

Mali Country Report 2020

Update

The African Seed Access Index

By

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TASAI
The African Seed Access Index

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LIST OF ACRONYMS:

ASSEMA – Association semencière du Mali/ Seed Association of Mali

CGIAR – Consultative Group on International Agricultural Research

CNS – Comité National Des Semences / National Seed Committee

CIMMYT – International Maize and Wheat Improvement Center

DNA – Direction Nationale de l'Agriculture/ National Directorate of Agriculture

DUS – Distinctiveness, Uniformity and Stability

EGS – Early generation seed

ECOWAS – Economic Community of West African States

ICRISAT – International Crops Research Institute for Semi-Arid Tropics

IER – Institut d'Economie Rurale/ Institute of Rural Economy

LABOSEM – Laboratoire des Semences/ Seed Laboratory

NGO – Non-Governmental Organization

NASTAG – National Seed Trade Association of Ghana

NSS – National Seed Service

NVRRC – National Variety Release and Registration Committee

SAA – Sasakawa Africa Association

SSN – Service National de Semences/ National Seed Service

VCU – Value for Cultivation and Use

WAAPP – West Africa Agricultural Productivity Program

INTRODUCTION

The increased use of productivity-enhancing technologies, including mechanization, irrigation, fertilizer and improved seed, is 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 that offers 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 country report summarizes the key findings of the study conducted by TASAI in 2020 to appraise the structure and economic performance of Mali'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 Mali, these crops are **maize, rice, sorghum, and cowpea**. The cultivation of these four crops covers 62% of the country's harvested area under cereals and pulses.¹

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 producers and companies and agro-dealers. This system produces seed of the highest varietal purity, physical and sanitary quality. Utilization of certified seed in Mali is low and varies by crop, ranging from 1% for groundnut seed to 15% for maize seed (ISSD, 2017). The utilization of improved varieties also varies for specific crops depending on measurement method and geographical location, for example, between 13% and 30% for sorghum (Smale et al., 2018).

Mali's Seed Policy provides the direction and overall strategy for the development of the formal seed sector in the country (Ministère de l'Agriculture, 2010). The policy is implemented through various decrees and by-laws. Table 1 lists the agencies in charge of various aspects of Mali's seed industry. Variety development and release lies within the remit of the Institut d'Economie Rurale (IER). Seed quality control, inspection and certification is conducted by the Laboratoire des Semences du Mali (LABOSEM), which is under the Direction Nationale de l'Agriculture (DNA). The Service National de Semences (SSN), under the DNA, is in charge of implementing the National Seed Plan. However, SSN is not active. Seed production and marketing are conducted by seed companies, seed co-operatives and individual seed producers.

OVERVIEW OF MALI'S FORMAL SEED INDUSTRY

Like most other African countries, Mali'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 and 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.²

The formal sector is a structured and regulated value chain for the production of improved seed varieties. This process involves many actors and institutions, whose activities range from breeding varieties to the multiplication, processing, and distribution of certified seed. The different stages of improved seed production are

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

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





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

ROLE	KEY PLAYERS
Research and breeding	Institut d'Economie Rurale (IER), Consultative Group on International Agricultural Research (CGIAR) centers
Variety release and regulation	Direction Nationale de l'Agriculture (DNA), Comité National Des Semences (CNS),
Seed production and processing	Individual seed producers, seed co-operatives, seed companies
Education, training, and extension	Association Semencière du Mali (ASSEMA), Non-Governmental Organizations (NGOs), extension officers
Distribution and sales	Seed co-operatives, seed companies, agro-dealers

METHODOLOGY

TASAI covers 22 indicators divided into 5 categories: **Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers**³ (Table 1). A comprehensive (full) study, which includes all indicators, is conducted every other year. In the interim year, an update study is conducted, which involves only a subset of these indicators. The present 2020 Mali study is an **update**.

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 2019; however, whenever 2020 data are available, they are included in the report. Accordingly, the Mali 2020 study encompasses data from 2019 and 2020.

In Mali, the last full study was conducted in 2019. The 2020 update study maintained a focus on the four main staple food crops - maize, rice, sorghum, and cowpea - and covered 13 of the 22 TASAI indicators⁴, thus updating information that is likely to change annually (Table 2). These included four indicators from the research and development category, two indicators from the industry competitiveness category, five indicators from the seed policy and regulations category, one indicator from the institutional support category, and two indicators from the service to smallholder farmers category.

³ The list of indicators and recent TASAI data are available of https://tasai.org/wp-content/uploads/TASAI-Appendix_CURRENT.pdf

⁴ https://tasai.org/wp-content/uploads/TASAI-Appendix_CURRENT.pdf



Table 2: TASAI Indicators

	Crop-specific	Impact on seed access	Covered in update?
A RESEARCH AND DEVELOPMENT			
A1 Adequacy of active breeders	Yes	+	Yes
A2 Number of varieties released	Yes	+	Yes
A3 Number of varieties with 'special' attributes/ 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	+	In part
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	+	No
C SEED POLICY AND REGULATIONS			
C1 Length and cost of variety release process	Yes	-	Yes
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	+	No
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	+	In part
E SERVICE TO SMALLHOLDER FARMERS			
E1 Availability of agricultural extension services for smallholder farmers	No	+	In part
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



To assess the progress of Mali’s formal seed sector, the Country Report draws comparisons with the findings of the 2019 TASAI Mali study (which draws on performance data primarily from 2018). Using TASAI survey tools, data collection focused on three types of key seed industry players: seed companies, plant breeders, and representatives of government entities active in the country’s seed sector. For several indicators, TASAI supplemented quantitative data with survey data, in which respondents were asked to rate various aspects of the seed sector in Mali 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**.

