

Tanzania Country Report 2021

The African Seed Access Index

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TASAI
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LIST OF ACRONYMS:

ASA	Agricultural Seed Agency
EAC	East African Community
CGIAR	Consultative Group on International Agricultural Research
CIAT	International Center for Tropical Agriculture
CIMMYT	International Maize and Wheat Improvement Center
CRI	Crop Research Institute
DUS	Distinctness, Uniformity and Stability
ISTA	International Seed Testing Association
LGA	Local Government Authority
MoA	Ministry of Agriculture
NBS	National Bureau of Statistics
NPT	National Performance Trial
NVRC	National Variety Release Committee
NSC	National Seed Committee
QBS	QualiBasic Seed
QDS	Quality Declared Seed
TARI	Tanzania Agricultural Research Institute
TASTA	Tanzania Seed Trade Association
TOSCI	Tanzania Official Seed Certification Institute
TPHPA	Tanzania Plant Health and Pesticides Authority
SADC	Southern African Development Community
URT	United Republic of Tanzania



INTRODUCTION

The increased use of productivity-enhancing technologies, including mechanization, irrigation, fertilizer, and improved seed, is critical to improving food and nutritional security across Africa.¹ For field crops, a competitive formal seed sector is key to ensuring the timely availability of high-quality seed of improved, appropriate varieties at affordable prices for smallholder farmers. Improved seed can deliver state-of-the-art technology to farmers including higher yields, disease and pest resistance, climate change adaptation, reduced post-harvest losses, and improved nutrition. To facilitate the delivery of these benefits to farmers, The African Seed Access Index (TASAI) conducts seed industry assessments at the national level and uses the findings to encourage public policymakers and development agencies to create and maintain enabling environments that will accelerate the development of competitive formal seed systems serving smallholder farmers in Africa.

This report summarizes the key findings of the study conducted by TASAI in 2021 to appraise the structure and economic performance of Tanzania's formal seed sector. TASAI studies focus on the four grain and legume crops important to a country's food and nutritional security (the "four focus crops"). In Tanzania, these crops are maize, rice, bean, and sunflower, and account for 58% of all land harvested under cereals, pulses and oil crops. The crops are also important as cash crops (URT 2017). Maize and rice are the two main staples of the country: these crops cover the largest land area among all crops cultivated in Tanzania, reaching 4.9 million and 1.7 million ha (NBS 2021), respectively. Bean is the main source of protein in household diets. In recent years, sunflower has gained prominence as an industrial crop that offers a reliable source of raw material for edible oil processing factories. Tanzania is the 16th largest sunflower-producing country in the world and is, after South Africa, the most important producer of sunflower in Africa.² Accounting for 35% of all oil seed production in Tanzania, sunflower is the largest oil seed crop in Tanzania. Other oil seed crops have production shares between 13% and 25% (URT 2016). Sunflower has an enormous potential in Tanzania, as it grows well in all regions, even in areas with low rainfall. Due to its potential, sunflower has attracted a number of investors from the edible oil processing industry. Currently, there are over 21 medium- to large-scale sunflower oil-processing factories in Tanzania.

In the 2021 study, rice and sunflower replaced pigeon pea and soya bean, two of the four focus crops for TASAI's 2017 study of Tanzania.³ These two crops were considered high-potential crops at the time. However, during the inception workshop for the TASAI 2021 Tanzania study, participants

from both the public and private sector recommended that rice and sunflower should be among the focus crops. The new crop selection is also justified by the area harvested to these crops. According to FAOSTAT, the total area harvested to pigeon pea and soya bean was 107,000 ha in 2019. In contrast, the total area harvested to rice and sunflower in same year was 2,053,000 ha.

OVERVIEW OF TANZANIA'S FORMAL SEED INDUSTRY

Like most other African countries, Tanzania's seed industry consists of three systems: the informal, Quality Declared Seed (QDS) and formal sectors. This Country Report focuses almost exclusively on the formal seed sector.

The informal sector refers to a system in which seed is produced, maintained, and distributed through informal networks. These activities "tend to be decentralized and might revolve around local entrepreneurship, seed banking, community-based seed production, or seed villages" (McGuire and Sperling 2016). In many cases, farmers keep seed from the harvest and exchange it with neighbors, relatives, and through rural markets. Seed from this system is of variable varietal purity, physical and sanitary quality. The informal seed sector contributes most of the seed used by farmers in Tanzania: it is estimated that 76% of the total cultivated area is planted with seed from the informal system (NBS 2021). The inaccessibility and limited availability of seed of improved varieties, as well as farmers' lack of awareness of the value of quality seed, are the main reasons for the low use of seed from the formal seed sector.

The Quality Declared Seed (QDS) system is promoted by the government to offer an alternative to seed from the informal sector for those crops, areas and farming systems in which highly developed seed quality control activities are difficult to implement or make relatively little impact. The main distinction between the QDS system and the certified seed system is that in the former, only a portion of all fields are inspected each season. The local agricultural officer conducts the inspections. The main requirements for QDS are that it can only be multiplied from formally registered open-pollinated varieties (OPVs), and marketing is restricted to the ward in which it is produced. In addition, QDS production is decentralized to the specific locations where the seed will be sold. In Tanzania, QDS production has been supported by the government since 2003 and has benefited from the enactment of the QDS Regulations in 2020 (URT 2020a). The production of QDS in Tanzania has increased five-fold between 2015 and 2019 (Waithaka et al. 2021).

1 In this report, TASAI uses "improved seed" as the short form of "seed of improved varieties"

2 <https://www.nationmaster.com/nmx/ranking/sunflower-oil-production>, accessed 3 November 2021.

3 TASAI strives to maintain the four focus crops in all studies, so that data can be compared across years. However, in unusual circumstances justified replacements are considered at the recommendation of seed sector stakeholders.



The formal sector is a structured and regulated value chain for the production of improved seed varieties. This process involves many actors and institutions, and ranges from the breeding of varieties to the multiplication, processing, and distribution of certified seed. The different stages of improved seed production are regulated by governments based on approved policies, laws, regulations and standards. The sale of seed from this system takes place through limited distribution channels such as registered seed companies and agro-dealers. This system produces seed of the highest varietal purity as well as physical and phytosanitary quality. In Tanzania, it is estimated that 20% of the total cultivated area is planted with improved seed (NBS 2021). The formal sector involves several key players, each with specific roles and responsibilities. Table 1 lists the key players and their respective roles in the seed sector.

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

ROLE	KEY PLAYERS
Research and breeding	Tanzania Agricultural Research Institute (TARI), International Center for Tropical Agriculture (CIAT), International Maize and Wheat Improvement Center (CIMMYT)
Variety release and regulation	Tanzania Official Seed Certification Institute (TOSCI), seed companies, Ministry of Agriculture (MoA)
Seed production and processing	Seed companies, selected contract growers, TARI, Agricultural Seed Agency (ASA), TOSCI
Education, training, and extension	Local Government Authorities (LGAs), MoA, seed companies, TOSCI
Distribution and sales	Seed companies, agro-dealers, LGAs, ASA, TARI

METHODS

TASAI studies cover 22 indicators divided into five categories: **Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support,** and **Service to Smallholder Farmers** (Table 2). In most TASAI studies, the bulk of the performance data reported comes from the year before the year in which the study is conducted ("the study year") because that is when most recent data are available. Accordingly, the data reported in this Country Report pertain primarily to 2020; however, whenever 2021 data are available, they are included in the report.

Table 2: TASAI Indicators

	Crop-specific	Impact on seed access
A RESEARCH AND DEVELOPMENT		
A1 Adequacy of active breeders	Yes	+
A2 Number of varieties released	Yes	+
A3 Number of varieties with 'special' features	Yes	+
A4 Availability of basic seed	Yes	+
B INDUSTRY COMPETITIVENESS		
B1 Number of active seed companies/producers	Yes	+
B2 Quantity of seed produced and sold	Yes	+
B3 Number of varieties sold and dropped	Yes	+
B4 Average age of varieties sold	Yes	-
B5 Market concentration	Yes	-
B6 Market share of state-owned seed company	Yes	-
B7 Efficiency of seed import/export processes	Yes	+
C SEED POLICY AND REGULATIONS		
C1 Length and cost of variety release process	Yes	-
C2 Status and implementation of national seed policy framework	No	+/-
C3 Harmonization with regional regulations	No	+
C4 Adequacy of efforts to eradicate counterfeit seed	No	+
C5 Use of government subsidies	No	+/-
D INSTITUTIONAL SUPPORT		
D1 Performance of national seed association	No	+
D2 Adequacy of seed inspection services	No	+
E SERVICE TO SMALLHOLDER FARMERS		
E1 Availability of agricultural extension services for smallholder farmers	No	+
E2 Concentration of agro-dealer network	No	+
E3 Availability of seed in small packages	Yes	+
E4 Seed-to-grain price ratio at planting time	Yes	-

To assess the progress of Tanzania's formal seed sector, this Country Report draws comparisons between the 2017 TASAI Tanzania study (with performance data primarily from 2016). Note, however, that two of the focus crops changed between the two studies, as pigeon pea was replaced by sunflower and soya bean by rice. In addition, TASAI has conducted similar studies in 20 other African countries, with which this report draws cross-country comparisons.

Using TASAI survey tools, data collection focused on three key seed industry players: seed companies, plant breeders and representatives of government entities active in the country's seed sector. Of these, seed companies were the study's primary source of information. For several indicators, TASAI supplements quantitative data with self-reported average levels of industry satisfaction on a 0-100 scale, with the following brackets: 0-19.99% **extremely poor**, 20-39.99% **poor**, 40-59.99% **fair**, 60-79.99% **good**, and 80-100% **excellent**.

In 2020 the Tanzania Official Seed Certification Institute (TOSCI) registered 43 seed companies involved in the production and sale of seed for one or more of the four focus crops. Out of the 43 seed companies, 35 companies were interviewed. Of the remaining eight companies, five companies produced insignificant volumes of seed and were omitted from the study. The other three companies were unwilling to be interviewed for the study. Of these three companies, two had closed their businesses in 2021. Table 3 provides a breakdown of the interviewed seed companies by crop.

In addition to seed companies, the study also surveyed several other important seed sector actors and key informants as listed in Table 4.

Table 3: Breakdown of respondents by crop (2020)

Crop	Number of seed companies surveyed (TASAI data)	Number of registered seed producers (TOSCI data)
 Maize	28	31
 Rice	3	3
 Bean	8	8
 Sunflower	22	24
Total*	35	43

* The discrepancies between the totals by crop and the grand total are due to the fact that some seed companies produce seed for multiple crops.

