



TASAI
THE AFRICAN SEED ACCESS INDEX



Tanzania 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 Tanzania. 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.

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 Tanzania’s seed sector. With a focus on four grain and legume crops important to food and nutritional security — maize, bean, soya bean, and pigeon pea — the study evaluates the enabling environment necessary to build a vibrant formal seed sector. The production of these four crops covers about 41% of the country’s arable land (FAOSTAT, 2017), a large part of which consists of maize and bean. Furthermore, pigeon pea is an important export crop for Tanzania: the country is the leading African exporter of pigeon pea to India (International Trade Centre, 2016).

The TASAI 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 Tanzania to 12 other countries where TASAI has conducted similar studies.

Overview

Like most other African countries, the seed industry in Tanzania consists of two systems: the informal sector and

Table 1: Role of key players in Tanzania’s formal seed sector

ROLE	KEY PLAYERS
Research and breeding	ARIs, ASA, MNCs, local companies, universities
Variety release and regulation	TOSCI, MoA (formerly MoAFSC and MoALF)
Seed production and processing	Seed companies, ASA, MNCs
Education, training, and extension	Seed companies, universities, TASTA, TANADA, ASA, TOSCI, NGOs, MoA, LGAs
Distribution and sales	Seed companies, agro-dealers

the formal sector. This policy brief focuses almost exclusively on the formal seed sector.

The informal sector broadly refers to the system in which farmers produce, obtain, maintain, and distribute seed resources from one growing season to the next (FAO, 1998). Due to factors such as limited knowledge, a lack of a wide variety of seeds, limited resources to purchase seed, and poor access to agro-dealers, most smallholder farmers in Tanzania still rely on the informal system, especially for legumes. This is clear from a recent national panel survey, which shows that only 44% of households use improved seed (Tanzania National Bureau of Statistics, 2017). 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 local social structures. The locally grounded nature of transactions, coupled with the lack of a clear distinction between seed and grain, means that there is scant performance data available on the informal seed sector.

The formal sector focuses on breeding and evaluating improved varieties and producing and selling seed of these varieties certified by the Tanzania Official Seed Certification Institute (TOSCI), the government institute under the Ministry of Agriculture (MoA) responsible for regulating seed in Tanzania. As shown in Table 1, Tanzania’s formal seed sector comprises other government institutions (including three agricultural research institutes and the Agricultural Seed Agency), the private sector (seed companies and agro-dealers), and development agencies. Established in 2002, the Tanzania Seed Trade Association (TASTA) brings together all the seed companies in the country and plays a key role in representing their interests at the policy level.

Key acronyms: ARI – Agricultural Research Institute; ASA – Agricultural Seed Agency; CIMMYT – International Maize and Wheat Improvement Centre; HHI – Herfindahl-Hirschman Index; LGAs – Local Government Authorities; MoA – Ministry of Agriculture; MoAFSC – Ministry of Agriculture, Food Security and Cooperatives; MoALF – Ministry of Agriculture, Livestock and Fisheries; NPT-TC – National Performance Trial Technical Committee; SUA – Sokoine University of Agriculture; TANADA – Tanzania National Agro-Dealer Association; TASTA – Tanzania Seed Trade Association; TOSCI – Tanzania Official Seed Certification Institute; Tsh – Tanzania Shilling; URT – United Republic of Tanzania



RESEARCH AND DEVELOPMENT

Number of active breeders

There are currently 46 active breeders in Tanzania for the four priority crops (maize, bean, soya bean, and pigeon pea). Of these, 40 breeders are based at the five public Agricultural Research Institutes (ARI): ARI-Chiloma, ARI-Ilonga, ARI-Selian, ARI-Tumbi, and ARI-Uyole, and one bean breeder is based at the public Sokoine University of Agriculture (SUA). The remaining five breeders work for three local private companies. An additional four private companies are multinationals with breeders based outside Tanzania. Of these 46 breeders, 28 produce maize, 7 produce bean, 7 produce soya bean, and 4 produce pigeon pea.

On average, seed companies rate their satisfaction with the number of active breeders as “fair” (57%).¹ The highest level of satisfaction was reported for maize (63%), while the lowest level was registered for pigeon pea (37%). Seed companies rated their satisfaction with breeders for both bean and soya bean as “fair” (54% for each). The “poor” and “fair” ratings of the availability of breeders for bean, soya bean, and pigeon pea signal the need to increase the number of breeders for these crops to meet industry needs.

