



TASAI

THE AFRICAN SEED ACCESS INDEX



Senegal Brief 2017 - The African Seed Access Index

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INTRODUCTION

A competitive seed sector is key to ensuring the timely availability of high quality seeds of improved, appropriate varieties at affordable prices for smallholder farmers in Senegal. This country brief summarizes the key findings of The African Seed Access Index (TASAI) study conducted in 2016/17 to appraise the structure and economic performance of Senegal's seed sector. With a focus on four grain crops important to food security — maize, rice, groundnut, and millet — the study evaluates the enabling environment for a vibrant formal seed sector. These four crops cover about 59% of Senegal's arable land (FAOSTAT, 2017).

The study covers 20 indicators divided into the following categories: Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers. [Appendix 1](#) summarizes all 20 indicators and compares Senegal with other countries covered by TASAI studies. TASAI seeks 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.

Overview

Like most other African countries, the seed industry in Senegal consists of two systems: the informal sector and the formal sector. This policy brief focuses almost exclusively on the formal seed sector.

The informal sector broadly refers to the system where farmers produce, obtain, maintain, and distribute seed resources, from one growing season to the next (FAO, 1998). Due to limited exposure, low availability of most varieties, inability to purchase seeds, limited access to agro-dealers, or other reasons, most smallholder farmers in Senegal still rely significantly on the informal system. Standards in the informal seed sector are not effectively monitored or controlled by government policies and regulations; rather, they are guided by indigenous knowledge and standards, and by social structures. The colloquial nature of transactions means that there is scant performance data on the informal sector.

The formal sector focuses on breeding and evaluating improved varieties, and producing and selling certified seed varieties to farmers. In Senegal, the entity responsible for regulating certified seed is the National Advisory Committee on Seeds and Plants (CNCSP) under the Ministry of Agricultural and Rural Equipment (MAER). As shown in Table 1, Senegal's formal seed sector comprises seed producers (including individual seed producers, seed companies, seed associations, and seed cooperatives), several government institutions (including DISEM and ISRA), and seed platforms such as UNIS. Note, however, that due to lax standards and limited enforcement, most formal sector seed producers in Senegal (also referred to as seed operators) would not meet the threshold of seed certification in most other countries.

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

ROLE	KEY PLAYERS
Research and breeding	ISRA
Variety release and regulation	DISEM, MAER
Seed production and processing	Individual seed producers, seed companies, seed cooperatives, seed associations
Education, training, and extension	DISEM, APROSEM
Distribution and sales	Seed companies, seed cooperatives, seed associations, agro-dealers

Key acronyms: CNCSP – National Advisory Committee on Seeds and Plants; DISEM – National Seed Division; ECOWAS – Economic Community of West African States; ISRA – Senegalese Institute of Agricultural Research; MAER – Ministry of Agricultural and Rural Equipment; UNIS – National Union of Seed Professionals



Number of active breeders

At present, Senegal has 12 active breeders for the four focus crops of maize, rice, groundnut, and millet. Of these, nine come from the three national public research institutions - the Institut Sénégalais de Recherches Agricoles (Senegalese Institute of Agricultural Research, or ISRA), the Regional Study Centre for the Improvement of Drought Adaptation, and the Higher National School of Agriculture. Two breeders are from regional institutions – Africa Rice and the Economic Community of West African States (ECOWAS) - and one breeder is from the Alliance for a Green Revolution in Africa. By crop, the breeders are distributed as follows: two for maize, four for rice, three for groundnut, and three for millet.

On average, seed producers rate the adequacy of breeders as “poor” (38%). Per crop, the highest levels of satisfaction were registered for groundnut (61%) and rice (50%). Seed producers’ satisfaction with the adequacy of breeders is “poor” for millet (25%) and “extremely poor” for maize (17%).¹ Although the number of breeders is similar across the four crops, the significantly lower ratings registered for millet and maize breeders signal a need to increase the number of breeders to meet market demand. This is unlikely to happen soon, as the breeding program at the Senegalese Institute of Agricultural Research (ISRA) is under-resourced, resulting in high turnover of researchers. Notably, most of those leaving are experienced researchers, who are now being replaced by inexperienced recent graduates.