Table 4: Other surveyed seed sector actors

Category of actors	Actors and description
National Agricultural Research Institutes	Tanzania Agricultural Research Institute (TARI) and three of its centers: Uyole, Ilonga, and the Kilombero Agricultural Training and Research Institute (KATRIN).
Other public institutions	Sokoine University of Agriculture (SUA); the Tanzania Commission for Science and Technology (COSTECH), which coordinates and promotes research and technology development activities in the country.
Regulator	Tanzania Official Seed Certification Institute (TOSCI)
Ministry of Agriculture	Division of Policy and Planning, which is in charge of policy planning, implementation, and monitoring of the agriculture sector; the Division of Crop Development, which is in charge of seed sector coordination and planning ; the newly established Tanzania Plant Health and Pesticides Authority (TPHPA), which is responsible for issuing import and export permits.
Private sector	Tanzania Seed Trade Association (TASTA), an association whose membership consists of seed companies; Mtandao wa Vikundi vya Wakulima Tanzania (MVIWATA), an organization representing farmers in Tanzania.

RESEARCH AND DEVELOPMENT

NUMBER OF ACTIVE BREEDERS

A functioning seed system needs vibrant public and private breeding programs to develop improved varieties that respond to farmer and consumer needs. The number of active breeders is indicative of the level of investment in research and development.⁴ In addition to tracking the number of breeders working on the four focus crops, this study also measures the level of satisfaction reported by seed companies with the public breeding programs. The latter often reflects the ability of active breeders in public institutions to produce new varieties.

In 2020, Tanzania had 36 active breeders for the four focus crops: 20 maize breeders, 10 rice breeders, 3 bean breeders and 3 sunflower breeders (Table 5). Of the 36 breeders, 29 were employed by the Tanzania Agricultural Research Institute (TARI); the remaining 7 were employed by private seed companies. TARI breeding programs are largely dependent on support from the centers of the Consultative Group on International Agricultural Research (CGIAR) for breeding technologies as well as germplasm. TARI breeders are involved in germplasm selection but can make adjustments by adding germplasm from the national programs. The breeders also collect data during the variety development process. Through engagement with CGIAR centers, TARI breeders can build their breeding capacities. In some cases, the public research institutes such as TARI receive finished or semi-finished varieties for final testing and release from the International Center for Tropical Agriculture (CIAT) and the International Maize and Wheat Improvement Center (CIMMYT). These arrangements help to

reduce the cost and time required for breeding and variety development. However, some breeders expressed concerns that this arrangement may not be sustainable, as it reduces the capacity of the local breeders to produce varieties and creates dependence on CGIAR centers. Moreover, the varieties developed through this arrangement may not be adapted to the requirements of Tanzanian farmers, as they were not developed specifically to address their needs. In 2020, of the seven breeders employed by private seed companies, six worked on maize and one worked on sunflower. The high number of private maize breeders reflects the importance of maize as a staple crop in Tanzania, as well as the fact that the hybrid maize seed business is more profitable than OPV maize seed business. Private breeders also work in close collaboration with CGIAR centers like CIMMYT for maize.

The number of maize and bean breeders has decreased from 35 in 2016 to 23 in 2020. The reduction is partly due to the fact that several breeders retired in the last five years.

Seed companies' satisfaction with the adequacy of active breeders was "good" for maize (61%), rice (65%) and bean (63%) and "fair" for sunflower (55%). According to the seed companies, the number of breeders is inadequate, and the research institutions are underfunded. Breeders are thus constrained by inadequate funds for breeding and variety maintenance. Furthermore, the overlap between breeders about to retire and newly hired breeders is often not long enough to leave sufficient time for training and mentoring; this results in a situation where early-career breeders are inexperienced and less productive. Consequently, although breeders note that the availability of land for seed production and the high demand for maize and sunflower seed provide opportunities in the seed sector, breeding remains constrained.

⁴ TASAI studies define an "active breeder" as a breeder who is currently engaged in breeding/maintaining a variety or a breeder who had either developed and released at least one variety or was developing a variety of the crop of interest at the time of the TASAI study.

Table 5: Number and adequacy of active breeders in Tanzania

Crop	Number of breeders in 2016	Number of active breeders in 2020			Satisfaction rating (out of 100%)
		Public	Private	Total	
 Maize	28	14	6	20	61%
 Rice	N/A	10	0	10	65%
 Bean	7	3	0	3	63%
 Sunflower	N/A	2	1	3	55%
Total⁵		29	7	36	61%

extremely poor
poor
fair
good
excellent

⁵ In some cases, the same breeder may work on multiple crops, so the total number of breeders may not equal the sum of breeders by crop.



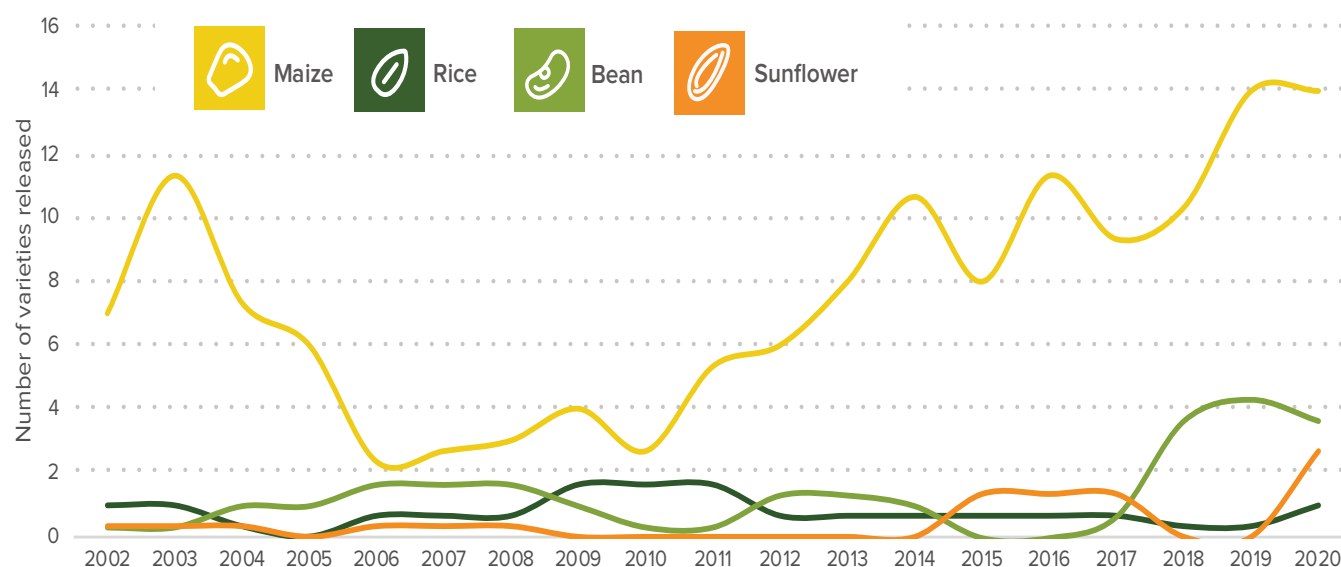
VARIETIES RELEASED IN THE LAST THREE YEARS

The number of varieties released is a good measure of outputs from the variety development and release system. The greater the number of varieties released in a country, the higher the chances of enhancing smallholders' access to improved seed. In addition to higher yields, new varieties often carry desired traits such as climate smartness, disease/pest resistance, and nutrition enhancements. However, the release of varieties needs to be supported by the commercial production and evaluation and bulking of early generation seed before the varieties can become more accessible to farmers.

Figure 1 shows the three-year moving average of the number of varieties released between 2000 and 2020. As a key staple crop, maize clearly dominates the variety release catalogue, averaging 7.5 variety releases per year with a very strong upward trend since 2010. The average number of

releases for the three other crops, bean, rice and sunflower, has been consistently low since 2000, with on average less than two varieties released per year for each crop. However, there was a slight increase in the number of bean and sunflower varieties released after 2017. A total of 64 varieties were released for the four crops between 2018 and 2020: 42 maize varieties, 3 rice varieties, 11 bean varieties and 8 sunflower varieties. Most of the varieties were maize, a consistent trend since 2000. Of the 64 varieties released, 45 varieties (35 maize varieties, 1 rice variety, 2 bean varieties and 7 sunflower varieties) came from the private sector, while the remaining 19 were produced by public institutions. This is noteworthy since most of the breeders (29 out of 36) work in the public sector. One of the contributing factors to the high number of varieties released by the private sector is that the multinational seed companies develop the varieties in other countries and then only conduct adaptive trials in Tanzania. Most of the maize varieties (29 out of 35) were released by multinational seed companies. The low number of varieties released by the public sector is partly a result of inadequate facilities and funds for variety development.

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



VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics, for instance climate-smart, fast-cooking and nutrition-enhanced, or industry-demanded features. While acknowledging the increase in biotic stresses (pests, weeds, and diseases) due to climate change, TASAI studies narrowly define “climate-smart features” as those that respond to extreme weather events, such as droughts, floods and frost, that affect current farming practices. Examples of climate-smart features are drought tolerance, early maturity, or extra-early maturity. As shown in Table 6, 23 of the 64 varieties released between 2018 and 2020 for the four focus crops have special traits. Climate-smart features are the most common special features, with 7 drought-tolerant varieties and 17 early maturing varieties. Two of the 11 bean varieties released are fast cooking. All eight sunflower varieties have a high oil content, responding to demand for this feature from edible oil processing companies.

Table 6: Number and percentage of varieties released that have special features

Feature	Description of feature	Number of varieties released 2018 - 2020				
		Maize	Rice	Bean	Sunflower	TOTAL
All varieties released		42	3	11	8	64
All varieties released with special features		13	2	2	8	23*
Climate-smart features	All climate-smart features	13	1	0	7	21
	Drought tolerant	5	0	0	2	7
	Early / extra-early maturing	9	1	0	7	17
Fast-cooking and nutrition-enhanced attributes	All fast-cooking and nutrition-enhanced attributes	0	0	2	0	2
	Fast-cooking	0	0	2	0	2
Industry-demanded features	All industry-demanded features	0	0	0	8	8
	High oil content	0	0	0	8	8

* The total number of varieties with special features is lower than the sum of varieties with each feature, because several varieties have multiple special features.

Source: TOSCI 2020





NUMBER OF VARIETIES SOLD IN 2020

An increase in the number of varieties sold in a country often results in an increased choice of varieties available to farmers. A total of 61 maize varieties, 3 rice, 14 bean and 8 sunflower varieties were sold in 2020 (Table 7). The most commonly sold maize varieties were UH 6303, Situka M1, UH 615, and Staha. The commonly sold rice varieties were TXD 306, which was sold by all three seed companies selling rice seed, and TXD 88. There were three commonly sold bean

varieties: Njano Uyole, Lyamungu 90 and Uyole 03. The most commonly sold sunflower variety, Record, was sold by 68% of the companies. The next most commonly sold sunflower varieties, Super Sun 66 and Super Sun 64, were only sold by 9% of the seed companies. Of all the commonly sold varieties, only Super Sun 66 and Super Sun 64 are private varieties. While varieties may become commonly sold due to their specific varietal traits, such as high yield and drought tolerance, they may also become commonly sold if they are public varieties which can be accessed by any company wishing to produce and market them.

