TASAI

THE AFRICAN SEED ACCESS INDEX

# Mozambique Brief 2017 - The African Seed Access Index

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## INTRODUCTION

A competitive seed sector is key to ensuring timely availability of high quality seeds of improved, appropriate varieties at affordable prices to smallholder farmers in Mozambique. 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 Mozambique's seed sector. With a focus on four grain crops important to food security — maize, rice, cowpea, and soya bean — the study evaluates the enabling environment for a vibrant formal seed sector. The four crops account for about 44% of the arable land in Mozambique and at least 30% of the average daily caloric intake (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 Mozambique to other countries where similar studies have been conducted. 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

The seed industry in Mozambique 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). Standards in the informal seed sector are not 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 Mozambique, the entity responsible for seed certification is the National Seed Authority (NSA), a department under the Directorate for Agriculture and Forestry (DINAS) in the Ministry of Agriculture and Food Security (MASA). Mozambique's formal seed sector is in the early stages of development. The adoption rates of improved seeds for maize, rice, and cowpea are below 10%. However, the adoption rates for improved soya bean varieties are 89%, mainly due to its role as a cash crop for the poultry industry (AGRA, Mozambique Early Generation Seed study, 2016).

As shown in Table 1, Mozambique's formal seed sector comprises numerous institutions, including government (e.g. Institute for Agricultural Research in Mozambique, Unit for Basic Seed, MASA, DNAS), private sector (mostly local or multi-national seed companies and agro-dealers), and development agencies.

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

| ROLE | KEY PLAYERS |
|---|---|
| **Research and breeding** | IIAM, CGIARs, UEM |
| **Variety release and regulation** | IIAM, Seed Companies, NSA |
| **Seed production and processing** | Seed companies, Seed producers/Associations, IIAM/USEBA |
| **Education, training, and extension** | Seed Companies, Agro dealers, NGO´s, FAO, (DNSA, IIAM/USEBA (MASA) |
| **Distribution and sales** | Public extension services, IIAM (MASA), NGO´s, Seed Companies |

**Key acronyms: AFSTA** – African Seed Trade Association; **APROSE**- The Association for Promotion of the Seed Sector; **CIAT** - International Center for Tropical Agriculture; **CIMMYT** – International Maize and Wheat Improvement Center; **COMESA** – Common Market for Eastern and Southern Africa; **DINAS** – National Directorate for Agriculture and Forestry; **DNSA** – National Directorate of Agrarian Services; **IIAM** – Institute for Agricultural Research in Mozambique; **IITA** – International Institute for Tropical Agriculture; **MASA** -Ministry of Agriculture and Food Security; ; **NSA** – National Seed Authority; **PEDSA** – Strategic Plan for developing the Agricultural Sector; **SADC** – Southern Africa Development Community; **USEBA** – Unit for Basic Seed

## RESEARCH AND DEVELOPMENT

### Number of active breeders

For the four priority crops in Mozambique – maize, rice, cowpea, and soya bean - there are 20 active breeders, all of whom are employed by public research institutions – IIAM and CGIARs. Broken down by crop, there are eight breeders for rice, six breeders for maize, four breeders for cowpea, and only two breeders for soya bean. While none of the local seed companies employs breeders, the multinationals active in the country rely on breeders based in other countries, such as South Africa.

In addition to the small number of active breeders, breeding activities and the production of early generation seed from the public sector are constrained by several factors including: (i) a lack of adequate facilities, particularly irrigation facilities, to ensure off-season breeding activities; (ii) limited seed processing facilities; iii) dispersed areas of production, making breeding activities expensive; (iv) limited availability of land, particularly for maize isolation and rice rotation, and; (v) lack of incentives for the breeders, as the law on Plant Breeders' Rights (PBR) is not yet operational.

On average, seed companies' satisfaction with the number of breeders for maize and rice is excellent (90%), and fair for cowpea (63%) and soya bean (68%).[1]

### Varieties released in the last three years

Figure 1 shows the trend for variety release for the four crops, using three-year moving averages. The trend shows a sharp increase in variety releases between 2011 and 2014. The increase was due to a new ministerial directive (Diploma Ministerial No. 51/2012) permitting a simplified variety release process based on Value for Cultivation and Use (VCU), with the aim of availing more quality seed to farmers (AGRA, Mozambique Early Generation Seed study, 2016). Despite such efforts, the level of commercialization of released varieties is low: of the four crops, only 43% of the 55 varieties released since 2000 have been sold to farmers.

