Liberia Country Report 2021

The African Seed Access Index

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TASAI
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LIST OF ACRONYMS:

CARI	Central Agricultural Research Institute
CGIAR	Consultative Group on International Agricultural Research
CNFA	Cultivating New Frontiers in Agriculture
CILSS	Permanent Interstate Committee for Drought Control in the Sahel
ECOWAS	Economic Community of West African States
FED	Food and Enterprise Development Program
GOL	Government of Liberia
IITA	International Institute of Tropical Agriculture
INSAH	Institute for Drought Control in the Sahel
LADA	Liberia Agribusiness Development Activity
LATA	Liberia Agriculture Transformation Agenda
LISGIS	Liberia Institute of Statistics & Geo-Information Services
MOA	Ministry of Agriculture
NAIDAL	National Agro-Inputs Dealer Association of Liberia
NGO	Non-governmental Organization
NSC	National Seed Council
SAPEC	Smallholder Agricultural Productivity Enhancement and Commercialization
SDCA	Seed Development and Certification Agency
SSSF	Seed Sector Support Fund
UEMOA	West African Economic and Monetary Union
USAID	United States Agency for International Development
VRRC	Variety Registration and Release Committee

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 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, offering 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 2018, and updated in 2021, to appraise the structure and economic performance of Liberia's formal seed sector. The study could not be completed in 2018 due to funding delays. The study was revisited in 2021 but due to limited time allocated in the new grant, it was not possible to update all the indicators and only a few were selected (Table 2). TASAI studies focus on the four grain and legume crops important to a country's food and nutritional security (the "four focus crops"). In Liberia, these crops are rice, maize, groundnut, and cowpea. The cultivation of these four crops covers 95% of the country's harvested area[1] under cereals, pulses, and oil crops (groundnuts and soya bean)[2]. Rice is the most important staple crop in Liberia, grown by 47% of households, followed by maize, grown by 34% of households (LISGIS, 2017).

OVERVIEW OF LIBERIA'S FORMAL SEED INDUSTRY

Like most other African countries, Liberia'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 and physical and sanitary quality[3]. In Liberia, about 96% of farmers rely on the informal seed sector as the primary source of their seed (LISGIS, 2017).

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 to the multiplication, processing, and distribution of breeder, basic and certified seed. The different stages of improved seed production are regulated by governments. The sale of seed from this system takes place through limited distribution channels such as registered seed producers/companies and agro-dealers. This system produces seed of the highest varietal purity, and physical and sanitary quality.

Before 2014, there was no formal policy framework for the regulation and development of the seed sector of Liberia. The Seed Law that was gazetted in 2014 gave the country a seed policy framework (Senghor, 2017). The seed law was a major milestone in that it was aligned with the ECOWAS harmonized seed regulations and provided for setting up institutions to regulate the seed sector. The Central Agricultural Research Institute (CARI) was charged with variety development as well as certification and inspection. In recent developments, the Liberia Seed Development Certification Agency (SDCA) Act (ROL, 2019) and the Liberia Seed (Development and Certification) Regulations (MOA, 2021) further outline the structure and activities of the formal seed sector. While these instruments, as detailed below, have set the groundwork for growth of the formal sector, the SDCA is not yet operational.

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 Liberia's seed industry. CARI is the main public research institution in charge of variety development, and often works closely with Centers of the Consultative Group on International Agricultural Research (CGIAR), specifically the International Institute of Tropical Agriculture (IITA) and AfricaRice. CARI's breeders and technical officers also act as seed inspectors, since the SDCA is yet to be operationalized. The National Seed Board (NSB) has only recently been formed and will set up the Variety Registration and Release Committee (VRRC), which will coordinate all activities related to the application for variety release, variety testing, evaluation, and release. Seed production and marketing is mainly done by seed companies, cooperatives, and individual seed producers, though NGOS and CARI are sometimes involved. The National Agro-Inputs Dealer Association of Liberia (NAIDAL) is the umbrella entity for agro-dealers in the country, since agro-dealers form a key distribution channel of certified seed in the country. Liberia has no national seed trade association at present.

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

ROLE	KEY PLAYERS
Research and breeding	Central Agricultural Research Institute (CARI), Africa Rice, International Institute of Tropical Agriculture (IITA)
Variety release and registration	Central Agricultural Research Institute CARI, National Seed Board (NSB)
Seed production and processing	Seed companies, seed cooperatives, seed producers
Education, training, and extension	Seed companies, seed cooperatives, extension workers, farmers' organizations, Non-Governmental Organizations (NGOs)
Distribution and sales	Seed companies, seed producers, NGOs, agro-dealers, National Agro-Inputs Dealer Association of Liberia (NAIDAL), Ministry of Agriculture (MOA)

METHODS

TASAI studies cover 22 indicators divided into 5 categories: **Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers**[4] (Table 2). In most TASAI studies, the bulk of the performance data reported comes from the year before the year in which the study is conducted ("the study year") because this is the most recent data available. Accordingly, the data reported in this Country Report pertain primarily to 2017 and 2018. However, additional data were collected in 2021 to update some of the indicators, as indicated wherever appropriate.

Table 2: TASAI Indicators

		Crop-specific	Impact on seed access	Updated data for 2021
A	**RESEARCH AND DEVELOPMENT**			
A1	Adequacy of active breeders	**Yes**	+	**No**
A2	Number of varieties released	**Yes**	+	**Yes**
A3	Number of varieties with 'special' features	**Yes**	+	**Yes**
A4	Availability of basic seed	**Yes**	+	**No**
B	**INDUSTRY COMPETITIVENESS**			
B1	Number of active seed companies/producers	**Yes**	+	**Yes**
B2	Quantity of seed produced and sold	**Yes**	+	**Yes**
B3	Number of varieties sold and dropped	**Yes**	+	**No**
B4	Average age of varieties sold	**Yes**	-	**No**
B5	Market concentration	**Yes**	-	**No**
B6	Market share of state-owned seed company	**Yes**	-	**No**
B7	Efficiency of seed import/export processes	**Yes**	+	**Yes**
C	**SEED POLICY AND REGULATIONS**			
C1	Length and cost of variety release process	**Yes**	-	**No**
C2	Status and implementation of national seed policy framework	**No**	+/-	**Yes**
C3	Harmonization with regional regulations	**No**	+	**Yes**
C4	Adequacy of efforts to eradicate counterfeit seed	**No**	+	**Yes**
C5	Use of government subsidies	**No**	+/-	**Yes**
D	**INSTITUTIONAL SUPPORT**			
D1	Performance of national seed association	**No**	+	**No**
D2	Adequacy of seed inspection services	**No**	+	**Yes**
E	**SERVICE TO SMALLHOLDER FARMERS**			
E1	Availability of agricultural extension services for smallholder farmers	**No**	+	**Yes**
E2	Concentration of agro-dealer network	**No**	+	**Yes**
E3	Availability of seed in small packages	**Yes**	+	**No**
E4	Seed-to-grain price ratio at planting time	**Yes**	-	**No**

4 The list of indicators and recent TASAI data are available at https://tasai.org/wp-content/uploads/TASAI-Appendix_CURRENT.pdf

To assess the progress of Liberia's formal seed sector, this Country Report draws comparisons between the 2018 and 2021 data for selected indicators as applicable. In addition, since TASAI has conducted similar studies in 20 other African countries, this report also draws relevant cross-country comparisons.