Table 7: Name and age of commonly sold varieties (2020)

Crop	Number of varieties sold in 2020	Name of commonly sold variety	% of companies selling the variety	Age of variety (years) in 2020	Average age of commonly sold varieties
 Maize	61	UH 6303	39%	16	22.8 (11.0)
		Situka M1	32%	19	
		UH 615	18%	17	
		Staha	14%	37	
 Rice	3	TXD 306	100%	18	18.5 (35.7)
		TXD 88	67%	19	
 Bean	14	Njano Uyole	63%	12	19.7 (14.5)
		Lyamungu 90	50%	30	
		Uyole 03	50%	17	
 Sunflower	8	Record	68%	70	24.0 (12.0)
		Super Sun 66	9%	1	
		Super Sun 64	9%	1	

AVERAGE AGE OF VARIETIES SOLD

In vibrant seed systems, farmers regularly replace old varieties with new ones. In many African countries, old varieties persist, despite the fact that newer varieties often outperform older varieties as they are bred for traits that respond to the demands of farmers, consumers, and industry. A lower average age of varieties signals higher rates of variety turnover and innovation. TASAI tracks the average age of varieties by crop.⁶

In Tanzania, the age of the varieties sold in 2020 ranged from one year to 70 years old (Table 7). The average age of commonly sold maize varieties was 23 years, while it was 19 years for rice, 20 years for bean and 24 years for sunflower.

⁶ Note that these are simple averages. Ideally, the average ages should be weighted by volumes sold of each variety, but this information is not available.

Based on the average age of all varieties sold for the four focus crops, rice has the oldest varieties, which reflects the low number of varieties released. Farmers continue to use the old varieties that they know, partly because they like them. TXD 306, an 18-year-old rice variety, is sold by all rice seed companies because it is high-yielding and semi-aromatic. Record, a 70-year-old sunflower variety, is still widely accepted because it performs well in the different agro-ecological zones across the country, including areas with unfavorable growing conditions. Uyole Njano, a 12-year-old bean variety, is widely accepted due to its color, taste, and fast-cooking properties. Staha, a 37-year-old bean variety, is widely accepted because it is tolerant to streak virus disease. The commercialization of varieties is very costly, especially for small seed companies. This is because farmers get comfortable with the existing varieties and will not want to try new ones. In addition, a seed company would need to reach out to farmers across the country (which is very large) to conduct a meaningful marketing program.

Table 8: Source of basic seed by crop, number of transactions, and percentage of total transactions (2020)

Source of basic seed	Maize		Rice		Bean		Sunflower	
	No. of transactions	% of total	No. of transactions	% of total	No. of transactions	% of total	No. of transactions	% of total
TARI	10	25%	3	100%	7	78%	9	45%
ASA	9	23%			1	11%	7	35%
QBS	5	13%						
Own	16	40%			1	11%	2	10%
CRI							1	5%
Other seed companies							1	5%
Totals	40	100%	3	100%	9	100%	20	100%





SOURCES AND AVAILABILITY OF FOUNDATION (BASIC) SEED

Seed companies use basic seed to produce certified seed for sale to farmers. In many African countries, limited access to basic seed from public research institutions often limits the ability of seed companies to scale up production. In Tanzania, the process by which seed companies obtain basic seed from the public institutions is as follows: seed companies place an order before the planting season, specifying the variety name and quantity of seed requested. Although research institutes prefer the orders to be placed at the end of the previous season, orders are often not submitted on time. In such cases, research institutes estimate the demand for basic seed using the previous years' records. Once the seed has been produced, the research institutes invoice the seed companies, and, upon payment, companies either collect the seed from the institute or request it to be delivered to their premises.

Sources of basic seed: Table 8 shows the sources of basic seed by crop and the number of transactions in 2020. The transactions refer to the number of seed companies that sourced basic seed from a particular source. In general, seed companies obtain basic seed from more than one source. TARI is the main source of basic seed for public seed varieties, followed by the Agricultural Seed Agency (ASA) and seed companies' own sources. Together, TARI and ASA account for 48% of all maize transactions, all the rice

transactions, 89% of bean transactions and 80% of sunflower transactions. A total of 16 seed companies sourced basic for maize from their own sources, either within Tanzania or from other African countries. Another important private source of maize basic seed was QualiBasic Seed (QBS). QBS is a private seed company that specializes in the production and sale of hybrid maize varieties. Established in 2017, QBS is based in Kenya and has offices and facilities in Zambia and South Africa. One company sourced sunflower basic seed from the Crop Research Institute (CRI) in Italy.

Availability of basic seed by organization: Seed companies were asked to assess each source organization on three aspects related to the availability of basic seed: the quality of basic seed received, whether they received the quantity of basic seed that they requested, and the timeliness of delivery of the seed (Table 9). Seed companies rated the quality, quantity and timeliness of delivery of basis seed from TARI, the QBS and their own sources as either "good" or "excellent". Seed companies noted that basic seed from ASA source was of lower quality than seed from other sources. This reflects the fact that ASA has inadequate capacity to manage the production of early generation seed, which requires stringent attention to standards, such as the maintenance of adequate isolation distances and the removal of weeds.

Figure 2 compares seed company satisfaction with availability of basic seed in 2016 and 2020.⁷ Ratings of the availability of basic seed for maize, rice and bean in 2020 were "excellent", ranging between 82% and 86%, while the rating for sunflower basic seed was "good" (75%). Satisfaction ratings increased for maize and bean between 2016 and 2020.

⁷ There is no data for rice and sunflower, as these were not among the focus crops in 2016.

Table 9: Satisfaction rating of the quality, quantity, and timeliness of basic seed received by source organization (2020)⁸

Crops		TARI	ASA	QBS	Own	CRI	Other seed companies	Overall
 Maize (n=40)	Quality *	81%	69%	78%	92%	-	-	82%
	Quantity **	72%	77%	72%	89%	-	-	80%
	Timeliness ***	90%	73%	72%	88%	-	-	83%
 Rice (n=3)	Quality *	90%	-	-	-	-	-	90%
	Quantity **	83%	-	-	-	-	-	83%
	Timeliness ***	83%	-	-	-	-	-	83%
 Bean (n=8)	Quality *	89%	-	-	-	-	-	86%
	Quantity **	81%	-	-	-	-	-	82%
	Timeliness ***	87%	-	-	-	-	-	82%
 Sunflower (n=20)	Quality *	82%	67%	-	-	-	-	80%
	Quantity **	70%	61%	-	-	-	-	71%
	Timeliness ***	79%	71%	-	-	-	-	73%

*Quality of basic seed (opinion)

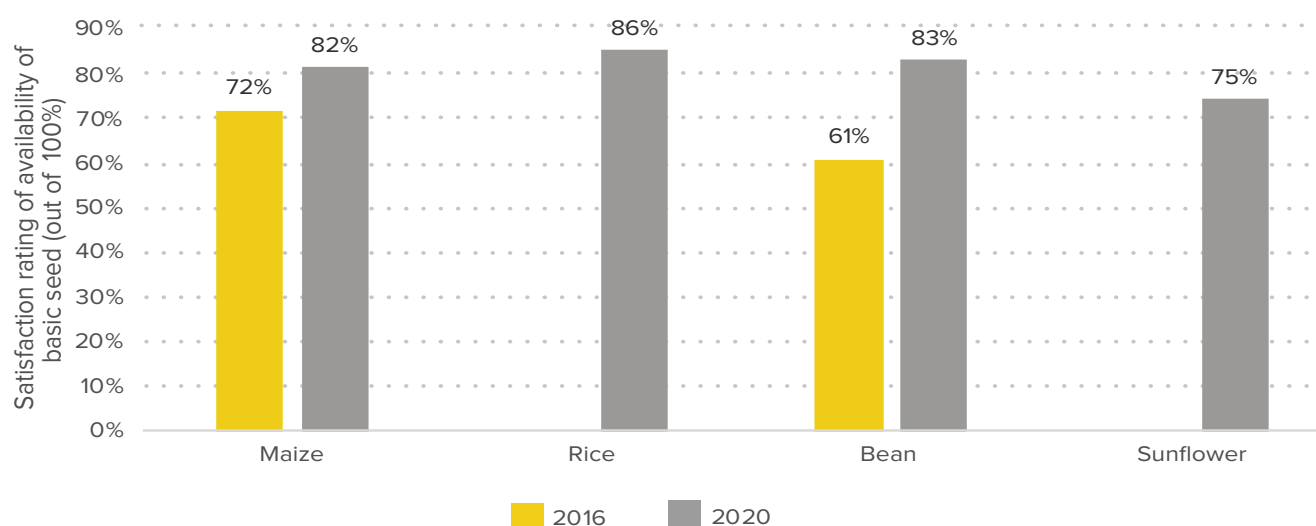
extremely poor poor fair good excellent

**Quantity of basic seed (% that received quantities requested)

***Timeliness of basic seed (% that received basic seed on time)

⁸ Note that ratings on availability of basic seed are only provided for organizations that had a minimum of 5 transactions (and thus a minimum of 5 ratings). The exception to this is TARI, which was the only source of basic seed for rice in 2020.

Figure 2: Overall satisfaction rating of availability of basic seed





INDUSTRY COMPETITIVENESS

NUMBER OF ACTIVE SEED COMPANIES

Competition breeds excellence: the presence of more active seed companies increases competition and creates incentives for companies to innovate and improve. A vibrant seed sector depends on a robust private sector in which seed companies invest in developing, producing, processing, and marketing improved varieties to farmers. This section tracks the number of registered seed companies that produced and marketed seed of one or more of the focus crops.

According to TOSCI, in 2020, there were 218 registered seed companies in Tanzania involved in the production and marketing of seed and planting materials. Of these, 43 companies were involved in the production, import, export and marketing of seed of at least one of the four focus crops. Broken down by crop, the number of active seed companies was 28 for maize, 22 for sunflower, 8 for bean and 3 for rice (Table 10). Note that some companies deal in more than one crop, making the total by crop higher than the actual number of companies. In comparison, Tanzania had 104 registered seed companies in 2016, when the TASAI study was last conducted. This indicates an increase of 110% in the number of registered seed companies between 2016 and 2020. According to TOSCI, most of the newly registered companies deal in other crops beyond the four crops. In 2020, TOSCI registered many seed companies that are dealing in vegetable seeds where there has been an increased seed business.