Varieties released in the last three years

In Senegal, variety release and registration are managed by the National Seed Division (DISEM). Between 2014 and 2016, seven varieties were released of the four crops. However, the new varieties were all groundnuts; no maize, millet, or rice varieties were released in the past three years. Figure 1 shows the three-year moving average of variety releases since 2003. Since 2000, 8 varieties of maize, 21 varieties of rice, 13 varieties of groundnut, and 3 varieties of millet have been released. Given the number of active breeders, the number of varieties re-

leased for the crops is relatively low. According to multiple sources, the main reason for the low number of variety releases is a lack of financial resources and skilled breeders at ISRA. Public breeding programs are underfunded by the government, and are largely dependent on external (donor) funding.

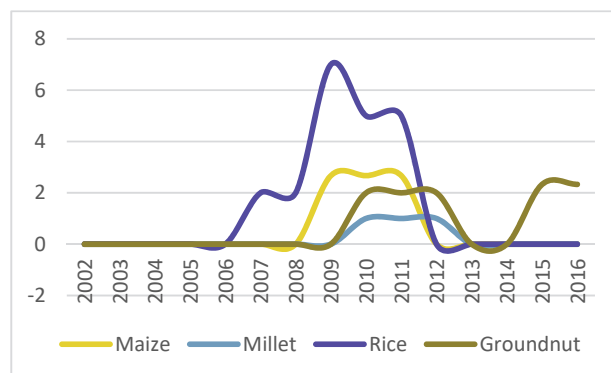


Figure 1: Number of varieties released in Senegal (three-year moving average)

Availability of foundation seed

On average, seed producers rate the availability of foundation seed as “excellent” for groundnut (82%), and “good” for the other three crops: rice (74%), millet (79%), and maize (77%). The main source of foundation seed in Senegal is ISRA. The high rating is primarily due to the fact that seed operators can easily access foundation seed from ISRA due to the low threshold for becoming a seed operator.

Average age of varieties sold

The average ages of varieties currently on the formal seed market are as follows: 19 years for maize, 17 years for rice, 20 years for groundnut, and 16 years for millet (Note that these are simple averages since data on market share by variety is not available.) The youngest groundnut variety on the market is one year old, while the youngest varieties for the other three crops are at least six years old. Some of the varieties still on the market are very old, with maximum ages of 33 years for maize, 26 years for rice, 56 years for groundnut, and 29 years for millet. The old age of the groundnut varieties can be attributed to a long history of cultivation, dating back to the colonial period in the 1960s. At present Senegal has no regulations governing the retirement of old varieties, and seed producers

¹ All scores reported in this brief are based on industry self-reporting of satisfaction ranging from 0% for completely dissatisfied to 100% for completely satisfied.



continue to supply them as long as farmers demand them.

Varieties with climate-smart features

To be classified as climate-smart, a crop variety must meet at least one of two criteria – early maturity and/or tolerance to extreme weather conditions such as drought, flooding, or frost. As only groundnut varieties were released during 2014-16, the TASAI study analysed all releases over the past decade for climate-smart features. Over half of maize (5 of 8) and millet (4 of 7) varieties released since 2007 are climate-smart. However, fewer than half the rice (21 of 45) and groundnut varieties (7 of 16) released over the same period are climate-smart. The maize, groundnut, and millet varieties are both drought-tolerant and early-maturing, while the rice varieties are drought-tolerant. While clearly not all new varieties are climate-smart, over the past decade, ISRA has deliberately prioritized the development of varieties that mitigate the effects of climate change.

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2016, 138 seed producers were registered by the Ministry of Agriculture and Rural Equipment (MAER) as producers of certified seed for at least one of the four focus crops. The seed producers can be classified into four different categories: seed companies, associations, co-operatives/farmer organizations, and individual seed producers. Of the 138 seed producers, 13 are farmer organization platforms, 25 are seed co-operatives, and 85 are individual seed producers. By crop, 89 produce maize, 51 produce rice, 109 produce groundnut, and 93 produce millet.

