sector or planting grain. The greater the price difference between the two, the less likely that resource-poor farmers will purchase certified seed. This indicator tracks the ratio of the retail price of seed (at agro-dealer level) vis-à-vis the market price of grain at the time of planting.

The seed-to-grain price ratios at the time of planting were as follows: 4.0:1 for hybrid maize, 3.7:1 for rice, 3.5:1 for OPV maize, 3.1:1 for sorghum and 2.6:1 for soya bean (Table 22). The highest ratio, for hybrid maize, can be attributed to its high production costs when compared to the other four crops. The average prices of seed and grain in 2019 are higher than the prices in 2017 for the four crops. This shows a difference in the magnitude of the price increase. The magnitude of the increase in the grain price for maize and soya bean is higher than the magnitude of the increase in the seed price for the two crops. The opposite is true for sorghum and rice.

Table 22: Seed-to-grain price ratios

Crop	Average seed price in USD/kg		Average grain price in USD/kg		Seed-to-grain price ratio	
	2017	2019	2017	2019	2017	2019
 Maize (hybrid)	1.0	1.45	0.18	0.37	5.8:1	4.0:1
 Maize (OPV)	0.9	1.30	0.18	0.37	5.0:1	3.5:1
 Rice	1.1	1.37	0.33	0.37	3.3:1	3.7:1
 Sorghum	1.1	1.10	0.16	0.35	6.7:1	3.1:1
 Soya bean	1.0	1.14	0.33	0.44	2.9:1	2.6:1



CONCLUSION

Nigeria's formal seed sector is in the early growth stage of development (Ariga et al., 2019). The early growth stage is characterized by, among other factors, established breeding programs and evolving seed policy environments. Seed companies produce and sell a limited range of staple crops. While governments and NGOs are still significant players in the sector, there is a growing agro-dealers' network that supports the distribution of seed to smallholder farmers. Since a large percentage of farmers' seed requirements are met through the informal seed sector (NSEG and FMARD, 2019), there is ample opportunity for the sector to grow. While the 2020 TASAI Nigeria study has revealed some areas for improvement, it highlights many positive aspects of the seed industry, most of which are the result of recent improvements initiated by the government.

Compared to other African countries covered by TASAI, Nigeria has a much larger population with more than 201 million people. In addition, the country has a very diverse agro-ecology and dietary preferences. Collectively, these factors call for much larger investments in the research, development and the multiplication of new crop varieties that are both climate and nutrition smart.

Under the **research and development** category, the number of active breeders has grown from the 24 breeders recorded in 2017 to 38 in 2019. This is reflected in the improved satisfaction rating for all crops over the two periods. While maize has continued to lead in the number of varieties released since 2015-2017 and for 2017-2019, the numbers of rice and sorghum variety releases have been low and these are even lower for soya bean. Of the newly-released maize varieties, 38% had climate-smart features, indicating that they were responsive to farmers' needs to adapt to climate change. However, the most popular varieties on the market were old varieties: a 49-year-old sorghum variety, a 29-year-old rice variety, and a 27-year-old soya bean variety. While NARIs continue to be a major source of basic seed in Nigeria, CGIAR centers and companies that specialize in basic seed production were prominent in 2019. Across all crops, the overall rating of the availability of basic seed was "excellent". This is an indication that the sources of basic seed are responding adequately to the needs of seed companies.

Under the **industry competitiveness** category, there was a reduction in the number of active seed companies between 2017 and 2019. This was a result of the delisting of some companies that were inactive and/or did not meet quality standards. Continued enforcement of quality standards will ensure that only committed seed companies will remain in the business. The markets for the four crops are competitive or very competitive, which facilitates smallholder farmers' access to seed.

The **seed policy** environment in Nigeria is characterized by recently developed instruments that are yet to be fully implemented. The policy instruments are aligned with the ECOWAS seed regulations when it comes to import and export procedures, although due to a lack of import/export

transactions, their implementation is difficult to assess. The national variety catalogue is updated regularly. The seed sector support fund has yet to be established. Despite this partial progress, seed companies rated their satisfaction with the enforcement of seed policy instruments as "good," which is a slight decline from the "excellent" rating given in 2017. The slight decrease in satisfaction between 2017 and 2019 is likely due to the fact that the reality of increasing regulation of the seed sector as a result of the NASC Act of 2019, while beneficial to the sector as a whole, has posed challenges to seed companies. Seed companies rated the adequacy of seed inspectors and efforts by the government to address counterfeit seed as "good". These efforts can be improved with a reduction in the cost and length of the variety release process and the rationalization of the conflicting roles of variety release and registration currently being undertaken by NACGRAB but also assigned to the NASC.

The **institutional support** for the formal seed sector in Nigeria is healthy. This is shown by the improved satisfaction ratings for SEEDAN, and the "good" rating of the adequacy of seed inspectors. While the overall rating of SEEDAN improved slightly, the two areas where performance has been low both in 2020 and 2017 are the association's ability to mobilize resources and democracy in elections. SEEDAN should strive to improve in these two areas. SEEDAN should work more closely with NASC to take the seed sector forward.

Service to smallholder farmers in Nigeria is wanting with respect to the provision of public extension services and the concentration of agro-dealer networks. Seed companies rated the adequacy of public extension services "fair" in both the 2017 and 2019. The number of seed sellers registered



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ABOUT TASAI



PILLARS OF COMPETITIVE SEED SECTORS

The African Seed Access Index (TASAI) is a seed industry research initiative that is coordinated by the nonprofit organization TASAI Inc. TASAI's goal is to encourage African governments and other seed industry players to create and maintain enabling environments that will accelerate the development of a vibrant private sector-led seed system serving smallholder farmers. It is this enabling environment that TASAI seeks to measure, track, and compare across African countries. The intended outcome of the index is improved access to locally adapted, affordable, and high-quality seed of improved varieties by smallholder farmers in Sub-Saharan Africa.

To assess the status of the seed industry value chain, TASAI tracks indicators in the following five categories: Research and Development, Industry Competitiveness, Policy and Regulations, Institutional Support and Service to Smallholder Farmers. By the end of 2021, TASAI studies will have been completed in 20 African countries: Burkina Faso, Burundi, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. In each country, TASAI works closely with local seed industry actors, government and international development agencies to share the TASAI findings and to identify the next steps for creating a vibrant national seed sector. TASAI's approach is guided by the principles of Simplicity, Transparency, and Accuracy.

TASAI PRINCIPLES

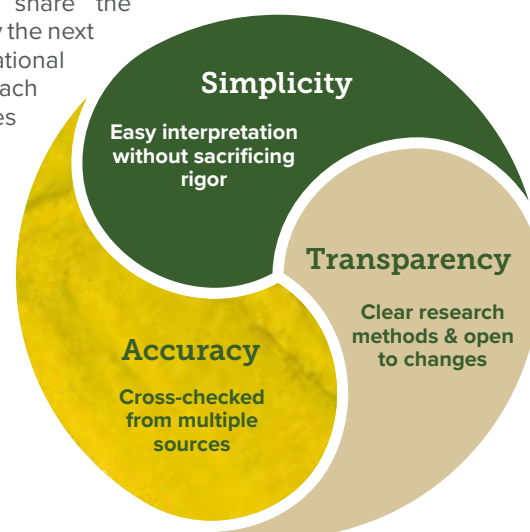


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