Table 10: Breakdown of active seed companies

Crop	Number of active seed companies in 2016	Number of active seed companies in 2020
 Maize	29	28
 Rice	-	3
 Bean	6	8
 Sunflower	-	22

GENDER IN MANAGEMENT OF SEED BUSINESSES

TASAI also tracks the number of women in management and ownership positions in seed companies. For many years, the involvement of women in the seed sector in Tanzania was low. However, in recent years, women have become increasingly involved in either the ownership or the management of seed businesses. Table 11 shows that there were 59 women in management positions in the 35 seed businesses that have a management structure. The management positions held by women were finance manager, farm manager, administration manager, production manager and general manager. In 2020, women held 4 of the 35 top management positions. Of the 20 surveyed seed companies for which ownership can be attributed to a single person, 4 were owned by women.

When compared with other African countries, Tanzania compares favorably in terms of women's participation in seed company management and ownership. Figure 3 shows that, while women's overall participation seed company management in African countries is low, Tanzania is second, after Kenya, in terms of the percentage of women in management positions.

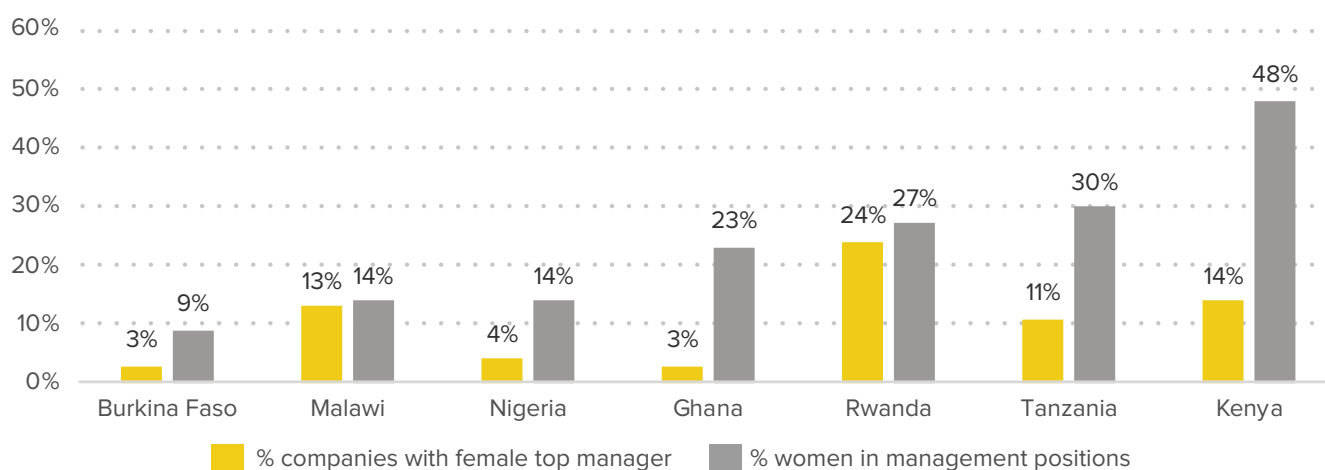
Table 11: Gender in management of seed businesses (2020)⁹

Gender indicator	Number	%
Women in management positions (n=200)	59	30%
Companies with female top manager (n=35)	4	11%
Companies with female owner (n=20)¹⁰	4	20%

⁹ TASAI first collected data for this indicator in 2020; in Tanzania, it was first collected in the 2021 study. As such there is no comparison with earlier data.

¹⁰ This only applies to companies for which ownership can be attributed to a single person. The number excludes government-owned companies, multinationals, some family-owned businesses and the like, which have multiple shareholders.

Figure 3: Comparison of women in seed management in countries surveyed by TASAI



PRODUCTION AND SALE OF CERTIFIED SEED

To measure the overall size of a country's seed sector, TASAI tracks the volumes of seed produced and sold for the four focus crops. The data are presented as aggregate quantities in metric tons (MT) of certified seed sold in the data collection year, as reported by active seed companies.

As indicated in Table 12, in 2020, the surveyed seed companies produced 18,432 MT of maize seed, 476 MT of rice seed, 1,499

MT of bean seed, and 649 MT of sunflower seed, a total of 21,056 MT. The table also compares TASAI's aggregate data on seed production with data from TOSCI. According to seed production data from TOSCI, the total amount of seed produced by the companies surveyed by TASAI was only 14,405 MT. The surveyed seed companies reported producing higher volumes of seed for all crops than the volumes recorded by TOSCI. The difference, especially for maize production data, is likely due to poor record-keeping and management systems in TOSCI. It is also likely that the quantities of seed declared to TOSCI by the seed companies are under-reported. Apart from maize, of which 1,406 MT was carried forward, most of the seed produced for the other crops was sold in 2020.

Table 12: Seed production and sales

Crop	Seed production in 2020 in MT (TASAI data) n=35	Seed production in 2020 in MT (TOSCI data) n=35	Seed sales in 2020 in MT (TASAI data) n=35
 Maize	18,432	12,503	17,027
 Rice	476	295	416
 Bean	1,499	1,423	1,492
 Sunflower	649	184	618
Total	21,056	14,405	19,553

MARKET CONCENTRATION

Competition among seed companies benefits farmers via lower prices, wider choices, increased innovation, and better customer service. To assess the level of industry market concentration, TASAI uses seed sales data for each crop, as reported by seed companies, to calculate the market share of the four largest firms, also known as four-firm concentration ratio (CR4), as well as the Herfindahl-Hirschman Index (HHI).¹¹

Table 13 shows the CR4 and HHI scores in 2016 and 2020. In 2020, the market share of the top four seed companies was high for maize (74%), rice (100%) and bean (98%). It was significantly lower for sunflower (58%). The market share for rice was 100%, because only three companies produced and marketed rice seed in 2020. Similarly, the market share for bean was very high, as only eight companies produced and marketed bean seed. These figures indicate low levels of competition in the rice and bean seed markets. On the other hand, the maize and sunflower seed markets are competitive. The market share for the top four companies producing maize and bean seed has not changed significantly between 2016 and 2020.

¹¹ See Table 13 below.



In 2020, HHI scores were low for maize and sunflower seed, and extremely high for rice and bean seed. The scores imply that there is a low degree of market concentration in the maize and sunflower seed markets, while the rice and bean seed markets are highly concentrated. Both the HHI scores and the market shares indicate that there are no dominant companies in the maize and sunflower seed markets, while the opposite is true for the rice and bean seed markets, which are controlled by a small number of companies.



Table 13: Market concentration (CR4 and HHI)

Crop	CR4 scores (%) 2016	CR4 scores (%) 2020	HHI (2016)	HHI (2020)
 Maize	76%	74%	1,973	1,886
 Rice	-	100%	-	6,936
 Bean	94%	98%	2,589	7,646
 Sunflower	-	58%	-	1,442

The HHI is a measure of market concentration and is calculated by squaring the market share of each firm competing in a market, and then adding up the results. It ranges from close to zero for perfect competition to 10,000 for monopoly. The scale for HHI scores, ranges from extremely low to extremely high levels of market concentration: less than 1,000 is **extremely low**, 1,000-1,999 is **low**, 2,000-2,999 is **moderate**, 3,000-3,999 is **high**, and greater than 4,000 is **extremely high**, i.e., monopoly or near monopoly.

MARKET SHARE OF GOVERNMENT PARASTATAL

In some countries, public entities are still active players in the marketing and sale of certified seed. Public seed companies can play a critical role in meeting farmer demand for varieties that private seed companies deem less profitable. In addition to seed production, public companies may support other national objectives, such as university training and research. However, state-owned companies may benefit from preferential treatment, less stringent enforcement of regulations, access to competitor information, and indirect production subsidies. Collectively, these privileges can result in unfair competition against purely private seed companies.

In Tanzania, two government entities are involved in the production and marketing of certified seed. ASA was established in 2006 as a semi-autonomous body within the Ministry of Agriculture (MoA). The key mandates of ASA include: i) the production, processing, and marketing of basic and certified seed; ii) the promotion of private sector participation in seed production; and iii) the promotion of the use of improved seed.

Like ASA, TARI, established in 2016, operates as a semi-autonomous body under the MoA. TARI is responsible for conducting, regulating, promoting, and coordinating all agricultural research activities conducted by both public and private research institutes in Tanzania.





Table 14 shows the aggregate market shares of TARI and ASA. The two entities collectively account for 4% of the maize seed market, 97% of the rice seed market, 7% of the bean seed market and 33% of the sunflower seed market. One possible reason that ASA and TARI have low market shares in the maize and bean seed markets is that there are many private companies producing and marketing seed of these two crops. For its part, the private sector is less likely to invest in markets dominated by government for fear of unfair competition. Some of the maize seed companies also have their own maize breeding programs and commercialize their own varieties. ASA and TARI constitute two of the three seed companies producing rice seed, accounting for 97% of the rice seed market.

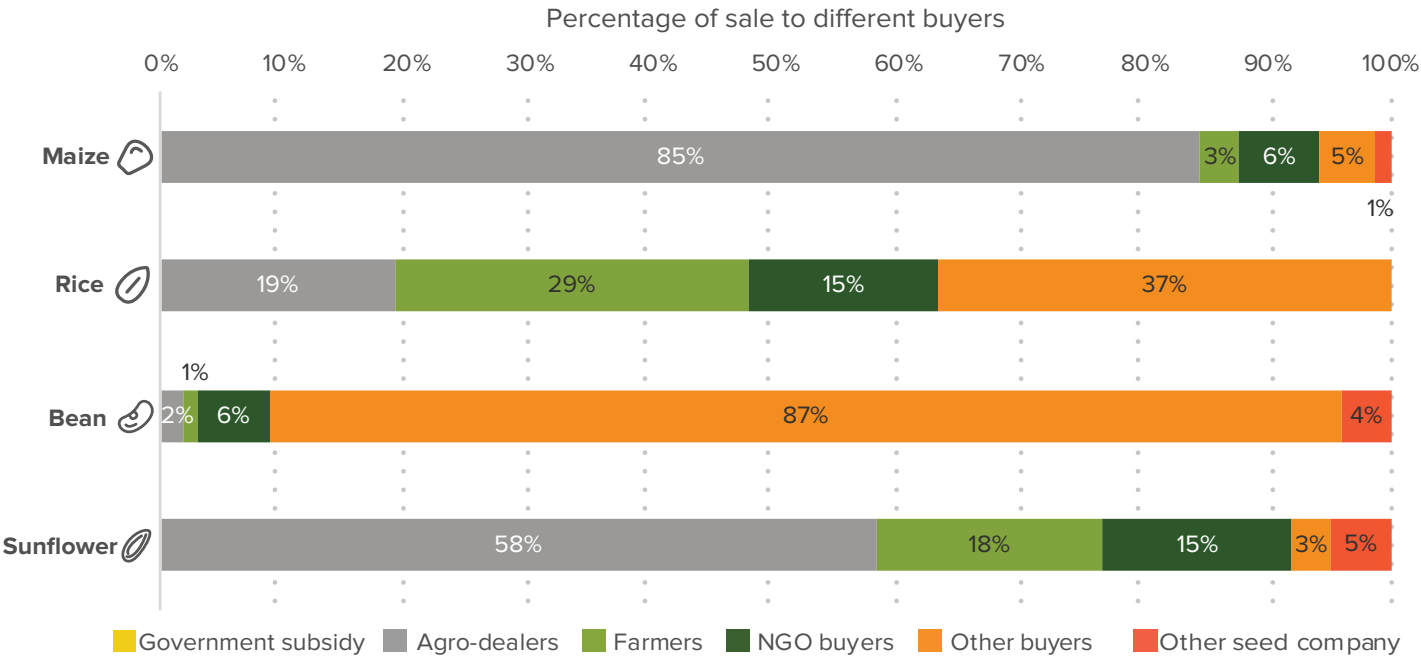
Table 14: Market share of government parastatals (2020)	
Crop	Market share
 Maize	4%
 Rice	97%
 Bean	7%
 Sunflower	33%
Average	35%