While the overall number of 138 may seem adequate, in reality, the situation is quite different. Due to the low standard required for registration, the majority of seed producers are small rudimentary enterprises. For example, only 20 of the 138 producers package their seed. In contrast, in other countries surveyed by TASAI studies, packaging is a requirement for all certified seed sales, and thus most of the seed producers registered in Senegal would not meet the minimum threshold of a seed company.

The estimated 2016 aggregate sales of certified seed of the four crops was 105,391 tons, of which groundnut accounted for about 71% (75,286 tons). The TASAI findings on the volume of groundnut seed sales are close to the government statistics, which state 64,349 tons of approved groundnut seed production in 2015 (one year earlier). However, as mentioned above, these numbers need to be treated with caution, as most of this seed is of very low quality because the producers are not adequately trained and much of the seed is not inspected by the regulator.

Market share of top seed companies

Market concentration is calculated in two ways: first, by calculating the output of the top four companies as a percentage of total industry output for each commodity, and second, by using the Herfindal-Hershman Index (HHI). The HHI is a measure of market concentration calculated by squaring the market share of each firm competing in a market and then summing the resulting numbers. HHI can range from close to zero (perfect competition) to 10,000 (monopoly).

Using the first method, by crop, the market shares of the top four producers are 32% for maize, 37% for rice, 30% for groundnut, and 40% for millet. These shares indicate that the seed market for all four crops is competitive, with no companies dominating the market (Fig. 2).

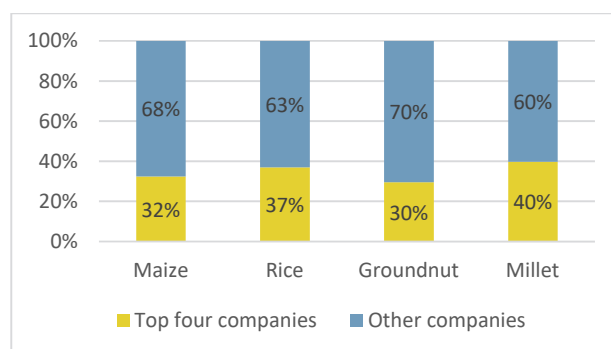


Figure 2: Total market share (%) of top four companies

HHI was also calculated for all the seed companies, for each crop. The market concentration for all crops is rated as excellent: 274 (maize), 375 (rice), 289 (groundnut), and 744 (millet). The market shares of the top four companies and the HHI results both indicate excellent competition in all four seed markets.

Despite the impressive measure of competitiveness, a note of caution is again required, given that most of Sen-



egal's seed sector is comprised of numerous small enterprises, many of which would not meet the standard definition of a formal seed company. As such, they operate at a small scale that does not allow them to take advantage of any economies of scale. Consequently, the investments in seed processing, packaging, and equipment by seed companies is minimal, and the final product sold to farmers is often of low quality.

Market share of government parastatal

No government parastatal is involved in the production and/or marketing of certified seed for any of the four crops. Nevertheless, the seed sector in Senegal is still mostly under government control. For example, seed prices are somewhat arbitrarily set by the state with limited input from the seed industry. Seed purchases by the state account for more than 90% of sales of maize, rice, and groundnut seeds. As noted by several private seed companies, the presence of the government serves as a guarantee for those who produce sub-standard seed as "the State purchases all seeds of any quality."

Length of import/export process for seed

In 2016, there were no imports or exports of certified seed for any of the four focus crops in Senegal. However, ISRA occasionally imports early generation rice seed from various sources, including the National Institute of Agro-nomic Research in Burkina Faso.

SEED POLICY AND REGULATIONS

Length of variety release process

The length of the variety release process is the duration between the application for release of a variety to the time the variety is released by the relevant authority. In Senegal, crop variety release is the mandate of the Technical Science Committee, under CNCSP in the Ministry of Agriculture.