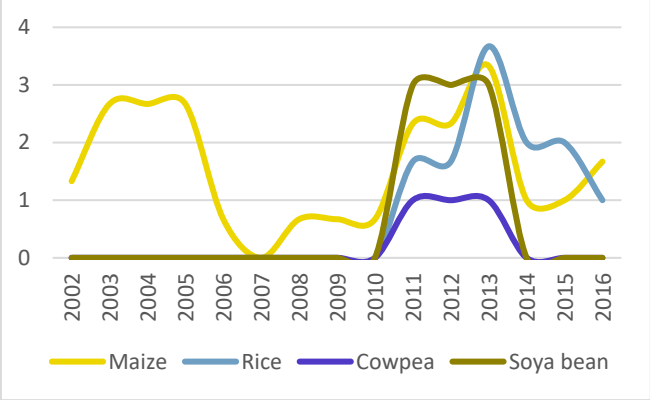


*Figure 1: Number of varieties released in Mozambique (three-year moving average)*

### Availability of foundation seed

The main sources of foundation seed in Mozambique are the Institute for Agricultural Research in Mozambique (IIAM) and CGIAR centers, namely CIMMYT for maize and wheat and IITA for cowpeas and soybeans. "Semente Melhorada para Agricultura Renovada" (SEMEAR), is a five-year seed promotion program funded by USAID and implemented by a consortium of four research institutions namely IITA, CIAT, ICRISAT and IIAM. SEMEAR facilitates the availability of pre-basic and basic grain legume seed to selected seed companies, individual and farmers groups. In addition, a few local seed companies also provide foundation seed to other seed companies under two-party agreements. Finally, all of the regional and multinational seed companies source foundation seed from their own regional breeding centers based outside Mozambique.

Seed companies expressed their concern about the shortage of foundation seed, highlighting it as a major constraint in the seed industry. On average, the levels of satisfaction with the availability of foundation seed is fair for maize (42%), cowpea (40%), and soya bean (46%), and excellent for rice (85%).

The opinions expressed by seed companies are also confirmed in a recent report on Early Generation Seed in Mozambique (AGRA, 2016). The study acknowledges the limited supply of early generation seed, and highlights challenges such as a weak EGS forecasting system, poor EGS distribution systems, and the degeneration of old varieties such as the popular OPV maize variety, *Matuba*.

[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.

### Average age of varieties sold

A total of 24 varieties of the four crops were sold in 2016 in Mozambique. Most of these were maize and soya bean - 11 and 8 of 24, respectively. Only 3 rice and 2 cowpea varieties were commercially available to farmers in 2016.

The average age of the varieties sold in 2016 was 11 years for maize, 2 years for rice, 21 years for cowpea, and 5 years for soya bean. The above figures indicate that the rice and soya bean varieties on the market are relatively new (released in the last 5 years), but the maize and cowpea varieties sold are old. For example, the most popular maize variety, *Matuba*, was released in 1995. In addition, while three new varieties of cowpea were released in 2011, they were not (yet) sold in 2016; instead, the two varieties on the market were released in 1995 and 1996. At present, Mozambique has no regulations to retire old varieties.

### 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. Of the varieties released between 2014 and 2016, three of five maize varieties and two of three rice varieties were climate-smart. There were no new cowpea or soya bean varieties released during the period. The most prominent climate-smart feature was drought-tolerance: 2 of 3 new maize varieties and both rice varieties possessed this feature. At present, no flood resistant varieties exist in Mozambique, even though parts of the country are highly susceptible to flooding. Farmers use early-maturing varieties to mitigate the risk of late-season floods.