SEED SALES TO DIFFERENT CATEGORIES OF BUYERS

The TASAI study tracked five different categories of seed buyers in Tanzania in 2020: agro-dealers, farmers who bought seed directly from seed companies, NGOs, other seed companies and other buyers. Figure 4 shows the

breakdown of seed sales for these categories of buyers. Seed companies sell most of their maize seed (85%) and sunflower seed (58%) through agro-dealers because they have established good relationships with the agro-dealers. However, most bean seed (87%) is sold to other buyers, such as agricultural marketing cooperative societies and farmers' groups. There is no dominant buyer of rice seed: 37% was sold to other buyers, such as the Government of Zambia and Agricultural Marketing Cooperative Societies, while 29% was sold directly to farmers.

Figure 4: Seed sales by category of buyers (2020)



SEED IMPORT AND EXPORT PROCESS

Efficient seed import and export processes extend the seed market beyond national borders. While seed companies benefit from an expanded market, farmers can access a wider range of varieties from across the region.

To import seed into Tanzania, a company must notify TOSCI of their intention to import seed. The notice specifies: (a) the name and address of the importer; (b) the seed's country of origin; (c) the quantity of seed; (d) the expected date of the consignment's arrival; and (e) the species and the cultivar. Upon the receipt of this notice, TOSCI communicates with the Tanzania Plant Health and Pesticide Authority (TPHPA) which issues a Plant Import Permit (PIP). All application forms are available online. In addition to the import permit, imported seed must also be accompanied by a certificate of quality, issued by a recognized certification agency, and a phytosanitary certificate. On arrival in Tanzania, the imported seed is expected to undergo a quality assessment by TOSCI before it can be sold. In addition, the MoA requires all imported seed to be tested to confirm that it does not contain any genetically modified materials. Seed samples are taken after the seed reaches the seed company's warehouse, and is taken for testing at the molecular biology laboratory at TARI Mikocheni. Seed lots with negative results are then issued with a GMO permit. Seven seed companies imported 10,981 MT of maize seed and 85 MT sunflower seed in 2020 (Table 15). The seed imports were sourced from the Southern Africa Development Community (SADC) and the East African Community (EAC) regional blocks, specifically from Zambia, Zimbabwe, South Africa and Kenya.

The process to export seed starts with the submission of a notice to TOSCI of intent to export. In addition, the company submits a copy of the import permit from the destination country. TOSCI then communicates with the TPHPA, after which an export permit is issued. Only two seed companies exported seed in 2020, of which 1,300 MT was bean seed and 1,000 MT was maize seed. While all the bean seed was exported to Italy, the maize seed was exported to the EAC countries, namely, Kenya, Burundi, and Uganda.

The average length of the import process in 2020 was 15 days, 3 days longer than the duration reported in 2016 (Table 15). The average length of the export process was nine days, six days shorter than the length reported in 2016. The main complaint from the seed companies was that the process to obtain the import permit takes too long due to delays from TOSCI and the TPHPA. TOSCI attributes the delays to the need to strictly adhere to the seed regulations to safeguard the interests of the country. The seed companies' satisfaction with the import process was "good" at 60%, a slight reduction from the rating of 63% in 2016. The rating for the export process was also "good" at 65%.

Table 15: Seed import and export process

Indicators	2016	2020
Number of seed companies importing seed	6	7
Volume of imports (in tons)	N/A	11,066
Average length of import process (in days)	12	15
Satisfaction with import process (out of 100%)	63%	60%
Number of seed companies exporting seed	0	2
Volume of export (in tons)	N/A	2,300
Average length of export process (in days)	N/A	9
Satisfaction with export process (out of 100%)	N/A	65%

extremely poor poor fair good excellent





SEED POLICY AND REGULATIONS

LENGTH OF VARIETY RELEASE PROCESS

Plant variety release is the process during which new varieties undergo various tests for yield, Value for Cultivation and Use (VCU), and Distinctness, Uniformity, and Stability (DUS). Varieties that perform satisfactorily in these tests are approved for release by the National Variety Release Committee (NVRC). A vibrant seed sector has a functional variety release system that is well understood by the relevant actors and is followed diligently. Lengthy and/or costly variety release processes can limit the number of released varieties, adversely affecting farmer choice. The length of the variety release process is calculated from the date the variety is submitted to TOSCI to the date when the variety is approved for release. The calculation does not include the time the breeder spends developing the variety.

The process for variety release in Tanzania starts with the submission of an application to TOSCI for the DUS and VCU/ National Performance Trials (NPT) tests. The application for DUS testing is made one season prior to the application for NPT testing. The application for DUS testing should be accompanied by a seed sample for the DUS test, a variety description, application fees, DUS test fees, and on-farm trial and farmers’ assessment data. TOSCI conducts the DUS test and issues DUS certificates for successful applications.

The application for the NPT test should be supported by a minimum of two recent seasons of trial data from no fewer than three recognized testing sites in Tanzania or another country within the East African Community which has harmonized its variety testing procedures under the Policy Analysis and Advocacy Program (PAAP) of the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA). The application also requires a seed sample sufficient to conduct the NPT and a second DUS test may be required if the first one was incomplete or inconclusive. TOSCI conducts the NPT tests and submits the report to the NPT Technical Committee for review. The secretary of the Technical Committee of the NPT, TOSCI, informs the applicant of the results and presents the NPT data and recommendations to the NVRC. The NVRC in turn reviews the recommendations of the NPT Technical Committee and, if the application is successful, recommends the variety to the National Seed Committee (NSC) for release.

The varieties approved for release by the NSC are presented to the Minister of Agriculture for final approval. A variety is officially released after the Minister announces the varieties that have been released. After a variety has been released, the breeder is required to submit an authentic sample of pre-basic seed for future reference purposes to TOSCI. TOSCI registers the variety and issues a certificate of registration to the applicant.

According to the Seed Regulations (URT, 2020b), the time from application to variety release is either two farming seasons or 24 months. However, seed companies reported that it takes 28 months to release a variety, which represents a slight improvement from the 31 months reported in 2016. Seed industry satisfaction with the process of variety release has likewise improved, from 70% in 2016 to 78% in 2020 (Table 16).

Seed companies noted that the variety release process may be delayed due to delays in the relevant committee meetings, in obtaining approval by the NSC, or in the announcement of their variety’s release by the Minister. In other cases, the process is delayed because seed companies submit incomplete DUS or NPT information, or they fail the first DUS test and are required to undergo a second DUS test. Seed companies and the government agree that if these delays could be resolved, the duration of the variety release process could be reduced to 24 months. Furthermore, if DUS testing could be conducted in parallel with the NPT test, varieties could be released in as few as 12 months.

Table 16: Average length of variety release process

Indicators	2016	2020
Average length of variety release process (in months)	31	28
Satisfaction with variety release process (out of 100%)	70%	78%

extremely poor

poor

fair

good

excellent



COST OF VARIETY RELEASE PROCESS

In well-functioning seed systems, the costs of releasing a variety should not be so high as to disincentivize variety releases altogether. The Seed (Amendment) Regulations of 2020 (URT 2020b) stipulate that the cost of variety release is TSH 2,600,000 per variety (~US\$ 1,130). The cost of DUS testing is TSH 1,200,000 (~US\$ 520), while the cost of the NPT test is TSH 1,400,000 (~US\$ 610). On average, seed companies and breeders reported incurring a total cost of between US\$ 1,549 and US\$ 1,602 for variety release. This is primarily due to the inclusion of other costs associated with the release process, such as travel and accommodation allowances for committee members during variety release meetings, and fees for application forms and certificates.

In comparison with other countries studied by TASAI, the average total cost for variety release in Tanzania is lower than in Kenya (US\$ 3,000), Mali (US\$ 7,031) Nigeria (US\$ 18,280) and Ghana (US\$ 41,668) (Mabaya, Ajayi, et al. 2021; Mabaya, Dagnoko, et al. 2021; Mabaya, Mburu, et al. 2021; Mabaya, Waithaka, et al., 2021).

STATUS AND IMPLEMENTATION OF NATIONAL SEED POLICY FRAMEWORK

Well-functioning formal seed sectors have effective coordinating institutions that work well together, following rules and procedures stipulated in clearly defined and regularly updated legal instruments. Tanzania does not have a stand-alone national seed policy. Instead, seed is included in the section on agricultural inputs in the National Agricultural Policy of 2013 (URT 2013). In addition, the policy contains a section on plant breeders' rights. The seed companies surveyed shared the opinion that Tanzania should develop a separate national seed policy that defines the roles of the key actors in seed value chain (those involved in seed breeding, multiplication, production, education and marketing) and provides a framework to determine the national seed requirements for all crops in the country. An advantage of a stand-alone policy is that it is easier to amend than a sector-wide policy.

The Seed Act, amended in 2014 (URT 2014), increased the punitive measures for persons who contravene seed laws by selling counterfeit seed from a fine of TSH 5 million (US\$ 2,178)¹² to TSH 50 million (US\$ 21,786) with the possibility of imprisonment for a period of one to five years.

The Tanzania Seed Regulations of 2017 (URT 2017b) were amended to, among others, transfer all seed-related mandates from the MoA to TOSCI. The regulations were further amended in 2020 to increase the fees for services rendered by TOSCI, including the current DUS and NPT tests (URT 2020b). In 2020, subsidiary legislation was enacted for the purpose of controlling Quality Declared Seed (URT 2020a).