Since this was an update study, the company survey targeted only those seed companies that imported or exported certified seed in 2019, as well as agricultural research institutions, government institutions, and other key stakeholders relevant to the formal seed industry in Mali. Government institutions interviewed included the SSN, the central and regional seed laboratories, and the DNA as well as all its decentralized offices located in the 15 agricultural regions of Mali and the District of Bamako. Table 3 below shows the number of respondents reached for each type of stakeholder.

Table 3: Respondents that were interviewed 2019

Stakeholder category	Numbers Interviewed
Seed companies	17
Plant breeders	6
Government Institutions	19
Others	12
Total	54





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 companies/producers with the public breeding programs. The latter offers a good indication of the ability of active breeders in public institutions to produce new varieties.

Mali has 10 breeders for the four focus crops; all are men, indicating a significant gender imbalance in Mali's breeding research (Table 4). All breeders work in the public sector research institution, the IER. None of the private seed companies employs any breeders. However, some seed companies are directly testing hybrids received from CGIAR centers with support from IER and/or CG breeders. These companies aim to develop and release proprietary hybrid varieties. Since 2018, the number of breeders has increased from 9 to 10 (Waithaka et al., 2019). The increase is due to the fact that the sorghum breeding program gained two junior plant breeders, while the maize breeding program lost one female plant breeder who left to join the IER's agro-forestry program.

Table 4: Number of active breeders 2018 and 2020

Crop	Number of breeders	
	Total (2018)	Total (2020)
 Maize	3	2
 Rice (irrigated & rain-fed)	3	3
 Soya bean	2	4
 Cowpea	1	1
Total	9	10

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.

Mali hosts the National Center of Specialization (NCOS) for rice, which is one of the seven centers established by the West Africa Agriculture Productivity Program (WAAPP) within the ECOWAS region to facilitate regional integration (WAAPP, 2015). Accordingly, the country is expected to lead rice technology development and supply those technologies to other countries in the ECOWAS region. The rain-fed rice system in Mali includes different subsystems: rain-fed upland, rain-fed lowland, traditional and controlled flooding systems. Each subsystem demands varieties with adapted features. These subsystems require Mali to have at least one breeder for each type of rain-fed rice system. Currently, this is not the case; only two rice breeders deal with all the rain-fed systems, while one breeder oversees the breeding activities for irrigated rice systems. For flooding rice systems, which occupy 45% of the areas in which rice is cultivated (DNA, 2020), the country has no dedicated breeder; however, the breeder in Sikasso has also developed new varieties for other agro-ecological zones of the country.

There are ongoing initiatives with CGIAR (Consultative Group on International Agricultural Research) centers to supply new varieties of the four crops directly to private companies for their own release and use. More-over, multinational seed companies work with several local seed companies to test and register new, improved varieties of hybrid rice, maize, and sorghum.

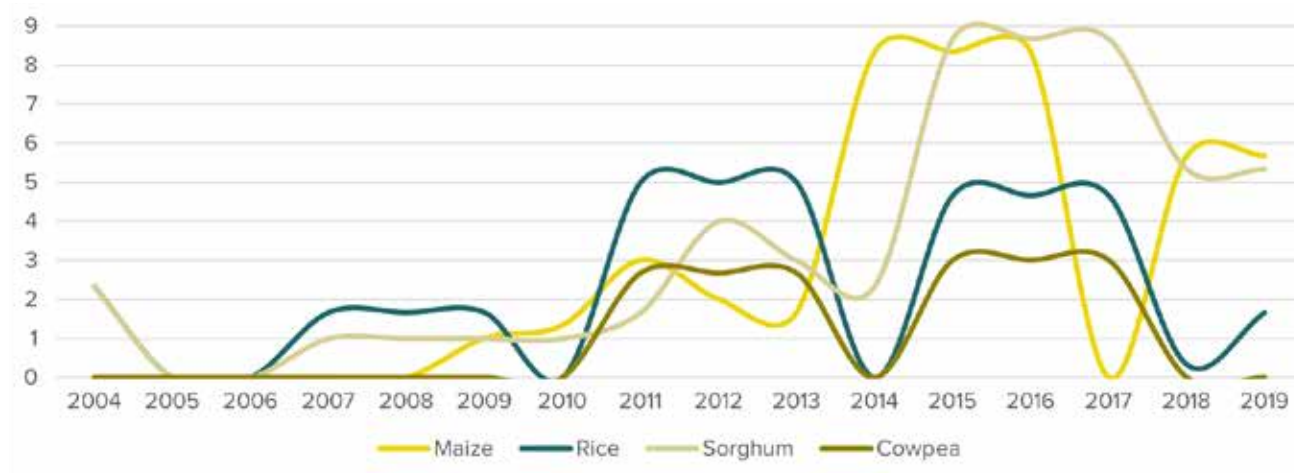
VARIETIES RELEASED IN THE LAST THREE YEARS

The number of varieties released 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 producing higher yields, new varieties often carry desired traits such as climate smartness, disease/pest resistance, and nutrition enhancement. A total of 38 varieties of the focus crops were released during the period 2017-2019: 17 varieties of maize, 16 varieties of sorghum and 5 varieties of rice. No cowpea varieties were released during this period. Figure 1 illustrates the 3-year moving averages of crop varieties released between 2002 and 2019.

The high number of maize and sorghum releases is partly due to the higher number of plant breeders in the two breeding programs. Moreover, the sorghum breeding program works closely with ICRISAT. This collaboration has strengthened the capacity of the program to produce new varieties.