Varieties released in the last three years

According to the National Variety Catalogue, between 2014 and 2016, 50 new varieties were released for the four crops: 44 new maize varieties, 2 bean varieties and 4 pigeon pea varieties. These new varieties were released by 10 private companies and 3 government research institutions. No soya bean varieties were released during this period (although two varieties were released in 2013). Figure 1 shows the three-year moving average of the number of varieties released since 2002.

Maize is clearly the most prominent crop in Tanzania. Since 2000, 124 varieties of maize have been released, compared to 15 for bean, 4 for soya bean, and 7 for pigeon pea. The numbers of varieties released are also positively correlated with the number of breeders.

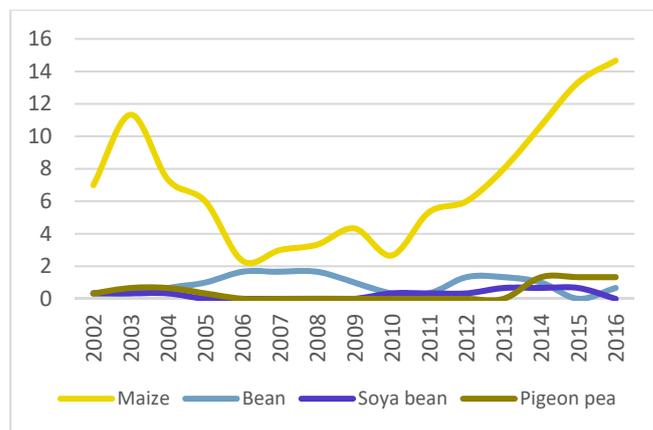


Figure 1: Number of varieties released in Tanzania (three-year moving average)

Availability of foundation seed

Seed companies obtain foundation seed from both public and private sources. The Agricultural Seed Agency (ASA) is a semi-autonomous agency mandated to produce and market foundation and certified seed. In theory, the ARIs should supply breeder seed to ASA, which then produces foundation seed to supply to seed companies. However, seed companies have reported that they source foundation seed from both the ARIs and ASA.

The main public sources of maize foundation seed for the seed companies are ARI-Uyole, the International Maize and Wheat Improvement Center (CIMMYT), and ASA. Three local seed companies maintain their own foundation seed for maize, while all the multinational companies source foundation seed from their breeding programs located outside Tanzania. Bean foundation seed is sourced from public entities (ASA, ARI-Uyole, and SUA). Foundation seed for soya bean and pigeon pea is sourced from ARI-Uyole and ARI-Ilonga, respectively.

On average, seed companies rate their satisfaction with the availability of foundation seed as “good” (67%). However, there is significant variation in these ratings across different types of companies. Parastatals and multinationals rated the availability of foundation seed as “excellent” (85% and 80%, respectively), which is significantly higher than the “good” rating (61%) reported by local private companies. The difference is due to the fact that multinationals and parastatals maintain their own foundation seed, while local private companies tend to rely on other entities for foundation seed.

¹ All scores are based on industry self-reporting of satisfaction on the following scale: 0-19.99% (extremely poor), 20-39.99% (poor), 40-59.99% (fair), 60-79.99% (good), and 80-100% (excellent).



Breaking down the figures by type of seed, companies are most satisfied with the availability of maize foundation seed (72%), and least satisfied with the availability of foundation seed for pigeon pea (45%). Satisfaction ratings for the availability of foundation seed for bean and soya bean are 61% and 65%, respectively.

Despite the relatively high satisfaction rates, several seed companies expressed concern about the limited supply of foundation seed. This concern is also reflected in a study on early generation seed² (AGRA, 2016), in which limited infrastructure and institutional capacity available to public breeders were identified as key bottlenecks constraining the supply of early generation seed in Tanzania. The study highlighted the low private sector engagement in early generation seed production (including foundation seed), especially for crops like bean and OPV maize, which, combined with a lack of capacity among public breeders, sets limits on the production of early generation seed.

Average age of varieties sold

The average age of the 44 maize varieties on the market in 2016 was 10 years. The youngest of these varieties were released in 2016, while the oldest variety was 48 years old. Of the 44 varieties, 18 (41%) were released between 2011 and 2016 (5 years or younger), while 17 (39%) were older than 10 years. Seed companies sold eight bean varieties in 2016. The average age of these varieties was 18 years, with a range of 8-39 years. Four soya bean varieties were sold by two companies in 2016. Of these, only two are listed in the National Variety Catalogue. The average age of these two varieties is 10 years. The only pigeon pea variety on the market in 2016 was 14 years old.