Tanzania joined the Organization for Economic Cooperation and Development (OECD) Seed Schemes in 2015. In addition, in 2018, TOSCI's laboratory received International Seed Testing Association (ISTA) accreditation, thus strengthening quality assurance efforts in the seed sector. The accreditation is for seed sampling, and testing for purity and germination for cereals and pulses. Tanzania also has a functioning plant variety protection office and is a member of the International Convention for the Protection of New Varieties of Plants (UPOV).

The Plant Health Act No. 4 of 2020 (URT 2020c) established the TPHPA. The TPHPA was restructured from the Tropical Pesticides Research Institute (TPRI) as a center dealing with all matters related to plant health and pesticides, including the issuing of import and export permits. Previously, these functions were carried out by the MoA and the TPRI. As the TPHPA was established in 2020, it is not yet fully functional. Seed companies expect that when the institution is fully functional, the length of the seed import and export processes will be reduced.

QUALITY AND ENFORCEMENT OF SEED REGULATIONS

Seed regulations give structure to the formal seed sector. The TASAI study assesses stakeholder perspectives on various aspects of seed regulations, including whether they are supportive to the growth of the seed sector, the role stakeholders play in their design and implementation, stakeholders' awareness of the laws and regulations, the presence of an enforcement agency, the costs of regulation, and the effectiveness of punitive measures.

¹² In November 2021, 1 US\$ was equivalent to TSH 2,295.





Implementation of the Tanzania Seed Regulations: TOSCI is mandated to implement and enforce seed regulations in Tanzania. It is responsible for the registration of all seed dealers, seed inspection and certification, as well as the overall monitoring of the seed sector. However, taking into account the size of the country and the number of seed dealers in Tanzania, TOSCI lacks resources to effectively enforce the seed regulations. A recent study on the implementation of policies and seed legislation in Tanzania revealed that there is a low degree of stakeholder awareness concerning existing seed policies, laws and regulations, and that the enforcement and implementation of the seed policies and legislation is inadequate (AGRA 2021). Seed companies' satisfaction with the enforcement of seed policies, laws and regulations has barely changed between 2016 (70%) and 2020 (73%).

Implementation of the SADC Regional Seed Regulations: Tanzania is a member of the SADC. The technical agreements on the harmonization of seed regulations in the SADC Region were passed in 2008 (SADC 2008). These agreements permit a more efficient movement of seed in the region using a common seed standards certification scheme that harmonizes terminologies, standards, procedures, seals, and labels. The SADC Seed Regulations are implemented according to the Memorandum of Understanding (MoU) signed by SADC member states in 2013 (Feed the Future 2016). One of the key elements of the MoU is that if a variety has been released in two SADC member states, it can be added to the SADC Variety Catalogue and will be accepted for commercialization in other member states as long as the regulatory authorities of the respective states are notified. No variety has yet been registered under this provision. According to TOSCI, the main reason behind the slow implementation of the SADC seed regulations is probably an inadequate awareness among seed sector stakeholders of the expected benefits of the regulations.

EFFORTS TO ERADICATE COUNTERFEIT SEED

Counterfeit seed (also known as fake seed) threatens the seed sector in two important ways. First, it reduces farmers' confidence in certified seed when farmers unknowingly plant inferior quality grain falsely labeled as certified seed. Second, it threatens the success of efforts to increase the adoption of improved varieties, because farmers are not sure which seed is genuine. TASAI tracks the number of cases of counterfeit seed reported by seed companies and the government in each data collection year and asks seed companies to report their level of satisfaction with government efforts to eliminate counterfeit seed.

Seed companies surveyed by TASAI reported five cases of counterfeit seed in 2020. For its part, the government reported three cases that year. The number of cases of counterfeit seed reported in 2020 was lower than the 18 cases reported in 2016 (Table 17). In addition, seed company satisfaction with government efforts to address the problem of counterfeit seed was "good" at 72%, a significant increase from the "fair" rating (57%) in 2016. The reduction in the number of reported cases and the increased seed company satisfaction are indications that the government's efforts to address the problem are bearing fruit.

The government, through TOSCI, has been setting up systems to control counterfeit seed in the market. These systems include the aggressive inspection and monitoring of seed businesses through regular inspections in agro-dealer shops, an increase in the severity of punitive measures, and awareness-raising among the public of the effects of counterfeit seed. For example, the Seed Act was amended in 2014 (URT 2014) to increase the punitive measures for persons who contravene seed laws by selling counterfeit seed from a fine of TSH 5 million (US\$ 2,178) to TSH 50 million (US\$ 21,786), with the possibility of imprisonment for a period of one to five years. In addition, TOSCI has introduced electronic labels on seed packages; when activated, the labels allow users to verify if the seed has been inspected and certified. The partners piloting this initiative are the Tanzania Telecommunications Corporation (TTCL) and Queenswood who are responsible for the printing of the labels. Lastly, TOSCI works with Local Government Authorities (LGAs) to train and authorize extension officers to detect and report counterfeit seed. In addition to increasing the manpower available at TOSCI, the inspectors constitute an important link between TOSCI and seed businesses. Through these connections, the inspectors are generally informed of incidences of counterfeit seed in their respective areas quickly.

Table 17: Industry satisfaction with government efforts to address counterfeit seed

Indicators	2016	2020
Number of cases of counterfeit seed (seed companies)	18	5
Number of cases of counterfeit seed (government)	N/A	3
Seed industry satisfaction with government effort to address counterfeit seed (out of 100%)	57%	72%

extremely poor

poor

fair

good

excellent

USE OF GOVERNMENT SUBSIDIES

Seed subsidies are intended as a short or medium-term measure to encourage farmers to adopt improved crop varieties. The design and execution of subsidy programs, in terms of the scale, targeting, distribution arrangements, and payment systems, may contribute to the development of the seed market in positive ways or it may be disruptive to market forces. There were no government seed subsidy programs operating in Tanzania between 2018 and 2021. Although the seed subsidy program ended in 2016, some seed companies are yet to be paid for seed delivered to the program.

INSTITUTIONAL SUPPORT

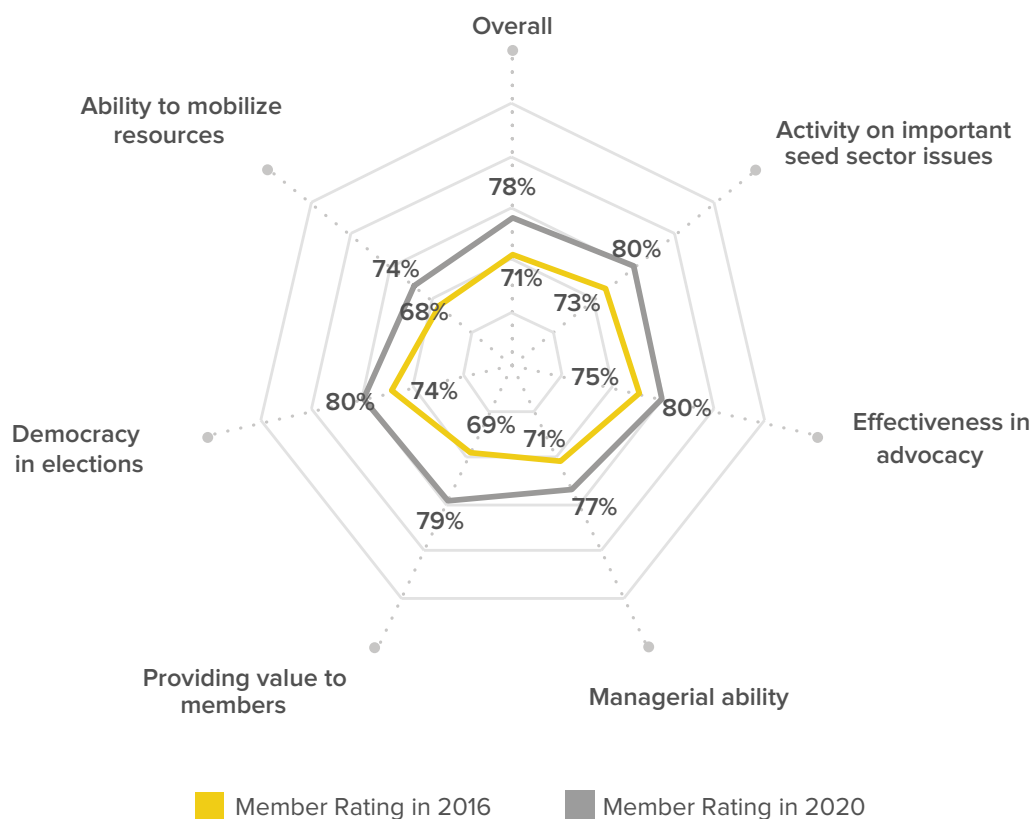
QUALITY OF THE NATIONAL SEED TRADE ASSOCIATION

Well-functioning national seed trade associations play a key role in representing the interests of the industry and engaging with the government. The membership of the national seed associations includes seed companies and, at times, agro-dealers. The Tanzania Seed Trade Association (TASTA) was established in 2002 as a not-for-profit organization whose primary objective is to represent the interests and voice of the seed industry in Tanzania and beyond. TASTA is a key link between private seed industry stakeholders and the government. Currently, TASTA has 49 members, comprising local, regional and multinational seed companies. TASTA is a member of the African Seed Trade Association (AFSTA) and the International Seed Federation (ISF). It is managed by a secretariat based in Arusha and is governed by a board of eight members.

In 2020, TASTA's members were reasonably satisfied with the organization's performance, giving it an overall rating of "good" (78%). As shown in Figure 5, the organization has improved its performance in all aspects assessed. The improvement in member opinion ratings is primarily due to the members' increased awareness of the importance of TASTA and the support the association continues to provide to the seed industry.

TASTA has engaged with the government, specifically with the MoA, to resolve matters of importance to the seed industry. For example, TASTA has successfully advocated for the removal of VAT on seed packaging materials, facilitated seed companies' efforts to license public varieties, and has also played a key role in lobbying for TOSCI's application for ISTA accreditation. These efforts have created confidence among members in TASTA's ability to support the seed sector. This increase in confidence is evidenced not only by the higher ratings but also by the increase in TASTA membership, from 28 members in 2016 to 49 members in 2020.