The low number of cowpea and rice varieties is likely due to the fact that these two breeding programs are located far from Bamako, where the Comité National Des Semences (CNS) is based. Owing to the long distances to be covered by the CNS members to visit the DUS and VCU fields, the cowpea and rice breeders incur additional costs to cover the accommodation, transportation, and allowances for the CNS members. The high costs limit the number of varieties that can be submitted for release.

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



VOLUME OF FOUNDATION SEED PRODUCED

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 restricts the ability of seed companies to scale up production. To obtain basic seed, the seed producer applies to the research institution that produces or supplies the particular basic seed, specifying the crop, variety, and quantity needed. The research institution invoices the seed producer for the basic seed, and upon payment, the producer receives the seed.

Table 5 shows the volume of breeder and basic seed produced⁶ in 2019. According to LABOSEM, a total of 16.7 tons of breeder seed was produced in 2019. The different breeding programs of the IER produced a total of 378.3 MT of basic seed. The irrigated rice breeding program accounted for the largest share (73%) of the total production of basic seed.

⁶ Breeder seed is the seed that breeders multiply to produce basic seed. Seed producers multiply basic seed to produce certified seed which is sold to farmers. For the definitions see <https://www.agrilinks.org/post/seed-system-definitions>

Various projects support the IER's basic seed production. For instance, the West Africa Seed Program, funded by USAID and implemented by CORAF/WE CARD, supported centers of the CGIAR to develop improved germplasm and supply it to the IER breeding programs from 2013 to 2018. Through this support, in June 2014, 445 kg breeder seed of 35 improved maize varieties was brought to Mali from the International Institute of Tropical Agriculture (IITA) in Nigeria and 1,260 kg of breeder seed of four rice varieties was delivered from Africa Rice (Dagnoko and Asiedu, 2016). The IER breeding programs were later supported to produce basic seed to supply to seed companies. From 2017 to 2020, the Food and Business Applied Research Fund (ARF), funded by the Netherlands Organization for Scientific Research (NWO) and implemented by the Sasakawa Africa Association (SAA), the Royal Tropical Institute and the Rural Institute of Training and Applied Research of Mali, supported IER breeding programs to produce 9 MT of basic seed of rice, sorghum, millet, groundnut and cowpea (Dagnoko et al, 2020).

Table 5: Volume of breeder and foundation seed produced

Crop	Volume of breeder seed produced in 2019 (in tons)	Volume of basic seed produced in 2019 (in tons)
 Maize	1.5	58.6
 Rice	10.8	274.7
 Soya bean	0.9	23.2
 Cowpea	3.5	21.8
Total	16.7	378.3

Data source: LABOSEM statistics as of June 3, 2020



Availability of basic seed: To access basic seed for maize, rice, sorghum, and cowpea, seed companies make requests to the relevant breeding programs of the IER, which then produce and supply the requested seed. The IER requires that the requests be made one year in advance. In 2019, the number of requests for basic seed received by the IER was 33 (for cowpea), 12 (for sorghum), 10 (for maize) and 5 (for rice).

All the seed producers who requested basic seed received at least part of the quantity requested. Orders of hybrid maize, sorghum, and irrigated rice seed were partially fulfilled. The demand for maize single-cross hybrids could not be met fully because of the breeder seed's low yield. The sorghum breeding program re-ported requests for 6 MT of basic seed in 2019 but only supplied 2.2 MT. The rice (irrigated) breeding pro-gram received requests for more than 50 MT of basic seed, but only supplied 31 MT. The IER's breeding programs only supplied part of the basic seed requested for these crops for the following reasons. First, some seed producers asked for more basic seed than they had originally requested. This was due to the fact that the producers did not have accurate estimates of the expected demand for certified seed at the time they submitted the

request. Second, the IER does not have adequate capacity to store surplus basic seed produced. If it had this capacity, it would produce large amounts of basic seed and store it for the fol-lowing planting seasons.

Other actors involved in basic seed production of maize, rice, sorghum, and cowpea in Mali include seed companies, NGOs (Sasakawa Africa Association), projects (WASP, WAAPP, ARF/NWO), individual farmers, and farmers' cooperatives (the Mozomblena women's group sup-ported by the ARF Project). The seed volumes produced by these other actors are not well documented. In general, IER breeding programs subcontract seed companies and farmers to produce basic seed under their supervision. Farmers' seed cooperatives and individual seed producers often obtain basic seed through their partner seed companies or NGOs.

The demand for basic seed is not met by the supply system. There is a need for better coordination be-cause breeders often receive requests for basic seed from seed companies late in the season, either at planting time or after planting. This poses challenges for IER breeders who cannot satisfy such demands.

INDUSTRY COMPETITIVENESS

NUMBER OF ACTIVE SEED PRODUCERS

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 producers that produced and marketed seed of one or more of the focus crops.

In 2019, LABOSEM registered 569 maize seed producers, 936 rice seed producers, 515 sorghum seed producers and 262 cowpea seed producers (Table 6). These producers included breeders, seed companies, farmers (individual seed producers), NGOs, development projects, and farmers' seed cooperatives. Due to its economic importance as the country's main staple crop, rice had the highest number of registered seed producers.

Table 6: Number of active seed producers

Crop	Number of active seed producers	Volume of seed certified by LABOSEM (2019-2020)
 Maize	569	1,253
 Rice	936	3,137
 Cowpea	515	398
 Soya bean	262	165

Data source: LABOSEM September 2020

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.