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. Six of the 44 maize varieties released between 2014 and 2016 have climate-smart characteristics (all early-maturing). A further 11 of the 15 maize varieties released in 2012 and 2013 are drought-tolerant.

None of the bean varieties and two of the four pigeon pea varieties released between 2014 and 2016 have climate-

smart characteristics. The pigeon pea varieties are early-maturing. No soya bean varieties were released during the same period.

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2016, the present study found that there were 104 seed companies or merchants registered by the MoA. Of these, 63 were seed companies, though only 40 of these were active. Of the 40 companies, 30 were producing/marketing seed for at least one of the four focus crops in 2016. All but one of these seed companies produced maize, six produced bean, two produced soya bean, and only one company produced pigeon pea. This data is consistent with the SeedCLIR report (USAID, 2013), which listed 27 active seed companies in 2013. Another recent study reports 23 active seed companies for the four crops (Agri Experience, 2016).

Market share of top seed companies

Market share is calculated using seed sales reported by seed companies. By crop, the market shares for the top four companies are 76% for maize, 94% for bean, 100% for soya bean, and 100% for pigeon pea. This data shows that a few companies dominate the market for bean, soya bean, and pigeon pea (fig. 2), with less than four companies producing soya bean and pigeon pea seed. The maize seed market is more competitive.

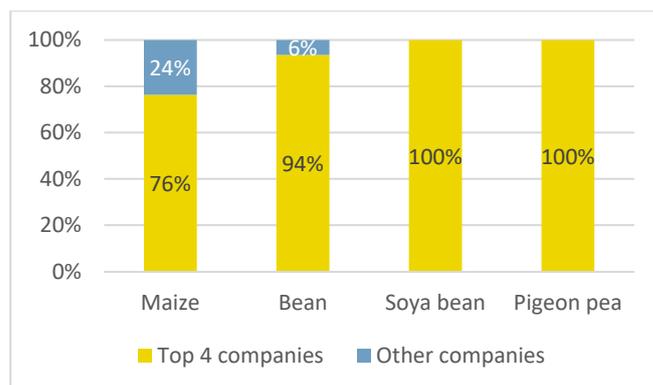


Figure 2: Total market share (%) of top four companies

The Herfindahl-Hirschman Index (HHI) was also used to quantify industry competitiveness. The index, a sum of squared market shares, ranges from near zero for perfect competition, to 10,000 for a pure monopoly.³ The HHI

² Early generation seed refers to both breeders and foundation seed put together.

³ The scale for HHI scores ranges from extremely low to extremely high levels of market concentration: <1,000 (extremely low), 1,000-1,999 (low),



was calculated for all seed companies, for each crop. Market concentration is low for maize (1,973) and average for bean (2,589). The market concentration for soya bean is extremely high (5,102), as there are very few players in the market. The HHI was not calculated for pigeon pea, since it was produced by only one company, which therefore enjoyed a monopoly status. In addition, only seven companies make up the top four seed producers for the four crops, indicating limited crop specialization.

Market share of government parastatal

The government seed parastatal, ASA, was created as an agency of the MoA in 2006 to produce, market, and distribute seed. ASA produces three of the four focus crops - maize, bean and soya bean - though its market share for two out of three crops is low. ASA seed accounts for 0.5% of the maize seed market, 3.9% of the bean seed market, and about 43% of the soya bean seed market. The high soya bean market share is due to the fact that the government parastatal is one of only two companies producing the crop.

Length of import/export process for seed

The length of the seed import process is calculated as the number of days from the time an import permit is requested to the time the seed is cleared at the border. In 2016, five companies imported maize seed and one company imported soya bean seed into Tanzania. Imports came from Kenya, Zambia, and Zimbabwe. Importing seed companies report that, on average, it takes 12 days to import seed into the country, and that most of the delays occur at the border where the shipment is cleared. Companies rate the import process as “fair” (63%). Some of the delays are caused by working with hand-written paperwork; seed companies suggest that switching to an electronic system would increase efficiency. The need to streamline the seed import process is also highlighted in the 2017 report “A Legal Guide to Strengthen Tanzania’s Seed and Input Markets” (SAGCOT, 2017).