Figure 5: Members' opinion of TASTA





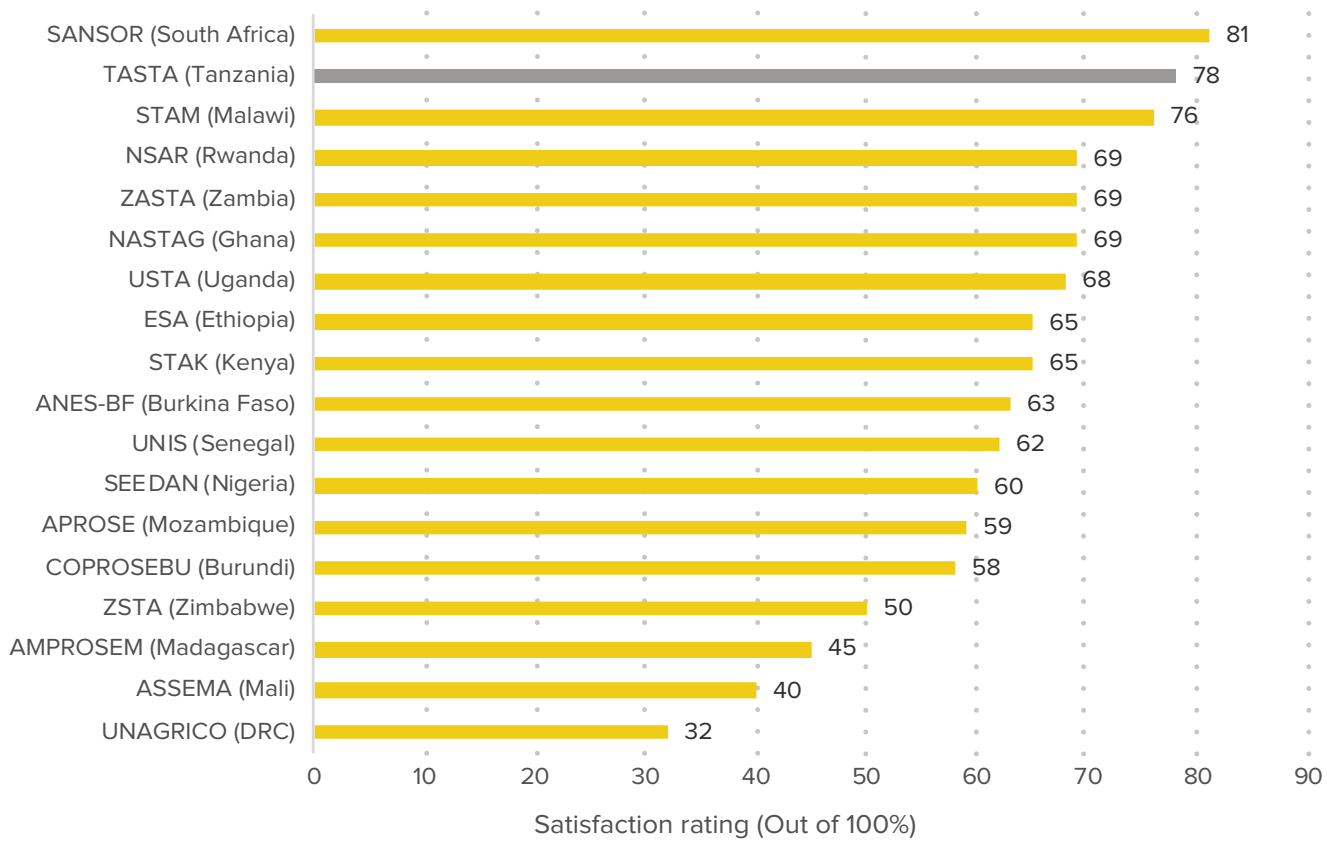
To continue providing and improving services, TASTA members have identified four priority areas for reform to build a vibrant seed industry in Tanzania:

- Continue engagement with government to review policies, laws and regulations to create a favorable environment for private-sector investment in the seed sector;
- Increase TASTA's membership;

- Resolve challenges in the crop value chains that limit the seed sector; and
- Engage the government in a dialogue on the optimal level of public-sector involvement in the seed industry that does not stifle the private sector.

When compared to seed trade associations in other African countries, the performance of TASTA ranks highly (Figure 6).

Figure 6: Members' opinion of seed trade associations across Africa (study years range from 2016-2021)



ADEQUACY OF SEED INSPECTORS

Seed inspection services ensure that certified commercial seed meets regulatory quality standards. Adequate inspection services require sufficient numbers of well-resourced inspectors. TASAI tracks the number of inspectors, and information pertinent to their effectiveness, such as the availability of resources and the use of (new) digital tools.

In Tanzania, seed inspection and certification are the mandate of TOSCI. Currently, TOSCI has 45 (29 male and 16 female) seed inspectors located in the eastern, southern highlands, northern, lake, and southern zones of Tanzania. The number of seed inspectors employed by TOSCI has decreased from 48 to 45 since 2016 (Table 18). TOSCI management has indicated that it needs an additional 10 seed inspectors to meet the requirements for seed inspection activities across the country.

Table 18: Number and rating of the adequacy of public inspectors

Indicators	2016	2020
Number of public seed inspectors	48	45
Number of private seed inspectors	0	0
Seed industry satisfaction with inspectors (out of 100%)	59%	77%

extremely poor poor fair good excellent

To complement the existing public seed inspectors, TOSCI has trained 145 public agricultural extension officers drawn from 111 LGAs to work as seed inspectors in their respective LGAs (AGRA 2021). Although the number of trained extension officers is high, their effectiveness as seed inspectors is very low because, in addition to seed inspections, these extension officers are also assigned other duties by the LGA administration. Although the extension officers have been trained as seed inspectors, they have not yet been gazetted as required by section 8 (i) of the Seed Act so that they are legally mandated to carry out seed inspection activities. Furthermore, inadequate resources for seed inspection activities in the LGAs and in TOSCI also pose a challenge to the effective implementation of seed inspection activities in Tanzania.

Article 42 of the Tanzania Seed Regulations of 2007 provides for the authorization of private seed inspectors by TOSCI. However, TOSCI is yet to train and authorize private inspectors, as no private companies have requested it to do so. According to TOSCI, seed companies should be made more aware of the possibilities of private seed inspections, which would lead more companies to demand these services. The seed companies on the other hand indicate that they are satisfied with the TOSCI inspectors because they are easily accessible. In addition, the cost of training and retaining private inspectors would be an additional cost to the seed companies. They opine that they would rather consider the marketing of their varieties.





Digital solutions can aid the work of seed inspection. Seed inspectors employed by TOSCI use mobile devices during field inspections to upload field inspection data on-site to the head office for further processing. This speeds up data processing and provides inspection reports quickly.

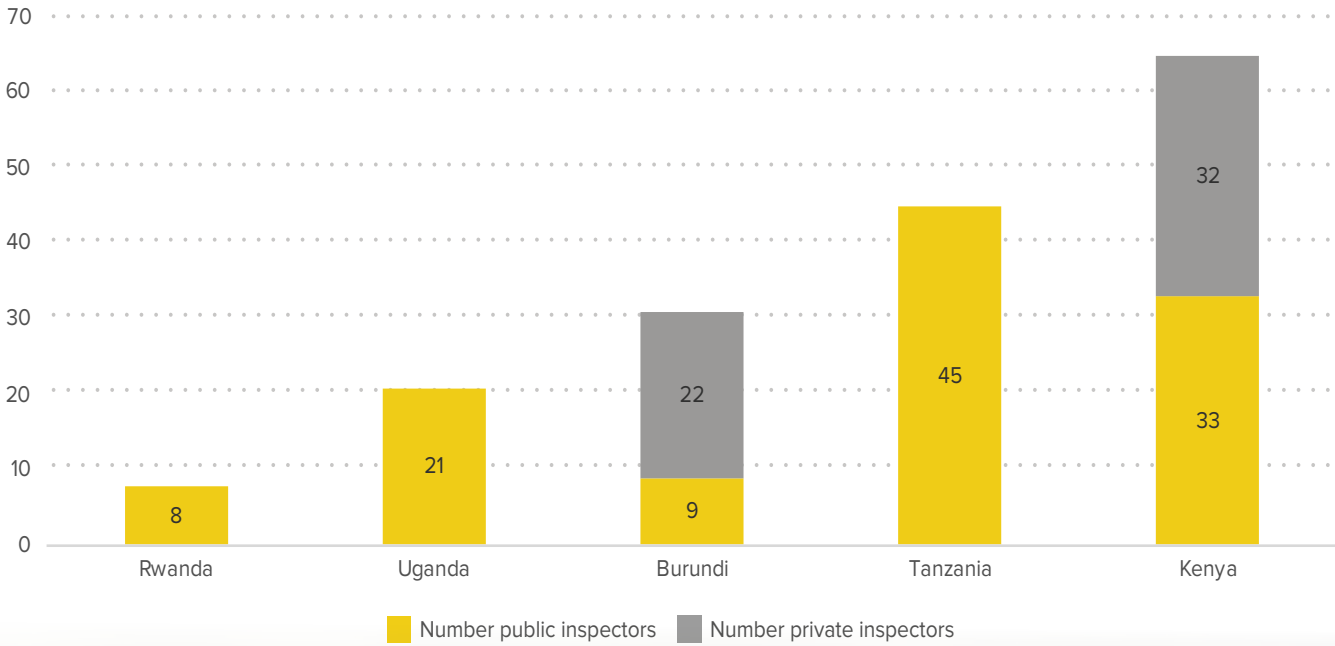
Seed companies' satisfaction with seed inspection services has increased from "fair" (59%) in 2016 to "good" (77%) in 2020 (Table 19). The nearly 20-point increase is due to four main developments:

- TOSCI established a new office in Mtwara which increased its coverage to five zones, thereby increasing the efficiency and speed of service delivery.
- In 2020, TOSCI introduced electronic labels on seed packages that contain information on crop and variety names, lot number, seed class and date of testing. The labels allow buyers to verify the authenticity of the product, which should help reduce the incidence of counterfeit seed.

- TOSCI introduced an online system to apply for seed labels, seed sampling and testing, seed dealer registration, DUS and NPT tests, and seed import and export permits. TOSCI started to use an online ATMIS (atmis.kilimo.go.tz) system for the application of its services in May 2020. This system is managed by the MoA. The ministry is at the final stages of introducing an e-certification system.
- The use of digital tools has been introduced during field inspections, substantially increasing the speed of service delivery.

Figure 7 shows the number of seed inspectors in the EAC countries in 2021. Tanzania has the highest number of public inspectors, and the second highest number of seed inspectors overall, after Kenya. Public seed inspection services in Kenya and Burundi are complemented by private or authorized seed inspectors.