Volume of seed imports and exports: Table 7 shows the volume, source, and entry points for seed imports. In 2019, 57 MT of seed of the four focus crops was imported into the country by eight seed companies. Most of the seed imported was maize seed (83%). The volume of imports of

the other two crops were much lower: 9 MT of rice seed and only 1 MT of sorghum seed. No cowpea seed was imported in 2019. The main source countries were Nigeria and India (maize), China, India, Burkina Faso, and Cote d'Ivoire (rice), and Vietnam (sorghum). The main entry points are the International Airport (IAPMK) of Senou, Diboli bordering Senegal. Zegoua and Heremakono in Sikasso region are the main points of entry for seed imported from Côte d'Ivoire and Burkina Faso. The numbers provided by seed companies on the volume of seed imports (56 MT) are lower than those provided by the DNA (145.9 MT). This is due to the fact that the DNA data is based on the quantities requested on the seed import permits, whereas seed companies report the actual volume imported.

Table 7: Overview of seed imports

Crops	Number of importing companies in 2019	Main country sources of imports	Main border points of entry	Total volume of imports in 2019 (MT)	
				Seed company data	DNA records
 Maize	6	Nigeria, India	IAPMK-Senou, Zégoua, Diboli	46	135
 Rice	4	India, China, Burkina Faso, Cote d'Ivoire	IAPMK-Senou, Zégoua, Diboli	9	0.9
 Soya bean	1	Vietnam	Diboli	1	10
 Cowpea	0	-	-	0	0
Overall	8*	-	-	56	145.9

* The number of importing companies does not add up to 8 because some companies imported seed for multiple crops.

Table 8 shows the volume and destination of seed exports from Mali in 2019. Five seed companies export-ed 397 MT of seed for the four crops in 2019, an increase from three companies in 2017. Most of the ex-ports were sorghum seed. All the destination countries were in West Africa (Sierra Leone, Côte d'Ivoire, Niger, and Mauritania). Seed companies reported higher volumes of seed exports than the DNA. The difference lies in the fact that some seed buyers come to

Mali from other countries and buy seed directly from the seed companies and ship it to their countries themselves. Seed companies recorded those transactions as seed exports, while these sales were not all recorded by the DNA as exports.

Table 8: Overview of seed exports

Crops	Number of importing companies in 2019	Main country sources of imports	Main border points of entry	Total volume of imports in 2019 (MT)	
				Seed company data	DNA records
 Maize	2	Côte d'Ivoire	Zegoua	76	0
 Rice	2	Niger	IAPMK-Senou	60	12
 Soya bean	3	Mauritania, Sierra Leone	Nara Kouremale	181	2
 Cowpea	2	Mauritania	Nara	80	0
Overall	5*	-	-	397	24

* The number of exporting companies does not add up to 5 because some companies exported seed for multiple crops.

Length of the import process: The length of the import process in days is the sum of the number of days needed to obtain import documentation (import permits, phytosanitary certificates, and an International Orange Certificate, if applicable) and the number of days needed to clear seed at the border. It excludes transportation time. The total time required to import seed in 2019 ranged from 9 to 30 days, with an average of 15 days (Table 9). The average duration has not changed significantly since 2017 (18 days) (Waithaka et al., 2019). Most of the importing seed companies (five out of eight) gave the import process a rating below 50%. The average rating of the import process was “fair” (41%). The low rating is due to the high cost of importation and the length of the import process. All eight seed importers complained of the high VAT rate

(18%) and the high customs fees (which were reported by respondents either as 7.5% of the seed value or US\$ 450 per MT). Four of the eight importers complained of the long duration of the process to obtain the permit and clear the seed at the entry point. In addition, importers noted that the process required many visits to the customs office, increasing the length of the import process.

Exporting companies do not handle documentation and clearance processes for exports through the customs office at the border point of exit. Customs authorities of the importing country and the importing company handle the export processes. The seed exporting companies report that the export process ranges between 4 and 30 days, with an average of about 19 days to export seed.

Table 9: Length of import and export process (2019)

Import process	Length of the import process (days)			Export process (days)
	Minimum	Maximum	Average	Average
Number of days to obtain relevant documents (import permit, phytosanitary certificate, etc.)	7	15	8	-
Number of days to clear seed at the border of entry	2	23	8	-
Total number of days	9	30	15	19
Satisfaction rating of the process (out of 100)	-	-	41%	

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 CNS. 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 adversely affects the number of varieties available to farmers. 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.

In Mali, the CNS is responsible for approving the release of a variety and its registration in the national seed catalogue. The Comité National d'Homologation (National Variety Release Committee) acts as the technical adviser for the CNS. The CNS was adopted by the decree N°0757/P-RM (Journal Officiel de la République du Mali, 2019a). The CNS is composed of 27 members and is chaired by the Minister of Agriculture or his/her representative. LABOSEM serves as the secretariat for the CNS. The CNS meets twice per year.

The IER reported that the duration of the variety release process does not vary by crop and is 24 months for all crops (Table 10). The breeders interviewed were generally not satisfied with the variety release process. An exception to this were the rice breeders, who rated the variety release process “good” at 75%. Irrigated rice breeders gave the highest rating. According to these rice breeders, the process is clear and generally straightforward. This is likely due to the fact that rice breeders, who have released more varieties over the years than other breeders, have more experience with the variety release process. The other breeders also considered the process to be too expensive, especially those established outside Bamako (cowpea breeding program). These programs are required to cover the cost of the CNS members' travel to their research stations. The breeders also complained of the large number of officials who participate in the field visit, which increases the costs.