Using standardized TASAI survey tools, data collection focused on three key seed industry players: seed producers (seed companies, seed cooperatives and individual seed producers), plant breeders, and representatives of government entities active in the country's seed sector. Of these, seed producers (companies, cooperatives, and individual producers) were the study's primary source of information. For several indicators, TASAI supplemented quantitative data with survey data, in which respondents were asked to rate various aspects of the seed sector in Liberia 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.

Table 3 presents a breakdown of the seed producers by crop in 2017 and 2020. Liberia has no formal registration process for seed producers, which makes it challenging to track the number of active producers. Instead, seed producers are considered to be active when they are involved in seed production already and contact CARI with the intention to produce certified seed and receive training in seed quality assurance. CARI maintains a list of seed farmers/out-growers (both individuals and cooperatives), in addition to the large producers (companies). In 2017, Liberia had 41 active seed producers for the four focus crops: six seed companies, 18 seed cooperatives, and 26 individual seed producers. All of the 41 producers produced rice seed, 19 produced maize seed, six produced groundnut seed, and four produced cowpea seed. In contrast, the country had only nine active seed producers for the four focus crops in 2020, a significant reduction from the number in 2017. The nine seed producers were two companies, six cooperatives, and one individual producer. However, lack of functioning regulation of the sector makes it difficult to confirm the actual number of active seed producers in the country; that is, some producers may have produced and sold seed in 2020 without informing and working with CARI. In addition, agricultural activities in 2020 were disrupted by the COVID-19 pandemic. This disruption may have reduced farmers' demand for certified seed and therefore the need for seed producers to work with CARI. The pandemic may have caused some seed producers to shut down.

In addition to the seed producers, the study also surveyed the two main government institutions – the Ministry of Agriculture and the Central Agricultural Research Institute (CARI) – and the umbrella private sector body for agro-dealers: National Agro-Input Dealers Association of Liberia (NAIDAL).

Table 3. Breakdown of respondents' activity by crop

Crop	Number of active seed companies, seed cooperatives and producers	
	2017	2020
Rice	36	9
Maize	19	3
Groundnut	6	0
Cowpea	4	2
Total	**41**	**9**

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 farmer and consumer needs. The number of active breeders is indicative of the level of investment in research and development.[5] In addition to tracking the number of breeders working on the four focus crops, the present study also measures the level of satisfaction reported by seed producers with the public breeding programs. The latter offers an indication of the ability of active breeders in public institutions to produce new varieties that meet industry demands.

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 shows the number and adequacy of active breeders in Liberia. The country has nine active breeders for the four focus crops – six rice breeders, two maize breeders, two cowpea breeders and one groundnut breeder. Two of these breeders work on multiple crops – one breeder works on both maize and rice seed, while another breeder works on both groundnut and cowpea seed. Of the nine active breeders, six work with CARI and the other three are employed by the private sector – two breeders work with Cuttington University and the third with a seed company. AfricaRice, the Consultative Group on International Agricultural Research's (CGIAR) Center focused on rice in Africa, is operational in Liberia, but it does not employ any breeders in the country.

There was a significant variation in seed producers' satisfaction with the adequacy of active breeders, by crop. Seed producers rating was "good" for rice at 76%, but "poor" for maize (36%), cowpea (25%), and groundnut (20%). The high rating for rice is because most of the government breeders work on rice, and there is only one public breeder for each of the other three crops.

Table 4: Number and adequacy of active breeders

Crop	Number of active breeders in 2017			Satisfaction with breeders (out of 100%)	
	Public	Private	Total	Rating out of 100%	Interpretation
Rice (n=23)	5	1	6	76%	Good
Maize (n=7)	1	1	2	36%	Poor
Groundnut (n=1)	1	0	1	20%	Poor
Cowpea (n=2)	1	1	2	25%	Poor
Total	**6[6]**	**3**	**9***		

* One breeder worked on both maize and rice while the other worked on groundnut and cowpea.

6 There are six public breeders, because two breeders work on multiple crops. One works on both maize and rice, while the second works on both cowpea and groundnut.

VARIETIES RELEASED IN THE LAST THREE YEARS

The crop-specific number of varieties released in the last three years is an indicator of the performance of the variety development and release system. 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 and pest resistance, and enhanced nutrition.

Crop variety release has been a rather complicated issue in Liberia, mainly because of the lack of a system for the formal release of varieties. For example, following the gazetting of the ECOWAS Regulations on Seeds in Liberia, a seed committee was formed in 2017 and thus far, there is no indication of the viability of that committee. Liberia does not follow the procedure for variety release outlined in the Economic Community for West African States (ECOWAS) Harmonized Seed Regulations, requiring a Variety Release Committee and a National Seed Board. These organs have been established in Liberia but are not yet operational. Despite the lack of the usual formal mechanisms, new varieties of rice and other crops have been regularly introduced into the country, tested in multiple locations by CARI and promoted for use by farmers by both government and non-governmental organizations (NGOs). For the purposes of this report, and in accordance with general usage, all varieties of crops that have been promoted and supplied to farmers since 2006 by the government through its approved agencies or partners are regarded as "released varieties." Varieties that are well-received are "released" by seed producers, the government, or NGOs to farmers and forwarded for formal registration in the ECOWAS-UEMOA-CILSS7 catalogue.

Figure 1 illustrates the 3-year moving averages of crop varieties "released" between 2002 and 2020. A total of 27 varieties were "released" by CARI (as described above) between 2000 and 2020 for the four crops – 17 for rice and 10 for maize (the validated catalogue is yet to be published). The were no releases for cowpea or groundnut over this 20-year period. In addition, only rice and maize varieties were released in the last three years (2018-2020). The spike in releases in 2016 and 2017 coincides with the last time CARI submitted maize varieties to the ECOWAS Regional Catalogue. Prior to 2015, CARI had only released rice varieties.

7 Referred to as the ECOWAS Catalogue.

Figure 1: Trend in number of varieties released (3-year moving average)

VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics, for instance Varieties may have special characteristics bred for traits that respond to demands made by farmers, consumers, and industry: for instance, climate-smart, fast-cooking, and nutrition-enhanced. Examples of climate-smart features are drought tolerance, frost resistance, or early maturity. Any one variety may have multiple special features. All 10 maize varieties and two rice varieties released between 2015 and 2017 were climate-smart, with early or extra-early maturity traits (Table 5).

Table 5: Number of varieties released that have special features

Feature	Description of Feature	Number of varieties released 2015 – 2017				
		Rice	Maize	Groundnut	Cowpea	TOTAL
All varieties released		2	10	0	0	**12**
All varieties released with special features		2	10	0	0	**12**
Climate smart features	All climate-smart features	2	10	0	0	**12**
	Drought tolerant	0	0	0	0	**0**
	Early / extra-early maturing	2	10	0	0	**12**

NUMBER OF VARIETIES SOLD IN 2017

An increase in the number of varieties sold in a country often reflects an increased choice of varieties available to farmers. The seed producers surveyed in 2017 sold a total of 29 varieties of the four crops to farmers. These were 19 rice varieties, eight maize varieties, one groundnut variety, and one cowpea variety (Table 6). Based on the number of seed producers selling a particular variety, the most popular rice varieties were: Nerica L-19 (sold by 64% of rice producers), Suakoko-8 (sold by 36% of producers) and PAC-23 (sold by 19% of producers). Suakoko-8 and Nerica L-19 were preferred because of their ability to withstand iron toxicity, which is important in lowland rice-growing areas. LAC 23 is preferred for its taste and ability to grow relatively well in upland areas. Guinea corn and sweet corn were the two most popular maize varieties. Lofa bean cowpea and Valencia groundnut were the only varieties sold by all producers of cowpea and groundnut.