It currently takes an average of 36 months to release a variety in Senegal. On average, seed producers rate the release process as "good" (74%). By crop, the ratings are "excellent" for millet (83%), and "good" for maize (72%), rice (70%), and groundnut (73%). Note, however, that due to the low number of varieties released in recent years, many seed companies have limited experience with the variety release process.

Status of seed policy framework

The seed laws (No. 94-81) in Senegal were passed by the National Assembly in 1994 and cover varietal registration, as well as the production, certification, and trade of seeds and seedlings. These laws were supplemented in 1997 with three decrees/regulations: i) on plant species and varieties; ii) on the creation of the CNCSP; and iii) on regulating the production, certification, and trade of seeds and seedlings. In addition, groundnut-specific technical regulations have been drawn up by the CNCSP for approval by the Ministry of Agriculture.

National regulations have been reinforced by the application of the ECOWAS seed regulations, to which Senegal is fully compliant.

Quality of seed regulations and enforcement

Seed companies are satisfied with the quality of the seed law and regulations, rating them as "good" (75%). They are equally satisfied with the enforcement of regulations (74%). However, the high scores may be misleading as many producers surveyed were not aware of the different seed policy instruments in the country. Despite the high ratings, discussions with seed producers revealed significant capacity challenges within the National Seed Division, constraining its ability to effectively enforce the regulations.

Seed producers are not sufficiently evaluated before being certified by DISEM. In addition, seed producers are not adequately inspected at the various stages of seed production. DISEM does not have the financial or technical capacity to effectively oversee seed activities at the different stages of the value chain. This lack of regulatory oversight results in high volumes of low quality seed on the market that cannot be traced back to its origin.

Adequacy of seed inspectors

DISEM has a total of 21 seed inspectors covering all 14 administrative regions nationwide. A pilot experiment to accredit private inspectors is currently underway, though it is only for rice seed in northern regions. On average, seed producers rate their satisfaction with seed services as "poor" (22%), because seed inspection services are mainly used for early generation seed produced by ISRA, rather than for certified seed produced by the various seed producers. Much of the certified seed is not inspected.



Efforts to stamp out fake seed

A sample of 20 seed producers reported about 39 cases of fake seed in 2016. On average, seed producers are not satisfied with the government's efforts to stamp out fake seed, rating them as "fair" (52%). However, the challenge of fake seed goes hand-in-hand with the problem of sub-standard seed. The sub-standard seed is the result of insufficient inspection of seed before it is sold or distributed to farmers. This also includes challenges such as poor handling of seed, government distribution of seed that is not packaged, and the poor labelling of packaged seed. There is no mechanism in place to monitor or report the distribution of fake seed and no measures in place to stop the practice.

Use of smart subsidies

The seed subsidy program in Senegal has been running for more than 10 years. There are two stages of seed subsidy in Senegal. The first is at the stage of early generation seed (pre-basic and basic seed). Government identifies seed producers who receive breeder seed from ISRA at a subsidized price (40%-60% of the actual price). Potential farmers apply to DISEM to benefit from this subsidy. The criteria for seed producers includes the ownership of at least one plot of land and a commitment to follow ISRA rules and procedures related to seed management.

The second stage is the subsidy of certified seed. The government buys nearly all the seed produced by the registered seed producers, and sells it at a lower price of about 60% of the purchase price. Due to the poor design, implementation and management of the subsidy program, most of the seed producers are neither well-trained, nor sufficiently inspected, leading to low-quality seed on the market. The low quality is evidenced by the low yields registered by farmers who use the subsidized seed. In 2013, farmers reported that the yields from subsidized groundnut seeds were lower than yields from three other sources of seed, namely farmer-saved seed, seed bought directly from seed producers and seed bought from the markets (Ndiaye, Audet-Bélanger and Gildemacher, 2015).

Compared to other countries, the seed subsidy program is not considered to be "smart" due to the low involvement of the private sector in the distribution, the distortionary pricing of seed, and the low quality of seed sold through the program.