No certified seed of the four focus crops was exported from Tanzania in 2016. However, the few companies that have exported seed in the past rate their level of satisfaction with the export process as “fair” (43%). While import permits can be issued at all ports of entry, export permits may only be issued in Dar es Salaam.

2,000-2,999 (average), 3,000-3,999 (high), >4,000 (extremely high, i.e., monopoly or near monopoly).

Length of variety release process

The length of the variety release process is calculated as the duration of time from the submission of an application for variety release to the release of the variety by TOSCI, the relevant authority in Tanzania. The National Performance Trial Technical Committee (NPT-TC) evaluates the test results and reports its findings to the National Variety Release Committee, which reviews the report and makes recommendations for release to the National Seeds Committee. TOSCI estimates that approximately 50% of all applications are rejected by the National Variety Release Committee.

According to the National Variety Catalogue, between 2014 and 2016, 10 seed companies and three public agricultural research institutes released varieties for the four focus crops. Seed companies report that the average release time was 33 months for maize, 28 months for bean, 42 months for soya bean, and 36 months for pigeon pea. According to the 2007 Tanzania Seed Regulations (MoAFSC, 2007) the mandated testing period is three seasons⁴, which usually ranges from 24 to 36 months. On average, seed companies rate their satisfaction with the variety release process as “good” (70%).

Status of seed policy framework

Tanzania does not have a stand-alone national seed policy. The National Agriculture Policy (2013) provides general policy guidance for agricultural input development in the country. Tanzania’s seed law (Seeds Act (No. 18)) was enacted in 2003. This was followed by seed regulations in the same year. In 2014, parliament passed an Amendment of the Seeds Act (CAP. 308), which focused on strengthening the mandate of TOSCI to include oversight of the Quality Declared Seed sub-sector and convening a seed sector forum. Since 2014, industry stakeholders have been in discussions with the government to update the existing regulations to fall in line with the 2014 Seeds Act (CAP. 308). The latest seed regulations were passed in January 2017. The Plant Breeders’ Rights Act (2002) provides the legal framework for plant variety protection. The most recent amendment to the Plant Breeders’ Rights Act was passed in 2012.

⁴ Two seasons of DUS and one season of NPT.



Quality of seed regulations and enforcement

The Seeds Act (No. 18) is enforced through Tanzania's seed regulations. Seed companies are satisfied with both the quality of the seed law and the level of enforcement of the seed regulations, rating both as "good" (70%). Despite this high rating, seed companies noted several challenges related to regulation and enforcement. TOSCI does not have adequate capacity to conduct seed inspections, seed testing, and labelling. This results in a long and bureaucratic regulatory process, which seed companies suggest should be streamlined. This issue was also reported in the report "A Legal Guide to Strengthen Tanzania's Seed and Input Markets" (SAGCOT, 2017).

Adequacy of seed inspectors

TOSCI has 48 (public) seed inspectors; there are no private inspectors in Tanzania. On average, seed companies rate their satisfaction with seed services as "fair" (59%). The main challenge facing inspection services is their lack of resources (e.g. vehicles) to facilitate the inspectors' work across the country. To address this challenge, with the support of USAID-Tanzania, the MoA Seed Unit has licensed roughly 100 para-seed inspectors, who will undertake several tasks originally conducted by the seed inspectors.

In addition, TOSCI has increased staff numbers in some regional offices (e.g. Mtwara and Mwanza). While having more inspectors has been helpful, the shortage of vehicles continues to impede inspections at both agro-dealers' shops and field inspections. Seed companies have expressed dissatisfaction with the long wait times for seed test results, approvals, and seed labels. These delays affect all classes of seed.

Efforts to stamp out fake seed

Seed companies indicated that a total of 18 cases involving the sale of fake seed were reported to TOSCI in 2016. This figure is likely to be an underestimate, as most cases of fake seed are not officially reported. On average, seed companies rate their satisfaction with the government's efforts to stamp out fake seed as "fair" (57%), citing the slow handling of fake seed cases by government authorities. According to companies interviewed, the main sources of fake seed are agro-dealers, some of whom distribute and sell fake seed.