Table 6: Name of popular varieties sold

Crop	Number of varieties sold in 2017	Name of popular* variety sold	% of growers selling the variety	Age of variety (years) in 2018	Average age of popular va-rieties (all varieties) sold in 2018[8] (years)
Rice	19	Nerica L-19	64%	8	17 (26)
		Suakoko-8	36%	39	
		LAC-23	19%	50	
		Nerica-14	17%	8	
Maize	8	Guinea corn	42%	Unknown	Unknown
		Sweet sweet	32%	Unknown	
Groundnut	1	Valencia	100%	Unknown	Unknown
Cowpea	1	Lofa beans	100%	Unknown	Unknown

* Popularity is based on the number of seed producers selling each variety

8 Using the most recent year

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 newer varieties, bred for traits that respond to demands made by farmers, consumers, and industry, often outperforming older varieties. A lower average age of varieties signals higher rates of variety turnover. TASAI tracks the average age of varieties by crop.

Table 6 shows the name and age of popular varieties sold. Rice had the oldest varieties on the market, with ages ranging from 8–50 years. Some of the popular varieties of rice are quite old; by 2018, rice varieties such as LAC 23 and Suakoko 8 were 50 and 39 years old, respectively. The average age of popular rice varieties sold in 2017 was 26 years. However, Nerica L-19 and Nerica-14 were 8 years old. CARI has not released any varieties of cowpea and groundnuts, so there is no detailed information on varieties, including age.

SOURCES AND AVAILABILITY OF FOUNDATION (BASIC) SEED

Seed producers 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 general process to obtain the desired quantities of basic seed starts with the grower applying to the research institution that produces or supplies a particular basic seed, specifying the crop, variety, and quantity needed. The research institution invoices producers for available basic seed, and delivers it upon payment.

Table 7 shows the different sources of basic seed for the focus crops in 2017 as reported by the seed companies surveyed. Of the four crops, CARI only has breeding programs for rice and maize; however, based on the data in Table 7, CARI only provided basic seed for rice in 2017. Importantly, the most prominent sources of 'basic seed' were "own," (that is, farmer-saved seed), "local market," and NGO: a combined 35% of rice, 91% of maize, 100% of groundnut, and 50% of cowpea were sourced through these channels, although in the case of cowpea, the observations were few (4) to begin with. This is significant because when seed is sourced through these channels, it does not qualify as basic seed from a regulatory point of view, as it is not sourced from breeder seed.

Table 7: Source of basic seed and satisfaction rating (2017)

Source of Basic Seed	Rice		Maize		Groundnut		Cowpea	
	Number of Transactions	% of total	Number of Transactions	% of total	Number of Transactions	% of total	Number of Transactions	% of total
CARI	24	56%	0	0%	0	0%	0	0%
AfricaRice	1	2%	0	0%	0	0%	0	0%
Own*	9	21%	8	38%	2	33%	0	0%
Local Market*	5	12%	9	43%	4	67%	2	50%
NGO*	1	2%	2	10%	0	0%	0	0%
Local Importer	0	0%	1	5%	0	0%	2	50%
Undisclosed	3	7%	1	5%	0	0%	0	0%
Total	43	100%	21	100%	6	100%	4	100%

* These sources do not qualify as basic seed.

Most rice seed producers surveyed sourced basic seed from CARI. One seed producer sourced basic seed from AfricaRice in Cote d'Ivoire. None of the maize, cowpea and groundnut seed producers obtained basic seed from CARI. Most seed producers maintained their own seeds and sourced seed from local markets and traders. This is not a good trend as the quality of seed produced cannot compare with that of certified seed.

In 2017, CARI did not have a legume breeding program. As a result, seed producers either sourced groundnut and cowpea seeds from the local markets and traders or maintained their own seed stock. One seed company and two individual seed producers sourced groundnut and cowpea seeds from neighboring ECOWAS countries. CARI has recently employed one legume breeder, who will work on cowpea and groundnut seed but has not been supplied breeder seed for the two crops.

Satisfaction with availability of basic seed: Survey respondents were asked to assess availability of basic seed. The rating was "good" for cowpea (70%), "fair" for rice (56%), and "poor" for maize (36%) and groundnut (25%) (Table 8). The main reason behind the high rating for cowpea was that half of the cowpea seed producers sourced their foundation seed from other countries and they are satisfied with these sources. The rating for rice basic seed was relatively high because CARI has invested in the rice breeding program, which now has the most active breeders.

Table 8: Overall satisfaction rating of availability of basic seed in 2017

Crop	Availability of basic seed (out of 100%)	Interpretation of satisfaction
Rice (n=35)	56%	Fair
Maize (n=19)	36%	Poor
Groundnut (n=6)	25%	Poor
Cowpea (n=4)	70%	Good

INDUSTRY COMPETITIVENESS

NUMBER OF ACTIVE SEED PRODUCERS

Competition breeds excellence: the presence of more active seed companies and individual producers increases competition and creates incentives 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 indicator tracks the number of registered seed growers that produced and marketed seed of one or more of the focus crops.

Seed producers consist of seed companies, seed cooperatives, and individual seed producers. As outlined in our Methods (pages 2–3), TASAI interviewed 41 registered seed producers (35 cooperatives and individual producers and six seed companies) in 2017. Seed producers were not interviewed in 2021; instead, the data presented in Table 9 was provided by CARI. The number of producers (of all categories) has reduced from 41 in 2017 to 9 in 2020. However, the change does not necessarily signal a reduction in the number of active seed producers between 2017 and 2020, because it is possible that some producers produced and sold seed without informing CARI of their intention. It is also possible that some producers who were active in 2017 may have ceased operations by 2020. The paucity in official data is largely due to the seed industry in Liberia being in the early stages of development; robust systems for registration and tracking of registered entities do not yet function well, or all the time.

Table 9: Active seed producers

Crop	No. of seed producers in 2017		No. of seed producers in 2020	
	Seed companies (n=6)	Other producers (cooperatives (n=18) and individuals (n=26)	Seed companies (n=2)	Other producers (cooperatives (n=6) and individuals (n=1)
Rice	6	30	2	7
Maize	3	16	2	1
Groundnut	1	5	0	0
Cowpea	2	2	1	1
Total	**6**	**35**	**2**	**7**

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 seed sold in the data collection year, as reported by active seed producers. Not all seed sold by the active seed producers was certified. The process of seed certification is prescribed in the recently enacted Liberia Seed Development and Certification Agency (SDCA) Act (ROL, 2019). Although the Agency and Act are in place, CARI only certifies seed at the request of the buyer, not as a general practice.

Table 10 compares the aggregate quantities of seed produced in 2017 and 2020. Note however, that much of the seed does not go through a formal certification process and would not meet the threshold of certification in more advanced formal seed systems. These data show an apparent decline of between 80–100% in quantities produced across the four crops. The reasons for this significant drop likely reflect the reasons previously offered for the change in the number of active seed companies: because the seed industry in Liberia is still not fully regulated, there is no central data collection system that captures data on all seed that is produced and marketed in the country. Another likely reason for lower production figures in 2020 is the COVID-19 pandemic. Government imposed a lockdown in April 2020, at a critical time in seed selling and distribution (peak seed sales are usually in April and May). The lockdown restricted the movement of farmers and farm workers, limiting their access to agricultural inputs. In addition, CARI staff had to stay at home, limiting their interactions with actors in the seed industry.

