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 timely availability of high quality seeds of improved, appropriate varieties at affordable prices for smallholder farmers in Tanzania. 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, beans, soya bean, and pigeon pea — the study evaluates the enabling environment for a vibrant formal seed sector. The production area of these four crops covers about 41% of the country's arable land (FAOSTAT, 2017), though this is almost all maize and beans. Further, pigeon pea is an important export crop for Tanzania, as the country is the leading African exporter of pigeon peas 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 similar studies were 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

Like most other African countries, the seed industry in Tanzania 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 factors such as limited knowledge, lack of a wide variety of seeds, limited resources to purchase seed, and poor access to agro-dealers, most small-holder 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 social structures. The colloquial nature of transactions, coupled with a lack of a clear distinction between seed and grain, means that there is scant performance data on the informal seed sector.

The formal sector focuses on breeding and evaluating improved varieties, and producing and selling seed of these varieties that are 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), 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.

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

ROLE	KEY PLAYERS
Research and breeding	ARIs (Uyole, Selian and Ilonga), 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

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

Tanzania currently has 46 active breeders for the four priority crops (maize, beans, 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. Four further private companies are multinationals with breeders based outside Tanzania. The number of breeders for each crop are as follows: 28 for maize, 7 for beans, 7 for soya bean, and 4 for pigeon pea.

On average, seed companies' satisfaction with the number of active breeders is fair (57%).[1] The highest level of satisfaction was reported for maize (63%), while the lowest level was registered for pigeon pea (37%). Both beans and soya bean were rated as fair (54% each). The poor and fair ratings of the adequacy of breeders for beans, soya bean, and pigeon pea signals the need to increase the number of breeders for these crops to fulfil industry needs.

Varieties released in the last three years

According to the national variety catalogue, during 2014-2016, 50 new varieties were released for the four crops, distributed as follow: maize – 44, beans – 2, pigeon pea – 4. The new varieties were released by 10 private companies and three government research institutions. No soya bean varieties were released during the 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 beans, 4 for soya bean, and 7 for pigeon pea. The numbers of varieties released are also positively correlated with the number of breeders.

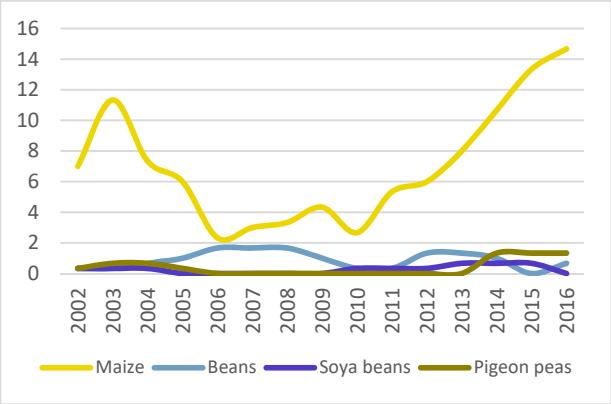

Figure 1: Number of varieties released in Tanzania (three-year moving average)

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. The intention is that the ARIs supply the breeder seed to ASA which then produces foundation seed, for 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 Centre (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. Foundation seed for beans is sourced from public entities (ASA, ARI-Uyole, and SUA). Foundation seed for soya bean and pigeon pea are 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 ratings by different types of companies. Parastatal and multinationals rated the availability 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 reported in this brief are based on industry self-reporting of satisfaction ranging from 0% for completely dissatisfied to 100% for completely satisfied.

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

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

Average age of varieties sold

The average age for 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 (five 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 being sold 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 (early maturing). A further 11 of the 15 maize varieties released in 2012 and 2013 are drought-tolerant.

None of the bean varieties and half (two) of pigeon pea varieties released between 2014 and 2016 have climate-smart characteristics. The pigeon pea varieties are early maturing. There were no soya bean releases during the study period.

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2016, there were 104 seed companies or merchants registered by MoA. Of these, 63 are seed companies, though only 40 are active. Of the 40 companies, 30 were producing/marketing seed of at least one of the four focus crops in 2016. Almost all (29) of the seed companies produced maize, six produced beans, two produced soya bean, and three produced pigeon pea. This data is consistent with the SeedCLIR report (USAID, 2013), which listed 27 active seed companies in 2013. Another recent study by Agri Experience (Mulemia Maina (Agri Experience), 2016) reports 23 active seed companies for the four crops.

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% (maize), 94% (bean), 100% (soya bean), and 100% (pigeon pea). Fewer than four companies produce soya bean and pigeon pea seed. This data shows that a few companies dominate the market for beans, soya bean, and pigeon pea (fig. 2). The maize seed market is more competitive.