INSTITUTIONAL SUPPORT

Availability of extension services

Public extension services are under the National Agricultural and Rural Advisory Agency and other extension organisations such as the National Society for the Development and Exploitation of the Delta Lands, the Senegal Agricultural and Industrial Development Corporation, and others. NGOs are also involved in agricultural extension work. The number of agricultural extension workers in Senegal is difficult to ascertain, though seed producers report that there are significant deficits in the quantity and quality of agricultural extension officers. Seed producers rate their satisfaction with extension services as "poor" (22%).

Quality of national seed trade association

The National Union of Seed Professionals (UNIS) is the primary association of seed producers in Senegal. UNIS was formed in the 1990s to unite all stakeholders (producers, seed producers, collectors, processors, transporters, suppliers of inputs, and local government) in the seed value chain and to advocate for the development of Senegal's seed sector. Soon after its formation, UNIS experienced a crisis of governance due to the undemocratic management style of the steering committee. In addition to the managerial dysfunction, the organization lacked financial resources, resulting in minimal activity from 2000 to 2014. During the same period, UNIS split into two opposing factions.

Since 2015, there has been a movement to revitalize the organization with a new interim steering committee. UNIS currently has 126 members. The seed producers rate their overall satisfaction with UNIS as "good" (62%). Figure 3 illustrates seed producers' level of satisfaction with UNIS's performance in six service areas. UNIS receives the highest rating for its activity in seed sector issues (73%), while the lowest rating is for its ability to mobilize resources (58%). Members rate UNIS as "good" on effectiveness in advocacy (66%) and democracy and governance (60%). The other service areas – managerial ability and providing value to members – are rated as "fair" (59%). For the quality of services offered, these numbers are higher than expected, and they may reflect the notable improvement (or at least optimism) after so many years of dysfunction.



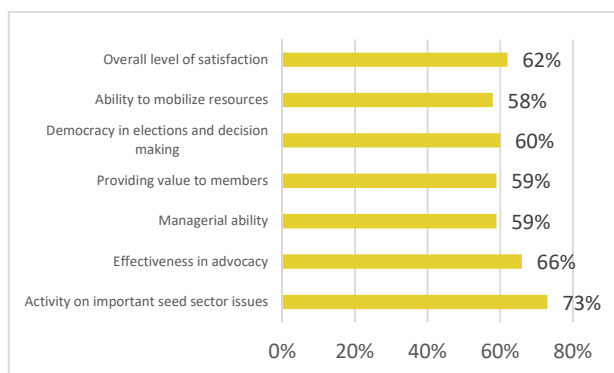


Figure 3: Members' satisfaction with UNIS

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

Most towns, villages, and markets in Senegal have small shops that sell agricultural inputs, such as seed, fertilizer, agro-chemicals, and tools. Strictly speaking, these shops are not agro-dealers and agricultural inputs are a small (and often seasonal) aspect of their overall business. Nevertheless, some serve as final points of sale for agro-inputs for international companies. The seed producers interviewed indicated that their products are carried in an average of two-to-three shops. Seed producers rate their satisfaction with the agro-dealer network as “poor” (25%).

In addition to the small shops, Senegal has a network of government-owned warehouses (“seccos”), which are points of deposit and sale for subsidized seeds. These are primarily intended for groundnut seed, but are also used for maize and millet seed. The warehouses are in poor condition and in need of rehabilitation. Despite their condition, the seccos inadvertently serve as agro-input distribution points. There are 97 seccos with capacities varying between 200 tons and 1000 tons across the country. This translates to a ratio of one agro-dealer for approximately every 7,788 agricultural households in Senegal.

The TASAI findings on the limited availability of agro-dealers in Senegal are confirmed by a 2013 survey of farmers (Ndiaye, Audet-Belanger, & Gildermacher, 2015), which revealed that less than 5% of groundnut and millet farmers sourced their seed from agro-dealers. None of the maize or rice farmers in the sample sourced their seed from agro-dealers. Apart from farmer-saved seed, the most important sources of seed were the direct sales from seed producers, informal market, seccos, and friends/neighbours.