Table 10 also provides data for quantities of seed sold in 2017, collected by TASAI from participating seed companies. Comparison to 2020 is not possible; seed companies were not interviewed in 2021 and government data is not available.

Table 10: Seed production and sales

Crop	Volume of seed (MT)		
	Produced (2017) (TASAI data)	Produced (2020) (CARI data)	Sold (2017)*
Rice	325	66.5	118
Maize	27	5.8	24
Groundnut	5	0	5
Cowpea	79	10	79

* Sales data not collected in 2020.

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).[9]

In 2017, the market share of the top four seed producers in Liberia accounted for 100% of the cowpea seed market, 81% of the groundnut seed market, 67% of the maize seed market and 49% of the rice seed market. The top four seed producers dominated the seed market for cowpea, groundnut, and maize. The market for rice seed was competitive.

Applying the HHI yielded the following scores: 809 for rice, 1,919 for groundnut, 2,098 for maize and 9,092 for cowpea (Table 11). Combined with the "top four" market share data, the HHI scores indicate that the rice market is very competitive, with no dominant seed producer, the groundnut seed market is also competitive. The maize market is fairly competitive, while the cowpea seed market was not competitive: there are only four active seed producers.

9 See below Table 11

Table 11: HHI scores in 2017

Crop	HHI (2017)	Interpretation of HHI	Market share of top four (%)
Rice	809	Very competitive	49%
Maize	2,098	Moderately competitive	67%
Groundnut	1,919	Competitive	81%
Cowpea	9,092	Near monopoly	100%

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.

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 supplying varieties that farmers desire, which private seed companies may consider to be less profitable. They also tend to support multiple national objectives such as university training and research, in addition to seed production. However, such state-owned companies often 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. Liberia does not have an active government parastatal engaged in the production and marketing of certified seed.

SEED IMPORT AND EXPORT PROCESSES

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.

Seed importation is guided by the Liberia Seed Development and Certification Agency (SDCA) Act of 2019. Since there were no imports or exports in 2017, there was no documentation of the processes. However, in 2019, the SDCA provided guidelines to the processes. To import seed, the importer first provides the SDCA with basic information such as the variety and volume to be imported; next, the importer must apply for an import permit, issued by the National Quarantine and Environmental Services of the Ministry of Agriculture. As the final step, seed importers must obtain a phytosanitary certificate from the source country.

A key data point tracked by TASAI is the length of the import (or export) process, measured as the sum of the number of days needed to obtain import/export documentation – import/export permit, phytosanitary certificates, and an International Orange Certificate[10], if applicable – and the number of days to clear seed at the border. Transportation time is excluded. There were no seed imports into Liberia for the four crops in 2017. However, in 2020, one seed company imported 0.2 MT of maize seed by air from Ghana. The import process took four days: one day to obtain the import permit and other documents and three days to clear the seed at the airport in Monrovia. There were no recorded exports for any the four crops in 2017 or 2020.

10 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.

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 variety release authority. A vibrant seed sector has a functional variety release system that is well understood by the relevant actors and is followed diligently. Lengthy and/or costly variety release processes can limit the number of released varieties, which can adversely affect farmer choice. 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 the variety is approved for release. The calculation does not include the time the breeder spends developing the variety.

The SDCA Act (ROL 2019) mandates the SDCA as the agency in charge of variety release and registration. In 2020 the SDCA was not yet fully constituted and functional. Once the SDCA is fully operational, the National Seed Board (NSB) will be formed to oversee the functions of the SDCA – formulating and providing overall policy guidelines and monitoring the development of the national seed system. The NSB will establish a Variety Release and Registration Committee (VRRC) which will coordinate all activities related to variety release. In its absence, CARI handles all activities related to variety release.

Despite the absence of a dedicated structure for variety release, two rice and ten maize varieties have been "released" in Liberia between 2015 and 2020. The rice varieties were released in 2017 while the maize varieties were all released in 2016. The varieties were "released" after being tested by CARI in multiple locations across the country and once promising varieties had been promoted by government and NGOs to farmers. Once the variety has been adopted by farmers, then it is "released". CARI reports that the length of variety release averages 36 months for rice and maize, and ranges from 24 to 60 months (Table 12). CARI breeders are more satisfied with the variety release process for rice (70%) than for maize (50%). Only CARI released new varieties during this period.

Table 12: Average length of, variety release process in 2017

Crop	Average length (months)	Satisfaction with variety release (out of 100%)	Interpretation of satisfaction
Rice	36	70%	Good
Maize	36	50%	Fair

STATUS AND IMPLEMENTATION OF THE 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. Liberia's seed industry is governed by two seed policy instruments: the Liberia Seed Development and Certification Agency Act passed in September of 2019, and the Liberia Seed (Development and Certification) Regulations approved in March 2021, detailing implementation of the Act.

The Liberia SDCA Act establishes the Seed and Development Certification Agency (SDCA), now responsible for all seed regulatory functions including quality control, certification, and enforcement of the Seed Regulations. The Act also establishes the National Seed Board (NSB) to oversee the performance of the SDCA. The Act and the Regulations outline the procedures for the following key services.

Variety release and registration: The Act establishes the Variety Registration and Release Committee (VRRC) as the technical unit under the SDCA, charged with maintaining a National Catalogue of Plant Species and Varieties. The Regulations outline the process for submission of applications for variety release, conduct of DUS and VCU tests, evaluation of test results, and registration and release of varieties. The SDCA serves as the secretariat for the VRRC.

Seed quality control: The SDCA Act establishes the Certification and Standards Unit to define and enforce all aspects of quality control. The SDCA Regulations outline the different processes and requirements for activities at the production and post-production stages of the seed value chain, including registration of seed producers and processors (individual producers and seed companies), quality control of seed lots, field inspection, laboratory control, seed conditioning and treatment, seed certification, seed packaging, and seed storage and labelling.

In addition to these two policy instruments, the ECOWAS Regional Harmonized Seed Regulation (C/Reg. 4/05/2008) (ECOWAS 2008) were promulgated (published) to govern the production, quality control, certification, and the marketing of seeds in Liberia as in other parts of West Africa.

QUALITY AND ENFORCEMENT OF SEED REGULATIONS

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

Implementation of domestic regulations: The Liberia Seed (Development and Certification) Regulations of 2019 are yet to be implemented. The National Seed Board (NSB) convened its first meeting in April 2021, to set up a steering committee to fast-track operationalization of the SDCA.

Implementation of ECOWAS seed regulations: This study assesses four key areas of implementation required under the ECOWAS regulations: i) the setting up of a national seed committee, ii) the issuing of a protocol for seed import and export, iii) the updating of the National Variety Catalogue, and iv) the creation of a seed support fund. Of these four, three have been instituted in the Act and Regulations and are being implemented.

i. **Setting up of a national seed committee: The National Seed Board (NSB) established by the Act of 2019 conducted its first meeting in April 2021. Prior to the passing of the Act and Regulations in 2019, the Ministry of Agriculture (MOA) had established a** Seed Certification and Quality Assurance Committee in 2010, headed by the Director General of CARI and acting as the seed committee for Liberia. The MOA is now seeking ways and means to operationalize the SDCA to formally take over the functions of this committee.

ii. **Issuing of a decree for seed import and export:** Procedures and documentation requirements for seed import and export are outlined in Article 21 of the Act and section IV of the Regulations. However, since there have been no substantive imports or exports since the 2019 Act, it is not possible to ascertain if the procedures are followed.

iii. **Updating of the National Variety Catalogue:** Both the Act and the Regulations recognize the West Africa Catalogue of Plant Species and Varieties. Article 10 of the Regulations outlines the composition of the National Catalogue of Plant Species and Varieties, while Article 11 outlines the technical requirements for listing varieties in the National Catalogue. Liberia's National Catalogue was last updated in December 2018, concurrent with an update to the ECOWAS Catalogue at a meeting of West African seed experts in Bamako, Mali. A print version of the Catalogue is not publicly available.

iv. **Creation of a seed support fund**: Article 13 of the SDCA Act and Article 66 of the Regulations establishes the Seed Sector Support Fund. The fund is not yet operational. The modalities for its structure and functions will be determined by the NSB.