## INDUSTRY COMPETITIVENESS

### Number of active seed companies

In 2016, Mozambique had 63 registered seed companies, of which 59 were local. Of the 63 registered companies, only 15 were actively engaged in the production and/or marketing of at least one the four focus crops. Of the 15, all produced maize, 3 produced rice, 11 produced cowpea, and six produced soya bean. Most of the seed companies are active in maize and cowpea because because these crops are highly suitable for the growing conditions in large parts of the country's central and northern regions. Consequently, most seed companies are also based in these areas. The majority of Mozambique's seed companies are young, having been in operation 3-5 years.

By crop, the estimated aggregate seed sales in 2016 were 4,375 tonnes of maize, 650 tonnes of rice, 364 tonnes of cowpea, and 689 tonnes of soya bean. These sales volumes are similar to the official DNSA sales figures for the 2013/2014 season reported in the SPEED report (Marrule, 2014) – 5,092 tonnes of maize and 1,092 tonnes of rice. Both sources show that seed production in Mozambique is dominated by maize.

### 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, the overall volume weighted market share for the top four companies (for all four crops) was 85%. By crop, the market share for the top four companies was 80% for maize, 100% for rice (there were only three companies selling rice seed), 96% for cowpea, and 97% for soya bean. Figure 2 illustrates the market shares.

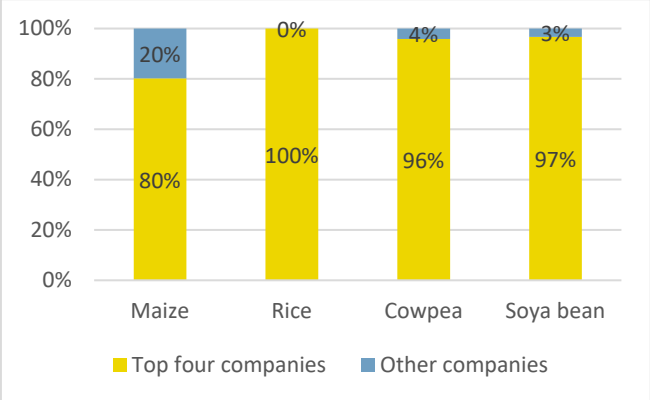


*Figure 2: Total market share (%) of top four companies*

HHI was also calculated for all the seed companies, for each crop. The market concentration for maize (2,623) is good, but for cowpea (4,379) and soya bean (4,218) it is extremely poor. The market shares of the top four companies and the HHI results both indicate that the seed markets for rice, cowpea and soya bean are dominated by a few players, with little to no competition.

### Market share of government parastatal

Mozambique's commercial seed industry was liberalized in 2000. The government is not nvolved in the production and/or marketing of certified seed for any of the four crops, and the former parastatal, SEMOC, is no longer engaged in seed production.

### Length of import/export process for seed

The time it takes to import seed is calculated as the number of days from the time an import permit is applied for to the time the seed is cleared at the border. Seven of the companies interviewed imported seed in 2016. None of the seed companies exported seed in 2016.

Maize is the most common seed imported into Mozambique. The source countries for maize and cowpea imports are Zimbabwe and South Africa. The source countries for soya bean are Malawi, South Africa, and Zimbabwe.

Seed companies reported that, the length of the seed import process ranges from 7-30 days, with an average of 21 days. Seed companies are content with the import process, on average rating it as "good"(74%). Crop-specific figures range from "excellent" (81%) for maize and "good" for soya bean and cowpea (80% and 60%, respectively).

## SEED POLICY AND REGULATIONS

### Length of variety release process

The time it takes to release a variety refers to the time from application for release of a variety to the time the variety is released by the relevant authority. In Mozambique, crop variety release is the mandate of the National Seed Committee, which is under the National Seed Authority. Prior to release, the variety is evaluated for Distinctness, Uniformity and Stability (DUS) and Value for Cultivation and Use (VCU) by the Variety Registration and Release Subcommittee over two cycles.

Four of the 13 companies released a variety in 2016. On average, the process of variety release takes about 24 months, ranging from 12 to 36 months.

As mentioned above, in 2011, a Ministerial directive (Diploma Ministerial 51/2012) allowed for the provisional release of varieties before the DUS and VCU tests were conducted. This contributed to an increase in the number of varieties being released around this period.