Table 10: Average length of and satisfaction with the variety release process 2019

Crop	The average length of variety release process (in months)	Satisfaction with variety release process (out of 100%)
Maize	24	50%
Rice	24	75%
Sorghum	24	30%
Cowpea	24	50%

COST OF VARIETY RELEASE PROCESS

To be registered in the official seed catalogue, a new variety must pass the DUS and VCU tests conducted over the course of two years in multiple environments under the supervision of the CNS. The cost of multilocation trials, transportation, and accommodation allowances for the members of various release committees and drivers are paid for by the applicant breeder. There are also additional costs related to the fees of a one-day meeting during which the CNS makes its final deliberations on the outcomes of the field visits. At least two-thirds of the members of the CNS must attend the field visits and the deliberations. In 2019, the CNS released four rice varieties, which all followed the above procedure. The average cost for variety re-lease ranges between US\$ 4,866 for sorghum to US\$ 9,211 for rice (Table 11).



Table 11: Costs of variety release (2019)

Indicator on variety release	Costs incurred by IER during variety release (in USD): 1\$=XOF570				
	Maize	Rice	Sorghum	Cowpea	Average
Cost of variety release (DUS)	2,632	3,728	1,974	3,509	2,924
Cost of variety release (VCU)	2,632	3,728	2,761	3,509	3,186
Other costs	877	1,754	132	877	921
Total cost	6,140	9,211	4,866	7,895	7,031

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 legal instruments that are regularly updated. The Mali seed sector's regulatory framework comprises a national seed policy, a seed law, and decrees guiding the seed law's implementation. Laws provide regulatory frameworks for policies, while decrees provide the procedures and modalities for the implementation of laws.

The national **seed policy** adopted in 2009 (Ministère de l'Agriculture, 2009) and updated in 2018 (Ministère de l'Agriculture, 2020) provides the framework for all actors involved in the seed value chain. The two important strategic objectives of the national seed policy are to develop a well-organized and well-performing seed industry and to incentivize breeders through a law on breeders' rights. Both strategic interventions are yet to be implemented.

The **seed law** of 2010 (Loi Relative aux Semences d'Origine Végétale) (République du Mali 2010a), was adopted by the National Assembly on July 12, 2010, and is the main law governing the seed sector in Mali. Six **seed regulations** (decrees) are aligned with the seed law. These decrees were published in Mali's official gazette in 2018 and 2019, establishing the CNS or National Seed Committee, defining the criteria for seed production areas, outlining the scope

for seed certification and the procedure for registering seed producers, and institutionalizing the national plant varieties catalogue. Decrees are decisions made by the Government during the meetings chaired by the President of the Republic.

In addition to the seed law, Mali has also adopted regulation C/Reg.4/05/2008, commonly referred to as the **ECOWAS seed regulations**, which harmonize the rules governing quality control, certification and marketing of seed and seedlings in the ECOWAS region (ECOWAS, 2008). The ECOWAS seed regulations were adopted by the 17 ECOWAS member states, including Mali, in Abuja, Nigeria in 2008. The ECOWAS regulations were published in the official gazette in Mali in June 2014 (Official Journal N°23) (Journal Officiel de la République du Mali, 2014). The regulations' main objective was to help member states implement procedures related to seed quality control and certification and seed marketing within and among member states.

While the ECOWAS regulations contain multiple clauses, this report focuses on the regional seed catalogue, the CNS, the registration of seed producers, the National Seed Support Fund, and decree on seed import and export procedures. Varieties released in any member state are automatically eligible for inclusion in the ECOWAS catalogue. Member countries are expected to form national seed committees to oversee seed certification. Member states are expected to establish a national seed support fund. This fund, which is supported by the national government, is expected to provide funding for components that are critical to growth of the seed sector in a country such as in building of the capacity of seed producers to increase seed production, and IER's basic seed production. Further, member countries are also expected to adopt ECOWAS regulations on seed import and export procedures.



QUALITY AND ENFORCEMENT OF SEED REGULATIONS

Seed regulations give structure to the formal seed sector. TASAI studies assess 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.

Institution leading the implementation of national laws and regulations on seed: The Direction Nationale de l'Agriculture (DNA) is the main institution in charge of implementing seed laws and regulations through the "Division Législation et Contrôle Phytosanitaire" (Regulation and Phytosanitary Control Division), the seed laboratory (LABOSEM), and the Service National de Semences (SSN). The DNA's offices are decentralized in the 15 agricultural regions of Mali and the district of Bamako. These offices oversee field inspections in their respective regions and collect and transfer seed lot samples to LABOSEM in Bamako. LABOSEM has recently opened a second station in Ségou, which is located 235km from Bamako in one of the key agricultural areas. The SSN head office is also located in Ségou.

Committee/assembly overseeing the implementation of regulations: Decree N°2019-0757/P-RM, (Journal Officiel de la République du Mali, 2019) established the Comité National des Semences (CNS). The establishment of this committee is one of the requirements of the ECOWAS seed regulations. The CNS has 27 members and is chaired by the Minister of Agriculture or his/her representative. LABOSEM serves as the secretariat for the CNS. Under the decree (Article 8), the CNS is required to meet twice a year and is responsible for the variety release and registration process in the national seed catalogue, through a variety release committee (VRC), which acts as a technical adviser to the CNS. However, in practice, the CNS meetings are held on an as-needed basis and are dependent on the availability of financial resources.

Official Seed Catalogue: Decree N°2019-0756/P-RM, (Journal Officiel de la République du Mali, 2019b) institutionalized the National Seed Catalogue of Plant Varieties. LABOSEM maintains the catalogue, which is supposed to be updated annually. In practice, the catalogue is updated ad-hoc, depending on the availability of financial resources. The last three updates were completed in 2011, 2013 and 2020. LABOSEM announces the publication of new editions, which may be purchased from LABOSEM for US\$ 45.