TOSCI has tried to address the problem of fake seed by placing serialized labels on seed packages weighing 2 kg or more. The label includes traceable information on crop type, variety, lot number, % purity, % germination, and test date. While the idea of tracing the seed on the market is good, several respondents noted that the stickers could be easily forged. In addition, the country does not have a central hotline for reporting cases of fake seed. On the other hand, a positive new development is the implementation of higher fines for those convicted of selling fake seed, who can now receive a maximum fine of 100 million Tanzanian shillings (approximately US \$44,700). The high penalty is expected to serve as a deterrent to faking seed. Finally, seed trade associations and other stakeholders are also becoming more involved in raising farmers' awareness of fake seed.

Use of smart subsidies

Tanzania's smart subsidy program, the National Agricultural Input Voucher Scheme, was launched in 2005. Currently, the program focuses exclusively on maize seed. During the 2015/16 cropping season, the scheme reached 378,900 farmers, down from 740,000 farmers reached in 2008/09. In 2016, the scheme purchased 3,858 tons of maize OPV and hybrid seed from companies to be distributed through agro-dealers, at a cost of approximately US \$33 million. On average, seed companies sold 46% of their maize seed through this subsidy program.

While the subsidy program is credited with increasing the adoption of improved seed by resource-poor farmers, it is not without its challenges. The farmer selection process is not transparent, and the scheme targets the poorest farmers, who are also the least able to take full advantage of improved seed. Furthermore, there are frequent delays in government reimbursements, sometimes lasting more than a year, which have resulted in cash-flow problems for seed companies.

INSTITUTIONAL SUPPORT

Availability of extension services

There are approximately 7,030 agricultural extension workers in Tanzania. A vast majority of these extension workers (99%) are employed by the government; the remaining 105 (1%) work for seed companies. The number of extension workers translates to a ratio of one extension officer for every 831 farming households, though this



varies widely by district. The “Study to establish return to investment in agricultural extension services in Tanzania” (2013) estimated an extension officer to farming household ratio of 1:630. Both estimates are similar to ratios in other East African countries, notably Ethiopia (1:592) and Kenya (1:910). Seed companies rate their satisfaction with the extension services as “fair” (56%).

There is a need for greater investment in the quantity and quality of Tanzania’s extension services, as this would promote the adoption of improved seed and good farming methods. The current MoA target is to have one extension officer in every village. Meanwhile, some NGOs have liaised with district councils to train selected farmers as quasi-extension agents known as Village Based Agriculture Advisors.

Quality of national seed trade association

TASTA is the umbrella association for all seed companies in Tanzania. It was formed in 2002 and had 28 members in 2016. TASTA is a member of the National Seeds Committee and works closely with the MoA on variety release and seed policy issues.

TASTA is active in coordinating seed companies’ engagement in policy-related discussions with the government, and seed companies rate their satisfaction with the overall quality of the organization as “good” (71%). Figure 3 illustrates the ratings of the association’s performance in six service areas. TASTA is rated “good” in all six areas, receiving the highest rating for advocacy (75%) and the lowest rating for ability to mobilize resources (68%).

When members of TASTA were asked to suggest areas for improvement, most mentioned that the current fees may be too high for some seed companies. Others recommended that, given the large size of the country, TASTA should open regional offices to better serve its members. A few respondents suggested that the association could do more to raise awareness about fake seed.

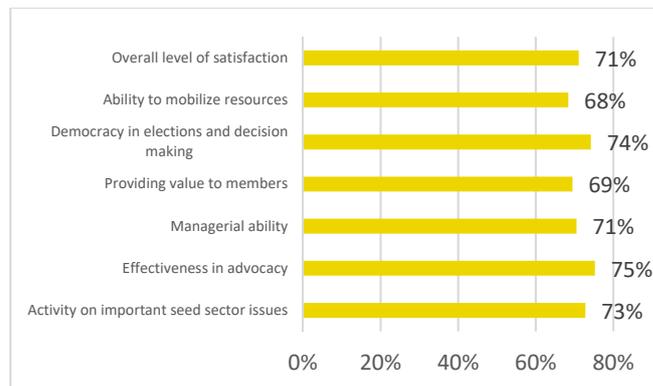


Figure 3: Members' satisfaction with TASTA

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

MoA has a list of roughly 4,000 agro-dealers, though only about 2,000 of these are active (USAID, 2013). This corresponds to the estimate of 1,500 agro-dealers cited in the Tanzania Seed Sector Report (ASARECA, 2014). Most seed companies reported working with at least 200 agro-dealers each, some of whom are hub agro-dealers or wholesalers with networks of smaller stockists. This translates to a ratio of one agro-dealer for approximately every 2,900 agricultural households in Tanzania. Most of the active agro-dealers were trained through a grant from the Alliance for a Green Revolution in Africa (AGRA). Seed companies rate their satisfaction with the agro-dealer network as “good” (66%).