Seed companies rate the variety release process as "fair" (53%). The per-crop figures are virtually identical to the average: maize (53%), rice (55%), cowpea (50%), and soya bean (53%). Several companies noted that the process is too long and bureaucratic, while others indicated that the national seed service did not provide timely responses to service requests. Further, survey respondents suggested that the protocols related to the variety release process should be decentralized and handled at level of the seed department as opposed to the highest level of the National Directorate (DINAS).

### Status of seed policy framework

At present, Mozambique has neither a seed policy, nor a seed law. The main policy instruments guiding the seed sector are the Strategic Plan of Development of the Agricultural Sector (PEDSA) through the Program for Strengthening of the Seed Chain (PFCS), and the Comprehensive Seed Regulation. PFCS is aligned to PEDSA, and is implemented under the Seed Division at DINAS. The overall aim of PFCS it to strengthen the entire seed value chain. The second document, the Comprehensive Seed Regulation (Decree 12/2013), was updated in 2013 and harmonized with the SADC seed regulation on variety release and registration, seed quality control and certification, and seed import/export requirements. The plant variety protection decree (Decree 26/2014) for plant breeders' rights is not yet operational due to a lack of implementation instruments, such as regulation, norms and procedures.

### Quality of seed regulations and enforcement

The seed companies surveyed have a favourable opinion of the quality and level of enforcement of the seed regulations in Mozambique, rating the regulations as "good" (69%) and the level of enforcement also as "good" (64%). Several respondents indicated that while the existing seed regulations were well developed, awareness about them and their implementation and enforcement remain poor.

### Adequacy of seed inspectors

There are 25 licensed seed inspectors in Mozambique, all under the NSA. Seed companies rate their satisfaction

with the adequacy of seed inspectors as fair (59%). Most seed companies interviewed complained about the inadequacy of the seed inspection services. Expressing a similar sentiment, the Seed Department also suggested that the ideal number of inspectors should be at least 33. Moreover, seed inspectors are constrained by limited access to financial resources and transportation to conduct field activities. To increase the efficiency of service provision, the NSA has proposed, under Decree 12/2013, the accreditation of private-sector seed inspection and analysis services. The proposal is awaiting parliamentary approval.

### Efforts to stamp out fake seed

Seed companies reported receiving a total of 11 cases of fake seeds. This is likely an under-estimate, as the government does not have a system in place to effectively monitor the problem and cases of fake seeds may also go unreported in the first place. Respondents surveyed agreed that fake seed is a growing problem in Mozambique. Seed companies rated the government's effort to stamp out fake seeds as "fair" (52%), indicating the need for improtvement. According to seed companies interviewed, the main sources of fake seed are seed companies (especially during the stage of seed packaging), and traders and farmers who buy grain and sell it as seed. The Association for Promotion of the Seed Sector (APROSE) plans to launch an awareness program on the radio to educate farmers on the concept of good quality/certified seed concept and ways to avoid buying fake seed.

### Use of smart subsidies

The government seed subsidy program started in 1988. Initially, the main objective of the program was to respond to emergency food situations such as war, displacement, floods, and droughts. The current version of the subsidy program focuses only on areas affected by emergency situations. It is currently in the pilot phase, covering four provinces - Manica, Sofala, Zambezia, and Nampula. It is being implemented by the Food and Agriculture Organization of the United Nations (FAO) with funding from the European Union.

In 2016, the government subsidized about 720 tons of maize seed (16% of total maize seed sales), 120 tons of cowpea (33% of total seed sales), and three tons of rice seed (less than 1% of total rice seed sales). These percentages are consistent with seed companies' records. On average, the companies sold 29% of maize seed and 37% of cowpea seed to the government under the subsidy program in 2016.

The total value of the government subsidy program in 2016 was about USD 880,000. The subsidy programs target mostly smallholder farmers; however, other groups of farmers (emerging farmers) are also included to promote the use of improved seed and food production. The program subsidizes 70% and 50% of retail price for smallholders and emerging farmers, respectively. Most of the subsidized seed is sold to farmers using vouchers through private institutions, including agro-dealers and seed companies. The government occasionally sells some of the seed through NGOs.