Seed import/export: Decree N°10 428 PRM, (République du Mali 2010b) outlines the requirements for the importation and exportation of seed. To import or export seed in the

country, importers and exporters must be registered by the DNA. The registration, which is renewable, is valid for three years. Registered importers and exporters must submit a written request to the DNA's regulatory and phytosanitary division. The re-quest should be accompanied by the list of the crop varieties, seed classes and quantity, destination and/or the source country, a quality tag, and a phytosanitary certificate from the relevant legal authorities in the source country. Applicants must also pay a processing fee. The exported seed must meet the quality standards of the destination country. According to the DNA, the import/export procedures are strictly applied to all importing and exporting companies through the division of regulation and phytosanitary control. These procedures are in line with chapter 23 in the ECOWAS seed regulations (ECOWAS, 2008).

Registration procedures for companies / traders / operators / seed producers: The registration requirements for seed producers/companies are described in the seed regulatory instruments (seed law and seed decree). However, these requirements are not completely followed. According to the law, the registration should be completed every three years. In practice, however, the registration is completed annually and automatically upon submission of the seed production plan by qualified parties. Due to the automatic nature of the process, it is uncertain whether these registrations are verified by the regulator. The seed production plan (déclaration des cultures) is a template in a tabular form that each producer submits to the DNA before producing seed. The process is mandatory and is done annually or twice a year if a second season of seed production is intended. In general, these procedures are well respected by all parties.

Regulations for cost of seed quality control and seed certification: Through Act N° 2018-1813 (Journal Officiel de la République du Mali, 2018a) the DNA set the costs to be applied for seed field inspection and seed sampling and analysis in the laboratory. The same act also specifies the costs of printing the two labels re-quired per package. These costs are paid by the seed producer. Generally, these procedures are well implemented.

Regulations for seed packaging: Act N° 2018-1810 (Journal Officiel de la République du Mali, 2018b) sets out the types, quality, and size of authorized packages to be used for seed packaging. Requirements for seed labeling are also specified.

Degree of implementation of other ECOWAS regulations: The implementation of the ECOWAS regulations in Mali is on course with respect to the submission of varieties to the regional seed catalogue, the establishment of the CNS and the implementation of the registration of all seed producers. In addition, Mali has developed and is implementing a decree on seed import and export procedures. However, the National Seed Support Fund is not yet in place.

EFFORTS TO ERADICATE COUNTERFEIT SEED

Counterfeit seed (also known as fake seed) threatens the seed sector: it reduces farmers' confidence in certified seed due to cases in which farmers unknowingly plant inferior quality grain labeled as certified seed. This threatens the success of efforts to increase the adoption of improved varieties, as 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.

The DNA does not have a system for reporting cases of counterfeit seed. However, the government is aware of the problem and the need to address it. The following measures have been implemented by the government:

- The construction of a modern regional seed laboratory in Ségou in 2016. This is the second laboratory in the country and is intended to increase the country's seed testing and analysis capacity. This laboratory became operational in 2019. Improving its capacity will enable the government to test more seed suspected to be counterfeit than is currently being done.
- The training of young farmers to increase technical capacity in seed processing. This is a project funded by the Food and Agriculture Organization of the United Nations (FAO).
- The deployment of five mobile seed processing and conditioning units funded through the WAAPP pro-gram in 2018. These units will ensure that seed is processed immediately after the harvest, thereby reducing the risk of the seed being contaminated or mixed with grain. This will also reduce the need for labor-intensive manual post-harvest activities - threshing, sorting and packaging.
- The training of the beneficiaries of the mobile seed processing and conditioning units (local seed producers and companies) with the support of the Center for Green Innovation (CGI/GIZ) was conducted at the SSN, in Ségou from February 20 to 25, 2019.
- The issuing of the exact number of ECOWAS seed tags for seed that successfully passed the certification process.
- The mandatory labeling of seed bags by the seed inspectors, instead of by the seed producers them-selves, using the ECOWAS seed tags.
- Technical expertise is being conducted at the point of delivery by seed inspectors (see next section) to double-check seed quality, seed certificates and seed tags attached to the seed to be purchased by the government under subsidy. Based on these measures, the acceptance of the seed is contingent on the approval by the seed inspector based on whether the quality documents are genuine or not.



INSTITUTIONAL SUPPORT

ADEQUACY OF SEED INSPECTORS

Seed inspection services ensure that certified commercial seed meets the regulatory quality standards. The provision of adequate inspection services requires a sufficient number 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 in Mali is the responsibility of the DNA. There are seed inspection units at most of the entry/exit border posts, the regional directorates of agriculture, and at LABOSEM. Seed inspectors based at entry/exit border posts inspect all plant/animal materials and seed entering or exiting the country. In total, the country has 174 seed inspectors. The number had significantly increased from 60 inspectors in 2018 (Waithaka et al., 2019). This is because, when the government increased the number of regions from 8 to 15, seed inspectors were hired and deployed to the additional 7 regions. Out of the 174 seed inspectors, 138 are based at the 15 DNA regional offices, and 10 are based at LABOSEM in Bamako. These 148 inspectors are all involved in field inspection work. The remaining 26 inspectors are based at the border points of entry and exit and are not usually involved in field inspection and quality control.

Of the 148 field seed inspectors, 22% are women. The seed inspectors do not use any ICT tools to conduct field inspections. The national seed laboratory, which is the main seed certification body, is not accredited by the International Seed Testing Association (ISTA).

The 10 inspectors based at LABOSEM are also involved in seed sampling, testing, and analysis. LABOSEM considers that the number of inspectors is insufficient considering the number of seed samples that need to be tested during the planting season. In 2019, the inspectors tested and analyzed samples from 3,171 seed lots, on average, over 300 seed lots per inspector. Moreover, most of the samples are taken around the same time of the year, leading to delays in issuing test results. This challenge was partly addressed by the establishment of the second seed laboratory in Ségou.