Availability of seed in small packages

None of the seeds for the four crops are sold in packages of 2 kg or less. As required by government, seeds are processed and packed in bags of different weights according to the seeding rates per hectare, which results in packages of 16 kg for maize, 40 kg for paddy rice, 50 kg for groundnut, and 4 kg for millet.

The reasoning behind the package sizes is that, if a farmer's land is parceled into hectares, she/he can use one bag of seed for each hectare at the recommended seeding rate. A key limitation of this standard is that it does not cater to farmers who might want to try out new seed varieties for a smaller piece of land. Thus, the limited availability of seed in small packages is a key limitation to both adoption and affordability of improved seed.

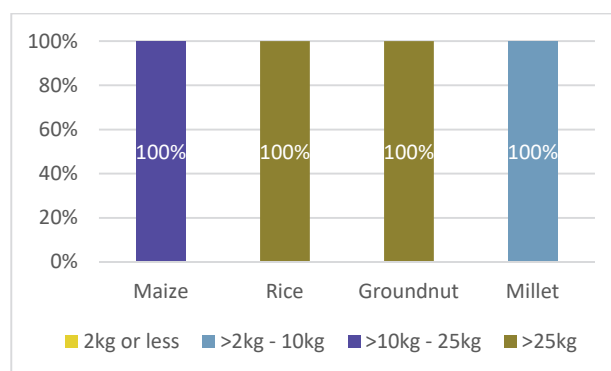


Figure 4. Percentage of seed sold in different package sizes

Seed-to-grain price ratio

Assuming stable prices at planting time, seed-to-grain price ratios can reflect the attractiveness of a variety or affordability of improved seed relative to farmer recycled grain. The seed-to-grain price ratio for the four crops does not vary significantly. The highest ratios are for millet (3.0:1) and maize (2.9:1), followed by rice (1.7:1) and groundnut (1.1:1). Compared to other countries covered by the TASAI study, these seed-to-grain price ratios are relatively low, indicating that in Senegal certified seed is more affordable than in other countries. However, the low ratios are a reflection of the low quality of certified seed (minimal value addition compared to grain) and the government's price-setting policies. At the set prices, seed producers can only maximize profits by cutting costs and there are no incentives for product innovation and quality improvement.



CONCLUSIONS

The seed sector in Senegal is in the early growth stage, with weak regulatory systems and structures across most stages of the seed value chain. Public investment is needed in research and variety development, as the current varieties being produced by producers are very old. In the short term, public breeding efforts can be complemented by imports of early generation seed from other ECOWAS member states.

At the policy level, the enforcement of seed regulations is weak at the stages of research and development, variety release, and seed testing. In addition, registered seed producers are not sufficiently inspected, which has led to low-quality seed in the formal seed sector. Government intervention in seed marketing through the purchase of seed and price-setting indirectly contributes to weaknesses in the system, by guaranteeing all seed producers a market for their low-quality, certified seed.

In addition, seed sector support systems and institutions in Senegal are quite weak. Agricultural extension systems and agro-dealer networks are inadequate and rated poorly by seed producers. UNIS, the seed association, is currently being revived after years of ineffective operation. Further, seed inspection services are not sufficient to respond to the challenges of fake seed.

Despite the significant challenges, there are several opportunities to facilitate the growth of the seed sector in Senegal. The large number of seed producers, coupled with the large volumes of seed sales, suggest that Senegalese farm-

ers are willing to invest in quality certified seed, if well regulated. In addition, Senegal's active engagement in the ECOWAS seed harmonization process presents an opportunity for regional trade in all classes of seed.

To achieve this potential, a key recommendation is to strengthen the enforcement capacity of DISEM. DISEM urgently needs greater financial, human, and technical resources to effectively conduct all seed quality control-related activities. In addition, the government should consider reducing its involvement in seed distribution to allow seed producers to sell competitively to farmers.

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APPENDIX 1.

For a comparison of TASAI Indicators across 13 countries, please visit: <http://tasai.org/wp-content/uploads/TASAI-Appendix-CURRENT.pdf>





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