## INSTITUTIONAL SUPPORT

### Availability of extension services

In total, Mozambique has 3,035 agricultural extension agents. Forty-nine percent are public agents, employed by MASA, and the remaining 51% work in the private sector (including seed companies and businesses engaged in contract farming for cash crops) and NGOs. Private seed companies active in producing seed for the four crops employ 49 extension agents. Most of public agricultural extension agents (83%) are male.

Given the 3.17 million agricultural households across the country, the ratio of extension agents-to-farming households is approximately 1:1,045. Compared to other countries covered by TASAI, this ratio is very high especially given that much of Mozambique is sparsely populated. Not surprisingly, the seed companies interviewed see room for improvement in the agricultural extension section, rating the availability of extension workers as "fair" (56%).

### Quality of national seed trade association

In 2014, the National Directorate of Agriculture and Forestry (DINAS) and strategic development partners established The National Platform for Seed Sector Dialogue (PNDS) with the objective of bringing together all the seed actors in a coordinated effort to foster dialogue. In 2015, PNDS was re-structured into the Association for Promotion of the Seed Sector (APROSE), a multi-sectorial initiative involving the seed value chain actors and development partners to facilitate the development of the seed

industry in Mozambique. APROSE is a relatively young association, facing challenges such as lack of funds to facilitate activities, lack of office space, and no full-time staff members.

Only six of the 13 seed companies surveyed are members of APROSE. Figure 4 illustrates the seed companies' satisfaction with APROSE's performance in six service areas. APROSE's overall rating by seed companies is "fair" (59%). The highest rating was given to democracy and governance (77%), while the lowest rated was the association's ability to mobilize resources (51%). APROSE's members rate the association as "fair" in all the other areas - providing value for members (54%), managerial ability (53%), effectiveness in advocacy (52%), and activity on important seed sector issues (55%).

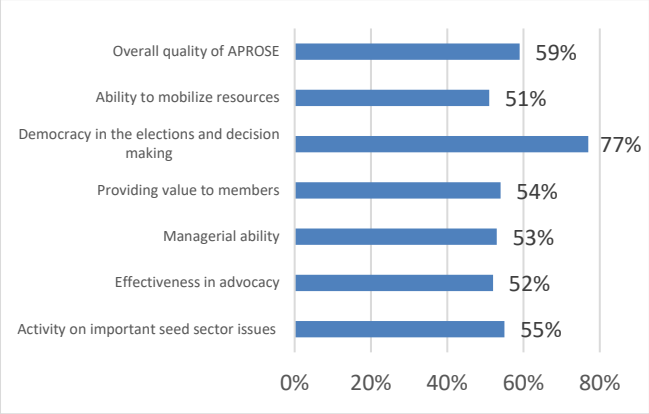


*Figure 3: Members' satisfaction with APROSE.*

## SERVICE TO SMALLHOLDER FARMERS

### Concentration of rural agro-dealer network

According to article 41 of the Comprehensive Seed Regulation (Decree 12/2013), MASA is required to register agro-dealers annually. In practice, this requirement is not yet implemented, and MASA does not maintain an up-to-date registry of agro-dealers. The available data indicates that the country has only 211 agro-dealers in Mozambique. This number is very low, and translates to a ratio of one agro-dealer for every 15,000 farming households.

Based on information obtained from seed companies, most of the agro-dealers are located in the central region, followed by the northern and southern regions. Very few agro-dealers are located in the Niassa province, where only one seed company is located. Seed companies noted that they do not have a strong relationship with the agro-dealers, and rated their satisfaction with the agro-dealer network as "fair" (57%). NCBA CLUSA is the only notable NGO that has worked on strengthening the capacity of agro-dealers in the country.

### Availability of seed in small packages

In total, 64% of the seed sold by the companies was sold in packages of 2 kg or less. Per-crop figures are 66% for maize, 60% for rice, and 88% for cowpea. In contrast, only 21% of soya bean seed was sold in small packages; most soya bean seed was sold in package sizes between 2-10 kg. This is not surprising because most soya bean growers are well-established smallholder or commercial farmers. On average, seed companies rate their satisfaction with the volumes of seed sold in small packages as "excellent" for maize (83%) and cowpea (83%), and "good" for rice (60%) and soya bean (66%).