SERVICE TO SMALLHOLDER FARMERS

ADEQUACY OF EXTENSION SERVICES

Well-functioning agricultural extension services are critical to the successful adoption of improved seed varieties 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.

In Mali, agricultural extension and advisory services to farmers are implemented through the DNA's regional offices. In addition to the DNA, several NGOs, such as Sasakawa Africa Association (SAA), MaliMark, and Association des Organisations Paysannes Professionnelles (AOPP), the Coordination Nationale des Organisations de Producteurs (CNOP) (National Coordination of Farmer Organizations), also provide extension services. The DNA and its technical and financial partners, the SAA and Alliance for a Green Revolution in Africa (AGRA), have recently provided smartphones and tablets to public extension agents. The beneficiaries also received training on the proper use of ICT tools, social media, and the Internet to strengthen their capacities in E-extension and advisory services. This is a strategy to mitigate the negative effects of COVID-19 on agricultural value chains, food and nutrition security.

Table 12 shows the number of public and private extension officers disaggregated by gender. Collectively, the government, NGOs, and farmer organizations employ 2,252 extension agents, most of whom are employed by the DNA (Table 12). Women constitute about 15% of the total number of extension agents. This shows that extension services in Mali are male dominated. The number of extension officers employed by the government and its partners increased significantly from the number recorded in 2018 (1,348) (Waithaka et al., 2019). The increase in the number of extension agents is due to two reasons. The first reason is that the government increased the number of regions from 8 to 15. As a result, extension officers were hired and deployed to the new regions. The second reason is that the AOPP recruited community-based extension workers/facilitators as part of their extension services.

Table 12: Extension workers disaggregated by gender

Number of extension officers	Male	Female	Total
Extension officers employed by the government (DNA and other government agencies)	1,094	310	2,014 ⁷
Extension officers employed by NGOs and farmer organizations	200	38	238
Total	1,294	348	2,252

Data source: DNA

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. This indicator tracks the number of agro-dealers and, if the data are available, this is disaggregated between registered and non-registered agro-dealers.

One of the National Seed Plan's objectives is to ensure that certified seed is available in various agricultural regions. This is to be achieved through the creation of networks of approved seed distributors and the establishment of input shops owned by cooperatives for the benefit of farmer organizations. The government does not maintain a database of agro-dealers and there is no association of agro-dealers in Mali. The most recent data is from AGRA. From 2007 to 2015, AGRA trained 4,689 agro-dealers (AGRA, 2017). This training was part of an agro-dealer strengthening program that was implemented in collaboration with the Citizen Network for Foreign Affairs (CNFA) and MaliMark.

⁷ The data from one of the government agencies is not disaggregated by gender. This is why the total is greater than the sum.



CONCLUSION

Mali's seed sector is in the early growth stage of development. This is based on TASAI's typology of country's seed systems, which considers the status of the policy and regulatory environment, the status of re-search and development and variety release processes, the degree of private sector participation, and the status of seed delivery systems. The 2020 TASAI Mali Update study reveals many positive developments in the seed industry, most of which are the result of recent improvements and programs initiated by the government. At the same time, the study also identifies challenges that may constrain growth.

In the area of **research and development**, a notable strength to build on is that Mali hosts the National Center of Specialization (NCOS) which focuses on rice. The center is one of seven similar entities, each specializing in a different crop, that were established by the West Africa Agricultural Productivity Program of ECO-WAS to facilitate regional integration. As the home of the NCOS, Mali is leading the development of technologies for the crop and supplies those technologies to other countries in the ECOWAS region. This development is expected to boost Mali's research and development capacity for rice while also serving other ECOWAS countries. With respect to maize and sorghum, the ongoing collaboration between private seed companies and CGIAR centers augments public breeding programs. This collaboration has strengthened the capacity of the IER's breeding programs to produce new maize and sorghum varieties. However, with the growing demand for basic seed for hybrid maize, sorghum, and irrigated rice, the IER needs additional storage facilities for surplus production to satisfy the increased demand. The establishment of a national seed sector fund, as required under ECOWAS regulations, could enable the IER's basic seed unit to increase seed production. For their part, seed producers should also plan their requirements well in advance to give the IER sufficient lead time to produce the desired quantities.

In terms of **industry competitiveness**, Mali has a highly competitive seed market, as evidenced by the number of seed producers (569 for maize, 936 for rice, 515 for sorghum, and 262 for cowpea). The country exports more seed of the four focus crops than it imports. The efficiency of the export process is difficult to assess, as the export process is not managed by the seed companies. In the case of seed imports, companies decry the high costs of importation and the long duration of the process. However, seed importation processes may be improved if the cost

of importation can be reduced and the documentation processes can be simplified.

Mali has made considerable efforts to strengthen its **seed policy environment**. Recent measures include the adoption of new laws and decrees in 2019. The decrees establish seed certification costs, authorized package sizes, the minimum and maximum planting areas per seed class, the national seed catalogue, and the creation of the CNS to oversee variety release and registration. Decrees on seed quality and packaging are currently being implemented. However, the CNS is not able to meet regularly due to funding constraints, the seed catalogue is not updated regularly, and the national seed fund is yet to be established. The variety release process takes 24 months across the four focus crops, and seed producers complain about the high cost of the process.