In 2017, seed producers in Liberia were deeply dissatisfied with the enforcement of the Seed Regulations in the country, rating their level of satisfaction as "extremely poor" (17%). The main reason for the low rating was the lack of a government agency to enforce regulations and industry standards and a general lack of awareness of the regulations in the country. As an example, some seed companies reported that while they had the necessary financial, land and human resources to invest in seed production and marketing, they would only do so if there was a functioning regulatory environment to support their businesses. Future studies can evaluate whether the new legal statutes and the ongoing efforts of implementation will result in higher ratings.

EFFORTS TO ERADICATE COUNTERFEIT SEED

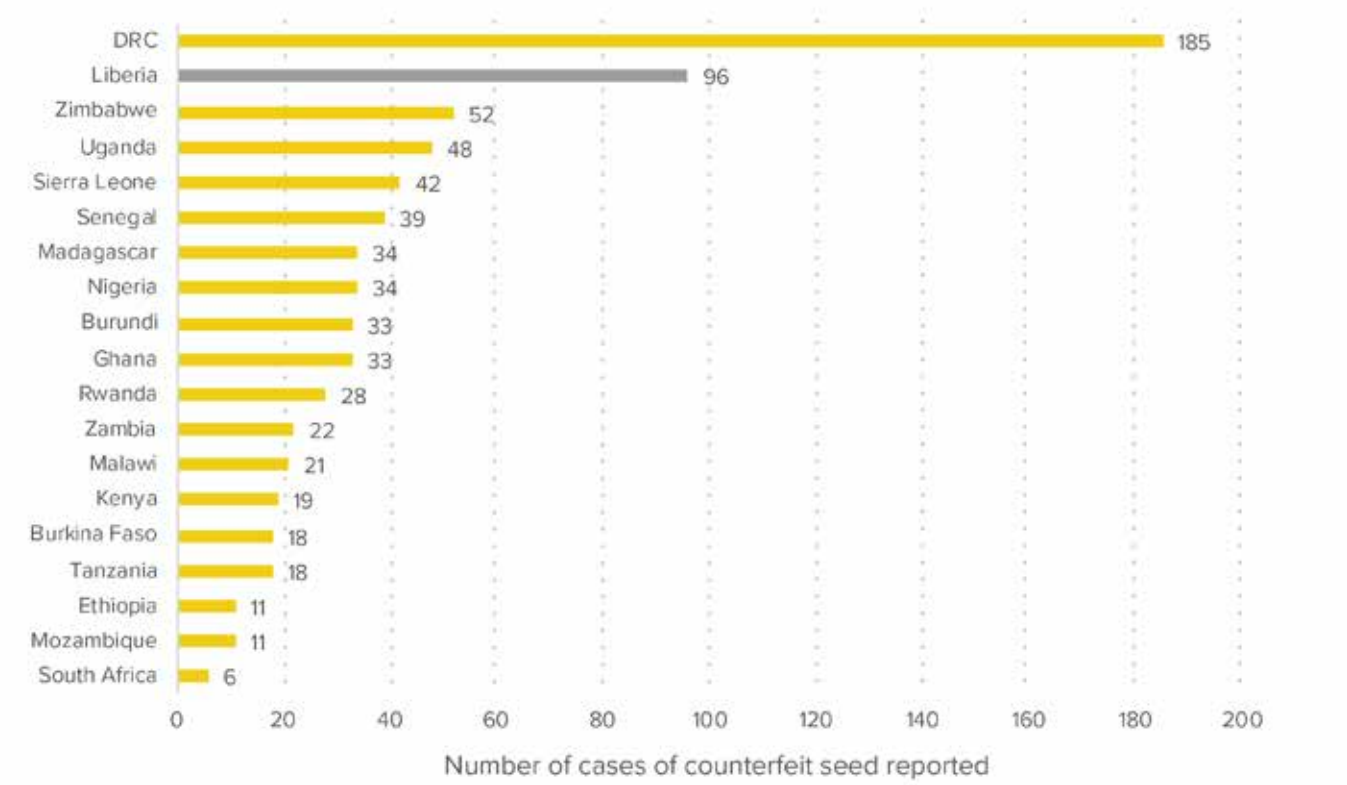
Counterfeit seed (also known as fake seed) threatens the seed sector in two important ways. First, it reduces farmers' confidence in certified seed due to cases in which farmers unknowingly plant inferior quality grain labeled as certified seed. Second, it threatens the success of efforts to increase the adoption of improved varieties because farmers are not sure 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. In addition, seed companies report their level of satisfaction with government efforts to eliminate counterfeit seed.

Seed producers surveyed reported a total of 96 cases of counterfeit seed in 2017. According to the seed producers, a major source of fake seed, reported by 34% of respondents, was cross-border traders who imported grains falsely declared as seed from neighboring countries (Table 13). Another source of counterfeit seed, also reported by 34% of respondents, is local traders who sell grain to farmers as seed. The third source of counterfeit seed, reported by 17% of respondents, were seed producers who were neither registered by CARI nor trained as seed producers, who sold seed to farmers unaware of the differences between certified and counterfeit seed.

Table 13: Sources of counterfeit seed

Main sources of counterfeit seed	Number of seed producers (n=29)	Percentage of seed producers
Neighboring countries	10	34%
Local traders who sell grain as seed	10	34%
Seed producers who are not registered nor trained to produce seed	5	17%

Figure 2: Comparison of number of counterfeit seed cases reported in Africa (2016-2021)[11]



11 Study years range from 2016-2021.

Figure 2 shows the number of counterfeit seed cases reported in countries studied by TASAI. While cases of counterfeit seed are prevalent across Africa, Liberia reports the second highest number of cases reported, with over half the cases of indicator leader the Democratic Republic of Congo, and well ahead of the remaining countries surveyed. Incidences are widely believed to be underreported.

The Ministry of Agriculture does not have a process to track the number of cases of counterfeit seed. The seed inspection services are also ill-equipped to track the sources of counterfeit seed. However, the Ministry of Agriculture undertakes three activities to indirectly respond to this challenge: awareness creation among farmers about the need to source seeds only from approved suppliers; training farmer groups to enhance their capacity to produce quality seeds for themselves and for other farmers; and involvement of government and donor agencies in input distribution to farmers. Donor agencies are expected to procure certified seed since they work closely with the government. Seed inputs are normally sourced from CARI or from seed producers who are approved by CARI. This is a way of encouraging local seed producers to receive training and supervision from CARI. Article 23 of the SDCA Act and Section VI of the Regulations outline prohibited activities, including the production and marketing of seed by unregistered entities, incorrect labelling of seeds, and importation of seeds without prior declaration, among other offences. However, neither the Act nor the Regulations stipulate specific fines for offenders. Functional deterrent systems are needed, starting with heightened tracking and resulting in effective prosecution.