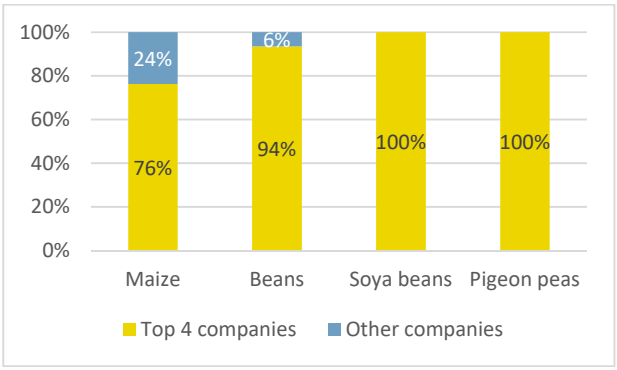

Figure 2: Total market share (%) of top four companies

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. HHI was calculated for all the seed companies, for each crop. The market concentration is good for maize (1,973) and fair for beans (2,589). The market concentration for soya beans is extremely poor (5,102) because there are very few players in the market. 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 MoA in 2006 to produce, market, and distribute seeds. Of the four focus crops, ASA produces maize, beans, and soya bean, though its market share in all three crops is low. ASA 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 time it takes to import seed is calculated as the number of days from the time an import permit is re-quested 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 physical 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 2015 report "A Legal Guide to Strengthen Tanzania's Seed and Input Markets" (New Markets Lab 2015).

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.

SEED POLICY AND REGULATIONS

Length of variety release process

The length of the variety release process is the duration of time from when the application for variety release is submitted to when the variety is released 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 Seed 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 beans, 42 months for soya bean, and 36 months for pigeon pea. According to the Tanzania Seed Regulations, 2007 (MoAFSC, 2007) the mandated release time is three seasons, which is usually equivalent 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 that year. In 2014, parliament passed an Amendment of the Seeds Act (CAP. 308), which focused on strengthening the mandate of TOSCI, expanding the coverage for Quality Declared Seed, 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 Seeds Act 2014 (CAP. 308). The latest seed regulations were passed in January 2017. The legal framework for plant variety protection is the Plant Breeders' Rights Act (2002). The most recent amendment to the Plant Breeders' Rights Act was passed in 2012.

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 them 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 is also reported in the New Markets Lab report (New Markets Lab, 2015).

Adequacy of seed inspectors

TOSCI has 48 (public) seed inspectors; Tanzania has no private inspectors. On average, seed companies rate their satisfaction with seed services as fair (59%). The main challenge with inspection services is the 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 about 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 sale of fake seed were reported to them 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 government's efforts to stamp out fake seed as fair (57%), citing the slow process of handling fake seed cases by the 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 the 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 highlighted the vulnerability that the stickers can 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 that those convicted of selling fake seed 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, which was a reduction from the 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 reported selling 46% of their maize seed through this subsidy program.

While the subsidy program is credited with increasing 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, 25% of whom are female. Most of the 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 there is wide variation by district. The "Study to establish return to investment in agricultural extension service 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). As a result, 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 adoption of improved seed and good farming methods. The current target by MoA 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 of improvement, most of them 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 of fake seed.

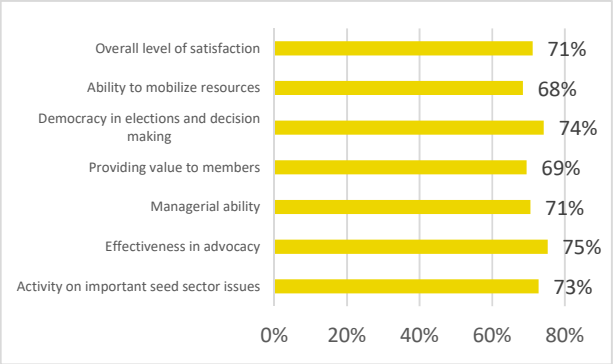

Figure 3: Members' satisfaction with TASTA

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

MoA has a list of about 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. 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 the companies 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 the seed for soya bean (34%) and pigeon pea (30%) is sold in small packages. The large package sizes for soya bean and pigeon pea could be an impediment for 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 is reflective of 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 beans (81%). However, companies' satisfaction is poor for soya bean (35%). No pigeon pea producers responded to this question.

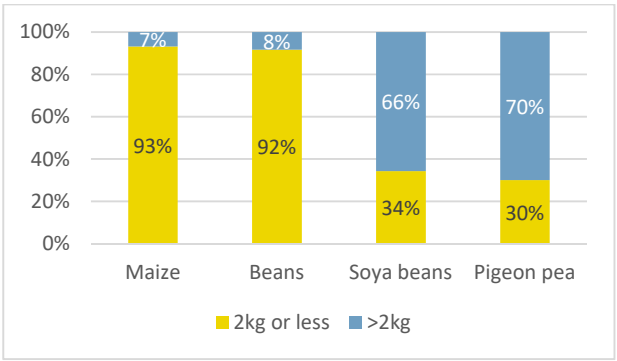

Figure 4. Percentage of seed sold in different package sizes

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. The highest ratios are for hybrid maize (8.7:1). The seed-to-grain price ratio for maize OPV is 5.2:1, for bean is 1.4:1, for soya bean 2.0:1, and for pigeon pea 2.0:1. The maize hybrid ratio is comparable with 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 Tsh 900 in September 2015 to Tsh 3,200 in November 2015, to Tsh 900 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.

Tanzania's seed industry has several promising opportunities. The stakeholders in the industry are working closely with the government to further improve the seed regulations. This will provide a sound policy environment to facilitate industry growth. Furthermore, seed companies are satisfied with both the quality and enforcement of the 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 their interests at various stages of the seed value chain.

At the research and development stage, 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 process to import seed into Tanzania is conducive for seed companies who are interested in testing varieties which are 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, resulting in 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 time taken for variety release, TOSCI should explore reducing the variety release time to 18 months by 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 use of para-seed inspectors across the country.

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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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