Availability of seed in small packages

A total of 93% of the seed sold by seed companies in Tanzania was sold in small packages of 2 kg or less, though package sizes varied widely across crops (fig. 4). Almost all maize (93%) and bean (92%) seed is sold in small packages, while only a third of soya bean (34%) and pigeon pea (30%) seed is sold in small packages. The large package sizes for soya bean and pigeon pea could act as an impediment to variety adoption by smallholder farmers, who are more likely to experiment with small volumes.

Seed companies’ satisfaction with the availability of seed in small packages reflects the volumes sold in small packages. On average, seed companies rate their satisfaction with the volumes of seed sold in small packages as “excellent” (86%). Companies’ satisfaction by crop is “excellent” for maize (92%) and bean (81%). However, companies’ satisfaction is “poor” for soya bean (35%). No pigeon pea producers responded to this question.



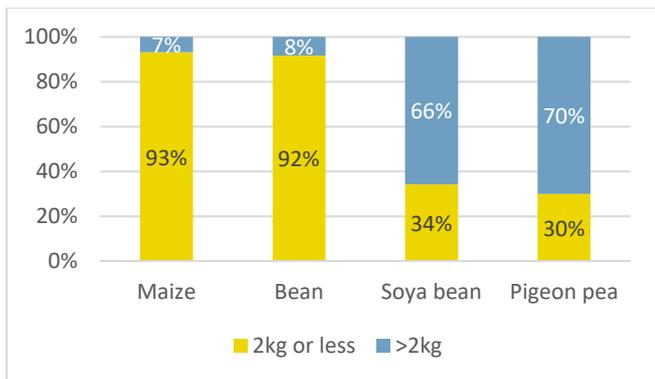


Figure 4. Percentage of seed sold in different package sizes

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 ratios for the four crops vary significantly. They are highest for hybrid maize (8.7:1), followed by maize OPV (5.2:1). Price ratios are significantly lower for bean (1.4:1), soya bean (2.0:1), and pigeon pea (2.0:1). The maize hybrid ratio is comparable to other African countries, such as Ethiopia (7.1:1) and Zimbabwe (9.3:1). Seed companies report highly fluctuating pigeon pea prices in Tanzania (from US\$ 0.41 in September 2015 to US\$ 1.45 in November 2015, to US\$0.40 in September 2016), which forces them to adjust their seed prices to match the market prices.

CONCLUSION

Tanzania's seed industry is in the growth stage. The low utilization rate of improved seed suggests room for improvement. The high number of active seed companies, most of which are local, signifies an active private sector, which is well-represented under TASTA.

There are several promising aspects to Tanzania's seed industry that suggest the potential for further development. The stakeholders in the industry are working closely with the government to further improve the seed regulations, which will provide a sound policy environment to facilitate industry growth. Furthermore, seed companies are satisfied with both the quality and enforcement of Tanzania's seed policy instruments. As an industry platform, TASTA is well-respected and appreciated by the seed companies. The private sector should fully exploit the association to advance its interests at various stages in the seed value chain.

At the level of research and development, there is a significant opportunity to invest in the variety development and

marketing of soya bean and pigeon pea seed, as only three companies currently produce seed for these two crops. Lastly, the relatively efficient process to import seed into Tanzania gives interested seed companies the option to test varieties already in use in other countries.

However, the sector still faces several notable challenges. There is a heavy emphasis on maize in terms of variety development, production, and marketing, which means there is an urgent need for public institutions and private companies to develop and release varieties for the other important food crops. In addition, most of the recently released varieties are not climate-smart. Breeders need to develop varieties that are drought-tolerant and early-maturing, to complement other popular traits. While companies are satisfied with the length of the variety release process, TOSCI should explore reducing the variety release time to 18 months using irrigation techniques. In addition, in relation to the subsidy program, the government should pay seed companies promptly. Delays are likely to affect business planning for the next season. Finally, seed companies are concerned about the problem of fake seed. One of the ways that this can be addressed is by fast-tracking the deployment of para-seed inspectors across the country.

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