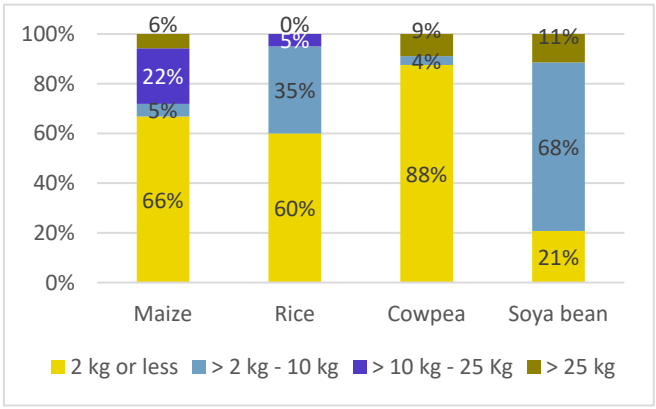


*Figure 4. Percentage of seed sold in different package sizes*

### 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 at the time of planting is highest for hybrid maize (4.79) and for OPV maize (3.83). For rice, cowpea, and soya bean, the seed-to-grain price ratio was 3.33, 1.50, and 1.55, respectively. These price ratios are comparable to corresponding statistics from other countries with emerging and early growth seed sectors: examples for maize hybrid include Tanzania (5.2:1) and Malawi (4.2:1), and Madagascar (2.3:1) for rice.

## CONCLUSIONS

With an estimated seed utilization rate of less than 10% for most key food crops, Mozambique's seed sector is the emergent to early growth stage of industry development. The TASAI study has highlighted several positive aspects of

the seed industry in Mozambique that can serve as a platform for sustained growth. Unlike most countries in the region, maize is not overly dominant in Mozambique's public breeding programs. The distribution of breeders and varieties released for the four crops is well balanced. This is a good foundation for further variety development in the different crop sub-sectors. However, this effort needs to be strengthened by greater public and private investment in the supply of foundation seed for all crops. Breeding programs should be responsive to climate change, with emphasis on developing more drought- and flood-tolerant varieties to prepare for extreme weather events likely in the country. Further, private companies should promote the attributes of newly-released varieties more aggressively to increase their uptake by farmers.

By simply looking at the number of registered seed companies, there is evidence of growth in the seed industry. However, many of these registered companies are currently inactive, signifying a need to build management capacity and provide better access to finance.

Mozambique is currently implementing favourable trading arrangements under SADC and COMESA. This is evidenced by seed companies' testimonies of the time and process for seed imports. This favourable regime could be exploited to enable seed companies to access breeder seed (for research and variety development) and certified seed (for sale to farmers) from neighbouring countries that have more developed seed sectors such as South Africa, Tanzania, Zambia and Zimbabwe.

APROSE, the newly-formed seed sector platform, has received the endorsement of key private and public-sector players in the seed industry in Mozambique. This endorsement is a good foundation on which the platform can build its profile and credibility. APROSE would need to demonstrate its pro-activeness in all seed sector matters, and at the same time provide valuable relevant services to its members. One of APROSE's urgent tasks could be to encourage coherence among the various development partners and NGOs involved in seed sector development. If well-coordinated, these efforts could effectively support capacity building of seed companies and provide a conjoint between industry advocacy and public policy.

For Mozambique's seed sector to sustain its current growth trajectory, the NSA needs to improve the current seed inspection services by fast-tracking the training and accreditation of private seed inspectors. This should reduce the length of the variety release process, improve the quality of seed certification and inspection, and reduce the incidence of fake seed. NSA's plans to establish a legal department in DNSA would complement the enforcement efforts of the seed inspection services.

The weak extension systems and ineffective agro-dealer network also contribute to the low adoption rates of improved varieties. The country needs both private and public-sector investment in extension to ensure that farmers receive adequate and up-to-date information on improved varieties and other productivity enhancing innovations. This needs to be complemented by strengthening the agro-dealer networks across the country through training, annual registration by MASA, and greater coordination with other agro-input companies.

To address the challenges in the seed sector, strategic interventions are needed at various critical stages, including: investment in research and breeding; improving seed companies' access to foundation seed; improving the performance of the National Variety Release and Registration Committee to reduce the length of time it takes to register a variety; and addressing the problem of fake seed, among other issues.

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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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