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, but may also be disruptive to market forces.

In 2020, the Liberia government did not implement any seed subsidy program for the target crops. Traditionally, the government had intervened to help increase productivity by supplying farmers directly with seeds, fertilizers and small tools and equipment. Unfortunately, seeds and fertilizers provided by the government often reached the beneficiaries after the optimum planting period. As part of the Liberia Agricultural Transformation Agenda (LATA) aimed at informing agriculture development planning by the MOA and other extension organizations, the government of Liberia launched a farmer e-registration program and the establishment of a platform to facilitate an eWallet[12] based input distribution reform (MOA 2018).

12 https://www.techcityng.com/cellulant-powers-liberias-ewallet-economy/ accessed 24 May 2021.

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 cooperatives, seed associations, individual seed producers, and at times agro-dealers. Liberia does not have a seed traders' association. To date, seed producers in Liberia are not organized under any umbrella organization.

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 studies track the number of inspectors and other information pertinent to their effectiveness, such as the availability of resources and the use of (new) digital tools.

Seed inspection services in Liberia are the mandate of the Seed Development and Certification Agency (SDCA). However, there are no seed inspectors in Liberia, since the SDCA is not yet functional. In the interim, CARI has been providing seed inspection services. However, these services are only provided to seed producers to whom CARI supplies seed. CARI has not employed dedicated seed inspectors. Not surprisingly, seed producers are greatly dissatisfied with the adequacy of seed inspection services in the country, rating them as "poor" (35%).

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 the number of extension officers by sector (public and private) and gender; it is not crop-specific.

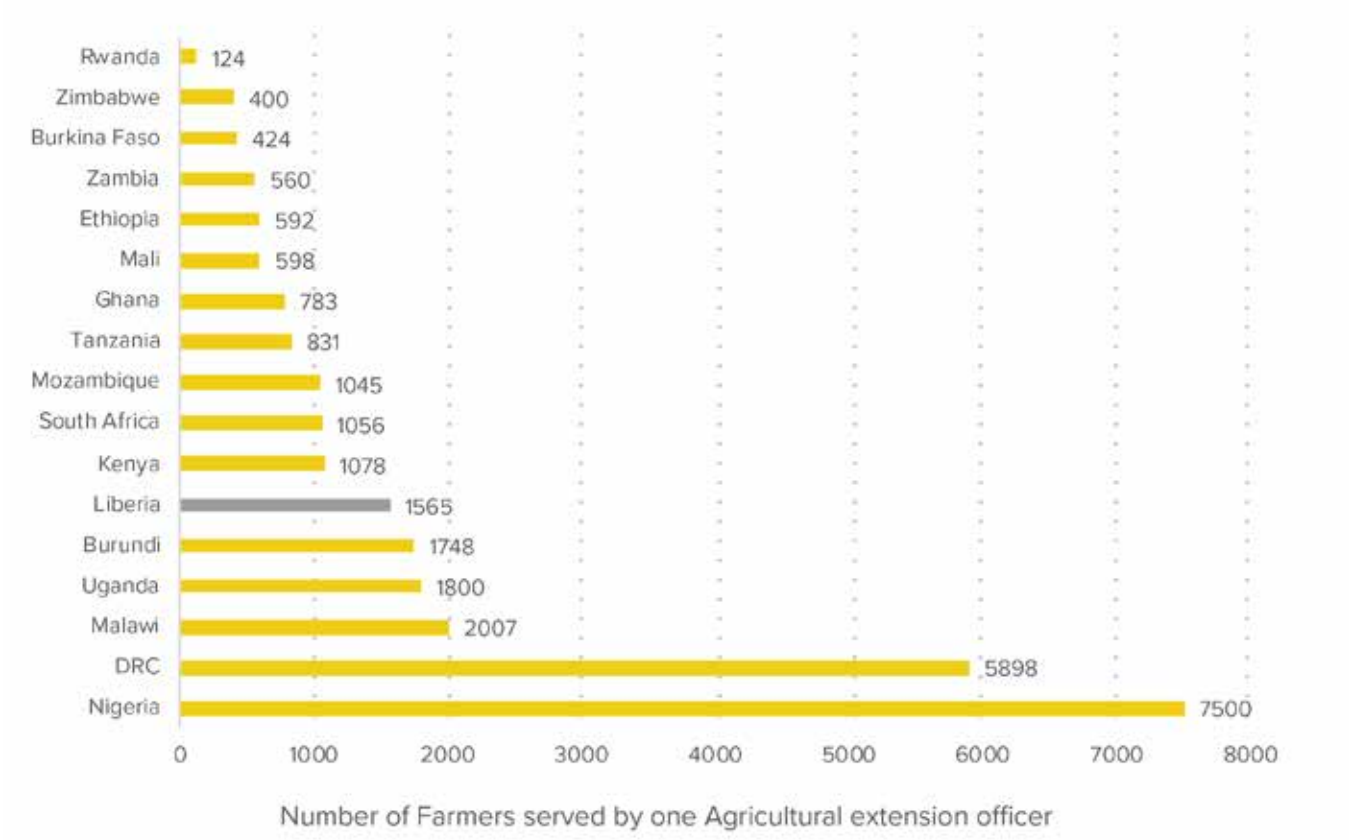
Agricultural extension services in Liberia are provided by the MOA and several NGOs. The main extension services provided to farmers include the installation and management of agricultural demonstrations, input distribution, training in farm practices, and assisted pest control exercises in farmers' fields. In 2020, MOA employed 130 agricultural extension officers (106 men and 24 women) at different levels – regional, county and district. This is an increase from the 90 agricultural extension officers employed by MOA in 2017 (Table 14). According to the farmer e-registration data reported by the end of 2016, there were at least 184,722 farmers in Liberia (FAO and MOA, 2016). This translates to a ratio of one government extension worker for every 2,052 smallholder farmers in Liberia. This is an improvement from the 2017 ratio of one government extension officer for every 2,052 farmers, but it remains high. There was no current data on the number of agricultural households in Liberia in 2020, so, for the purposes of the present study, we estimated the number of agricultural households using the country's population, for which 2020 data was available. Accordingly, Liberia's population grew by 2.44% during the 2017-2020 period (World Bank Data, 2021). Applying this growth rate, we extrapolated the number of agricultural households in 2020 to be 203,447. This in turn gives a ratio of 1:1,565 a significant improvement from 2017. This ratio is lower than in five countries surveyed, such as Malawi at 2,007 (Mabaya et al., 2021), but is considerably higher than the 1:124 in Rwanda (Waithaka et al., 2019), 1:400 in Zimbabwe (Mabaya et al., 2019), and relatively lower ratios in nine other countries surveyed. Also reflecting the inadequacy of extension services, seed producers surveyed in 2017 also rated them relatively low at 59% ("fair").

Figure 3 compares the number of farmers served by one extension officer in countries TASAI has studied. Liberia's relatively high ratio means that Liberian farmers do not have good access to extension services as their counterparts in most other African countries surveyed.