In terms of **institutional support**, the decentralization of seed regulatory services to the 15 agricultural regions has ensured that seed services are close to seed production sites. Mali has a good number of seed inspectors. The recent establishment of a second testing laboratory at Ségou will likely ease bottlenecks in the main laboratory in Bamako, where the number of samples to be tested is often very high during the planting season.

Mali should explore the use of ICT to ease and speed up seed inspection services. The government's efforts to counter the proliferation of counterfeit seed will contribute to the growth of the formal seed sector. Some notable initiatives are the establishment of the second laboratory, the deployment of mobile processing plants in the seed production zones, and the issuing of ECOWAS seed tags for seed that successfully passes the certification process. Additional measures are the mandatory labeling of seed bags by seed inspectors instead of by seed producers themselves, the use of the ECOWAS seed tags, inspections conducted at the point of delivery to double-check seed quality, and seed certificates and seed tags attached to the seed to be purchased by the government under subsidy programs.

Under **services to smallholder farmers**, the introduction of smartphones and tablets to public extension agents and training on the use of ICT tools, including popular social media channels, will strengthen the country's provision of extension and advisory services. The recent strengthening of agro-dealers' capacities through training should be augmented by establishing a database of agro-dealers.



REFERENCES

- AGRA 2017. AGRA Mali Operational Plan 2018-2021.
- Dagnoko, S., Camara, F., Cissé, F., Khouma, P dit M., Dakouo, M.K. 2020. Résultats sur la production de semence de base par les Institutions de Recherche [Modèle MIR]. Présentation PowerPoint, Atelier de clôture du Projet ARF, Bamako, Mali, Azalai Hotel 21 Juillet 2020.
- Dagnoko, S. and Asiedu, E. 2016. Innovative experiences in access to foundation seed for commercial and non-commercial crops for formal and informal seed systems. The case of Malian stakeholders and the West Africa Seed Programme (WASP). Final survey report, ISSD Africa.
- ECOWAS. 2008. Regulation C/Reg. 4/05/2008 on Harmonization of the Rules Governing Quality Control, Certification and Marketing of Plant Seeds and Seedlings in ECOWAS Region. ECOWAS Official Journal Vol. 53.
- Direction Nationale de l'Agriculture, 2020. Compilation des statistiques des différentes Directions régionales de l'Agriculture, Septembre 2020, Bamako, Mali.
- ISSD. 2017. Access to foundation seed of varieties in the public domain.
- Journal Officiel de la République Du Mali. 2019a. Décret n°0757/P-RM du 30 septembre 2019. Portant mise en place du Comité National des Semences (CNS)
- Journal Officiel de la République Du Mali. 2019b. Décret n°0756/P-RM du 30 septembre 2019. Portant institution du catalogue National des E'spèces et Variétés Végétales
- Journal Officiel de la République Du Mali. 2018a. Arrêté n°2018-1813/MA-SG du 29 mai 2018. Fixant les modalités et les conditions de la redevance de certification
- Journal Officiel de la République Du Mali. 2018b. Arrêté n°2018-1810/MA-SG du 29 mai 2018. Déterminant la gamme des emballages autorisés
- Journal Officiel de la République Du Mali. 2014. Règlement C/Reg.4/05/2008 Portant Harmonization des Règles Régissant Le Contrôle de Qualité, La Certification et la Commercialisation des Semences Végétales et Plants Dans L'Espace CEDEAO.
- Journal Officiel de la République Du Mali. 2010. Décret N°10-428 du 09 août 2010. Fixant les modalités d'application de la loi relative aux semences d'origine végétale
- McGuire, S., Sperling, L. 2016. Seed Systems Smallholder Farmers Use. Food Security, vol. 8 (1), 2016, pag-es. 179–195.
- Ministère de l' Agriculture. 2020. Politique Semencière du Mali (PNS Mali).
- République du Mali 2010a. Loi N°10-032 du 12 juillet 2010 relative aux semences d'origine végétale
- République du Mali 2010b. Décret N°10-428 du 09 août 2010 fixant les modalités d'application de la loi relative aux semences d'origine végétale
- Smale, M., Assima, A., Kergna, A., Thériault, V., Weltzien, E. 2018. Farm family effects of adopting improved and hybrid sorghum seed in the Sudan Savanna of West Africa. Food Policy, 74 (2018), 162–171. <https://doi.org/10.1016/j.foodpol.2018.01.001>
- Waithaka, M, Dagnoko, S., Dembele, S., Mugoya, M. Tihanyi, K. 2019. Mali Brief 2018 - The African Seed Access Index.
- WAAPP. 2015. West Africa Agriculture Productivity Program. Regional Integration in Breeding and Food and Income Gaps. National Centers of Specialisation. <http://www.waapp-ppaao.org/en/cns> accessed January 25 2021.

ABOUT TASAI

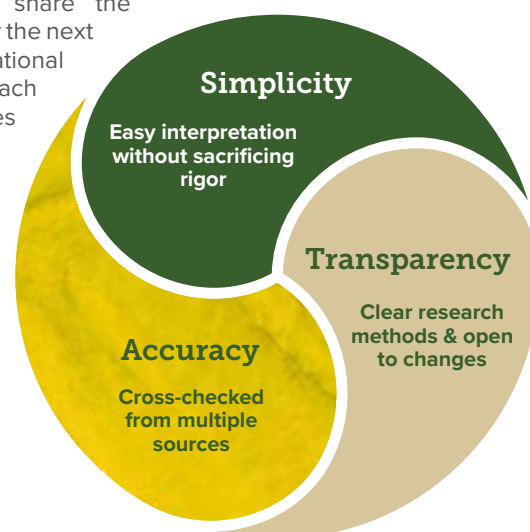


PILLARS OF COMPETITIVE SEED SECTORS

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
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