Table 14: Number and adequacy of agricultural extension services

Indicator	2017	2020
Number of public extension officers employed by the government	90 (17 men and 73 women)	130 (106 men and 24 women)
Ratio of extension officers to farmers	1:2,052	1:1,565
Seed industry satisfaction with extension officers (out of 100%)	59%	-

Figure 3: Comparison of number of farmers served by one extension officer[13]



13 Study years range from 2016-2021.

CONCENTRATION OF THE AGRO-DEALER NETWORK

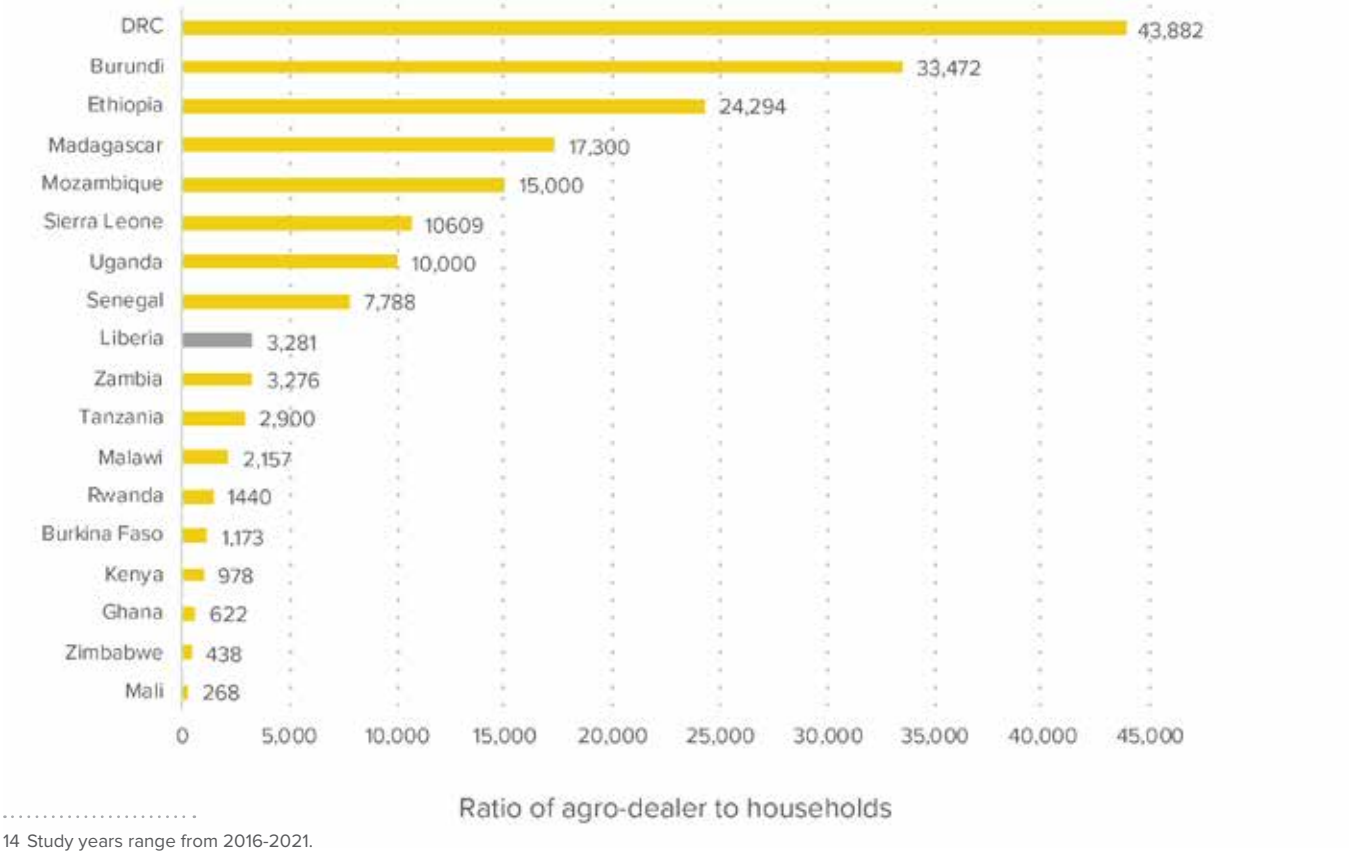
Agro-dealers play a key role in Africa's seed distribution systems, connecting seed growers to individual farmers, especially in hard-to-reach rural areas. They are often the main point of sale for certified seed. A higher concentration of agro-dealers means that smallholder farmers have greater access to improved seed. This indicator tracks the number of agro-dealers and, where possible, this is disaggregated between registered and non-registered agro-dealers.

The process to register as an agro-dealer in Liberia entails three steps: registering as a business with the Ministry of Commerce; registering for accreditation by the National Agro-Inputs Dealer Association of Liberia (NAIDAL) and the Ministry of Agriculture; and demonstrating relevant knowledge and skills or receiving training in the handling of agricultural inputs.

The agro-dealer network in Liberia comprises both small business enterprises and informal sellers. The National Agro-Inputs Dealer Association of Liberia (NAIDAL) is the umbrella body for agro-dealers in the country. NAIDAL was launched in March 2017, and by 2020, it had a membership of 62 registered agro-dealers, of whom 49 were enterprises and 13 were individuals. The 62 agro-dealers have all been trained under the Liberia Agribusiness Development Activity project and are located in four counties in Liberia - Bong, Nimba, Lofa, and Montserrado. The number of registered agro-dealers translates to a ratio of one agro-dealer for every 3,2 farmers in Liberia. In 2017 seed producers rated their satisfaction with the concentration of the rural agro-dealer network in the country as "fair" (50%).

Figure 4 shows the comparison of the ratio of agro-dealers to agricultural households in countries studied by TASAI. The ratio is relatively high in Liberia, but still lower than in nine other countries surveyed.

Figure 4: Comparison of ratio of agro-dealers to agricultural households (2016_2021)[14]



14 Study years range from 2016-2021.

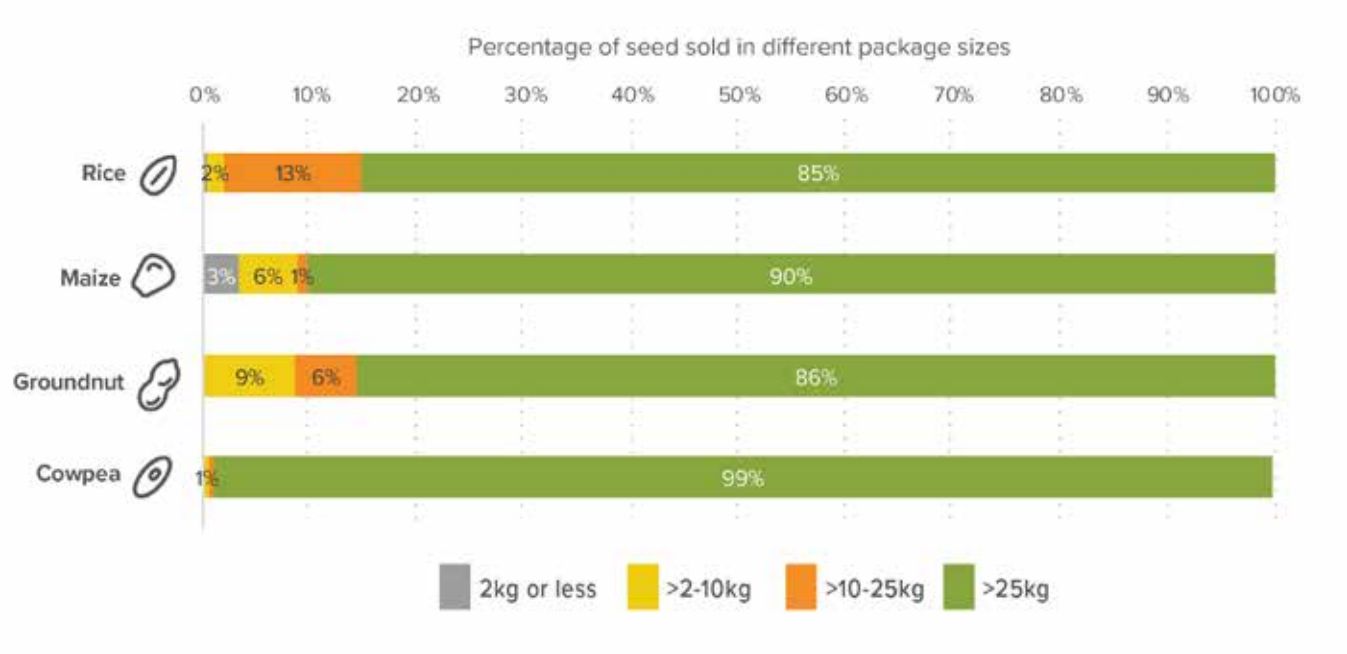
AVAILABILITY OF SEED IN SMALL PACKAGES

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 or less, 2-10 kg, 10-25 kg, and above 25 kg. Seed not packaged is usually sold per kg as needed by the farmer. Most seed producers for the four crops packaged their seed for sale in 2017: 89% of maize seed producers, 78% of rice seed producers, 67% of groundnut seed producers, and 50% of cowpea seed producers.

Only 3% of the maize seed was sold in small packages of 2 kg or less, and no seeds were sold in small packages for the other three crops (Figure 5). Most of the seed for all four crops - cowpea (99%), maize (90%), groundnut (86%) and rice (85%) - was sold in package sizes of larger than 25 kg. The reason for the large package size is the low demand of seed from smallholder farmers. The target market for packaged seed is predominantly medium and large-scale commercial farmers.

The government and NGOs have been the largest and most dependable buyers of certified seeds – for distribution to farmers. Direct demand by farmers has been low, as farmers have traditionally relied on their own saved seeds for production. The low volume is due to the low awareness of the benefits of improved seeds, leading to low rates of adoption of improved varieties by farmers. The low adoption is a disincentive for seed companies to invest in small packages.

Figure 5: Percentage of seed sold in different package sizes (2017)



SEED-TO-GRAIN PRICE RATIO

The seed-to-grain price ratio at the time of planting is a good measure of the 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 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 planting time are presented in Table 15. As was highlighted in the section on basic seed, of the four crops, basic seed (as defined in the formal seed sector) was only sourced for rice in significant quantities; seed for the other three crops came mostly from sources that do not meet the definition of basic seed. As Table 15 shows, the average seed-to-grain price ratio for rice seed is 2.23:1, which reflects the fact that a significant portion of the seed goes through the formal process of being inspected and certified by CARI before it reaches the market. In the case of maize, the ratio is 1.54:1; although the bulk of maize seed is farmer-saved seed or comes from the local market, the price difference likely reflects that some of the seed is an OPV variety. In the case of groundnut and cowpea, seed price data was not available, therefore it is not possible to compute the seed-to-grain price ratio.

Table 15: Seed-to-grain price ratios (2017)

Crop	Seed price (US$/kg)	Grain price (US$/kg)	Seed/grain price ratio
Rice	1.25	0.56	2.23:1
Maize	1.00	0.65	1.54:1
Groundnut	Not available	1.00	--
Cowpea	Not available	0.52	--

CONCLUSION

Liberia's seed sector is at the nascent stages of growth (Ariga et al., 2019). Countries in the nascent stage of seed sector development lack key policy and institutional frameworks for a formal seed sector. With less than 4% of farmers utilizing certified seed for the key crops in Liberia, there is significant room for growth (LISGIS, 2017). While the 2020 TASAI Liberia study has revealed areas for improvement, it also highlights positive aspects of the seed industry, most of which are the result of recent improvements and programs initiated by the government.

Under the **research and development** category, seed research and development is active but largely dominated by the public sector. The few varieties of the four crops that have been released over the years reflect the low number of breeders in the country. Availability of basic seed from CARI appear to face challenges, thereby forcing seed producers to resort to maintaining their own basic seed. However, allowing and training seed producers on how to produce quality seed is good for the Liberian seed sector. Given that CARI only has breeding programs for rice and maize, there is need to support breeding programs for the other crops that are important to food security in Liberia.

In the **industry competitiveness** category, the seed industry in Liberia seems to be growing, as the private sector becomes more active in the production and distribution of certified seeds. However, most farmers remain dependent on NGOs and government seed support programs for their seed. These programs create a dependence by farmers on free inputs and are unsustainable in the long run. There is an urgent need to develop the market for certified seed by promotion of the benefits of using improved seed, strengthening rural agro-dealer networks and agriculture extension services, and facilitating direct linkages between seed producers and farmers.

The **seed policy** environment in Liberia has recently improved with the recent adoption of the Liberia Seed Development Certification Agency (SDCA) Act (ROL, 2019) and the Liberia Seed (Development and Certification) Regulations (MOA, 2021). These two documents provide the necessary legislative and regulatory framework to guide the development of the seed sector in the country and are fully harmonized with the ECOWAS Regulations of 2008. However, failure to operationalize the SDCA and its technical committees is hampering the implementation of the seed instruments. Some seed companies report that they require a functional regulatory environment in order to invest in seed production and marketing.

Tracking of cases of sale of counterfeit seed is hampered by lack of process to do so at the ministerial level. In addition, seed inspection services are not equipped to track the sources of counterfeit seed. Further the Seed Act and the Regulations do not stipulate specific fines for offenders caught selling counterfeit seed.

The **institutional support** for Liberia's seed sector is wanting. For a start, the SDCA is yet to be established and the country does not have any seed inspectors. Only limited seed inspection and certification are carried out by CARI breeders and technical officers. Further, seed producers in the country are not organized under a national seed trade association.

Service to smallholder farmers is wanting in many areas. However, the formation of the National Agro-Input Dealers Association of Liberia (NAIDAL) as an umbrella body for seed producers is a positive step for the country. The joint registration and training of agro-input dealers by NAIDAL and the Ministry of Agriculture is a way of building a sustainable seed delivery system for farmers in the country.

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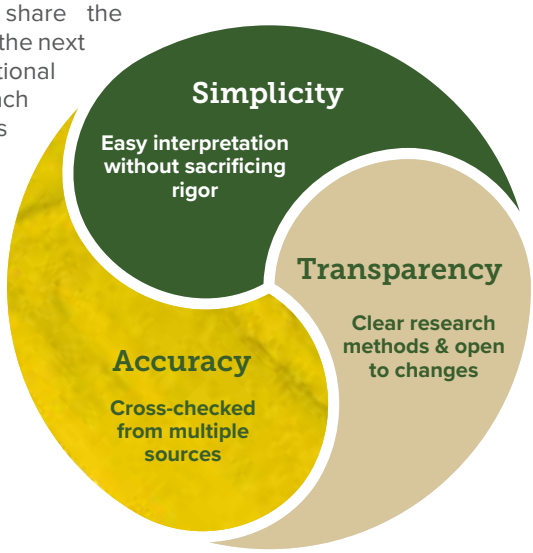
ABOUT TASAI

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

For a comparison of TASAI Indicators across different countries, please visit:
http://tasai.org/wp-content/uploads/TASAI-Appendix-CURRENT.pdf

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