Figure 7: Number of seed inspectors in the EAC countries (2021)



SERVICE TO SMALLHOLDER FARMERS

ADEQUACY OF EXTENSION SERVICES

Well-functioning agricultural extension services are critical to the successful adoption of improved seed by smallholder farmers. TASAI tracks the average number of agricultural households served by one extension officer. The lower this ratio, the better access farmers have to expert information and advice on how to access and use improved seed and other relevant agricultural technologies. This indicator tracks the number of extension officers by sector (public and private) and gender; it is not crop-specific.

The agricultural extension services in Tanzania are managed by two government offices. The MoA is mandated to train extension officers, develop policies, and provide directives on all matters related to extension services in the country. However, the extension officers are employed by the President's Office Regional Administration and Local Government (PO-RALG) office and deployed through the LGAs.

The Tanzania mainland has 26 administrative regions, 185 district councils, 570 divisions, 3,956 wards and 12,319 villages. According to the PO-RALG,¹³ the government plans to have at least one extension officer in each village, requiring at least 12,319 extension officers. Currently, there are 6,704 public extension officers, or 54% of the required number. Further, the 6,704 public extension officers in

13 See <https://www.tamisemi.go.tz>.

2020 represent a slight reduction from the 6,925 officers reported in 2016. On the other hand, the number of private sector extension officers employed by seed companies increased from 105 in 2016 to 369 in 2020 (Table 19). These private extension officers are primarily responsible for the training of farmers and the promotion of varieties.

Table 19 shows the number of extension officers in Tanzania and satisfaction levels with agricultural extension services. In 2019/2020, there were 7.8 million agricultural households in Tanzania (NBS 2021). This gives a ratio of one extension officer for every 820 agricultural households, a slight decline from the 1:831 ratio in 2016. However, the ratio is high and shows that extension services in Tanzania reach only a minority of agricultural households. Reflecting the insufficient number of extension officers, seed company satisfaction with extension services has remained "fair" – 56% in 2016 and 55% in 2020.

In response to these difficulties, the government has taken initiatives to improve the delivery of extension services. It has increased the budget and working facilities for extension services from TSH 0.603 billion during the 2020/21 financial year to TSH 11.5 billion in the 2021/22 financial year (URT 2021). In addition, the MoA has established a facility called M-Kilimo or "mobile agriculture" that allows farmers who call the center with technical questions to speak to an extension officer.

Table 19: Number and adequacy of agricultural extension services

Indicators	2016	2020
Number of public extension officers employed by the government	6,925	6,704
Number of private extension officers employed by seed companies	105	369
Total number of extension officers	7,030	7,073
Ratio of extension officers to agricultural households	1: 831	1: 820
Seed industry satisfaction with extension officers (out of 100%)	56%	55%

extremely poor poor fair good excellent

CONCENTRATION OF THE AGRO-DEALER NETWORK

Agro-dealers play a key role in Africa's seed distribution systems, connecting seed companies to individual farmers, especially in hard-to-reach rural areas. They are often the main point of sale for certified seed. A higher concentration of agro-dealers means that smallholder farmers have greater access to improved seed. TASAI tracks the number of agro-dealers and, where possible, disaggregates registered from non-registered agro-dealers. This indicator is not crop specific.

In Tanzania, agro-dealers are registered by TOSCI. Before they can begin operations, agro-dealers are trained by TOSCI on seed storage, basic agronomic practices, and general seed business management.

In 2020, TOSCI's registry listed 7,189 agro-dealers, a significant increase from the estimated 4,000 agro-dealers in

2016 (Table 20). Given that there were 7.8 million agricultural households in Tanzania in 2019/2020, this translates to one agro-dealer for every 1,085 agricultural households. The ratio was 1:2,900 in 2016, indicating a significant improvement over those four years. However, the 2016 data should be treated with caution, as these figures were only an estimate provided by the MoA at the time. On average, seed companies rated the concentration of agro-dealers as "good" at 60%, a slight decline from the 66% reported in 2016.

On average, each seed company works with 190 agro-dealers. However, only two seed companies have exclusive sales arrangements with agro-dealers. The low number shows the difficulty of executing exclusive sales arrangements between companies and agro-dealers. An exclusive sales arrangement reduces the choice of varieties that an agro-dealer can sell to farmers, while farmers prefer to have a wider choice from many companies.

Table 20: Number of agro-dealers and satisfaction with agro-dealer network

Indicator	2016	2020
Number of agro-dealers	4,000	7,189
Ratio of agro-dealers to agricultural household	1:2,900	1:1,085
Average number of wholesalers per seed company		13
Average number of agro-dealers per seed company	N/A	190
% of companies with exclusive agro-dealers	N/A	6
Seed industry satisfaction with agro-dealer network (out of 100%)	66%	60%

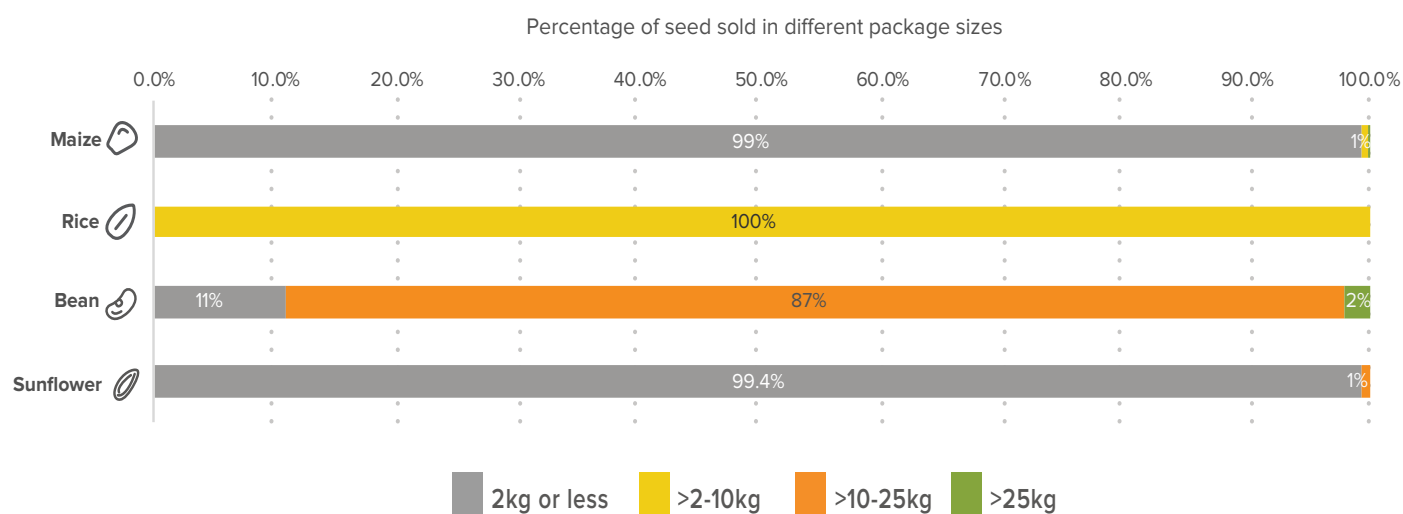
extremely poor poor fair good excellent

AVAILABILITY OF SEED IN SMALL PACKAGES

Because most farmers in Sub-Saharan Africa operate on a small scale, making seed available in small, more affordable packages is a good way to increase adoption rates of certified seed. TASAI tracks the percentage of seed sold in different package sizes, i.e., 2 kg or less, 2-10 kg, 10-25 kg, and above 25 kg. All seed companies in Tanzania are required to package their seed before sale. Seed packages are clearly marked and labelled, in compliance with Part V of the Seed Regulations of 2007 on marking and labelling seed packages (URT 2007). One of the requirements is for the seed companies' contact details (name and address) to appear clearly on every seed package.

Figure 8 shows the percentage of seed sold in different package sizes, for each crop. The choice of package size is determined by the seed companies. Nearly all maize seed and sunflower seed (99%) was sold in packages of 2 kg or less. This is because most farmers have small plots of land and can only afford such small package sizes. By comparison, 100% of rice seed was sold in packages of between 2 and 10 kg. This is because the seeding rate for rice (between 40 and 100 kg per hectare) is higher than the seeding rate for maize and sunflower (25 kg per hectare). Eighty-seven percent of bean seed was sold in package sizes of between 10 and 25 kg. The reason for the large package sizes for bean is that most of the bean seed produced in Tanzania is produced for export and the large sizes respond to export market requirements.

Figure 8: Percentage of seed sold in different package sizes (2020)



SEED-TO-GRAIN PRICE RATIO

The seed-to-grain price ratio at the time of planting is a good measure of the affordability of improved seed. This data point is important as many smallholder farmers end up making a choice between purchasing seed from the formal sector or planting grain. The greater the price difference between the two, the less likely that resource-poor farmers will purchase certified seed. This indicator tracks the ratio of the retail price of seed (at the agro-dealer level) vis-à-vis the market price of grain at the time of planting.

Table 21 presents the seed-to-grain price ratio in 2020 and compares this with the 2016 price ratios for the four crops. The ratios are highest for hybrid maize seed in both years:

an increase from 8.7:1 in 2016 to 10:1 in 2020. On average, hybrid maize costs twice as much as OPV maize seed. The price of seed for rice and bean is nearly twice the price of grain, with ratios of 2:1 for rice and 2.5:1 for bean. The ratio for bean seed increased from 1.4:1 in 2016 to 2.5:1 in 2020. The increase is attributed to the increase in seed prices and low grain prices in 2020. The ratio for sunflower was 20:1, which is the highest among the four crops. The high ratio is primarily caused by a high demand for and low supply of seed. The increase in the demand for sunflower seed was caused by the growth of the market for sunflower grain for oil processing. There has been an increased investment in sunflower oil processing factories in the last three years. However, most factories are operating below their installed capacity due to an inadequate supply of sunflower grain (URT 2016). The high seed-to-grain price ratio for sunflower seed was also the result of a shift among farmers from OPV seed to the more expensive hybrid sunflower seed.

Table 21: Seed-to-grain price ratios

Crop	Prices in 2020 (TSH*)		Seed-to-grain price ratio	
	Average Seed price	Average grain price	2020	2016
Maize (hybrid)	12,000 (2kg)	1,200 (2kg)	10:1	8.7:1
Maize (OPV)	6,000 (2kg)	1,200 (2kg)	5:1	5.2:1
Rice	12,000 (5kg)	6,000 (5kg)	2:1	-
Bean	20,000 (10kg)	8,000 (10kg)	2.5:1	1.4:1
Sunflower	20,000 (2kg)	1000 (2kg)	20:1	-

*In November 2021, 1 US\$ was equivalent to TSH 2,295.



CONCLUSION



Tanzania's formal seed sector is in the growth stage of development. The growth stage is characterized by well-established breeding programs, established and enforced seed policy instruments, many stable seed companies and a growing agro-dealer network (Ariga et al. 2019). In Tanzania, seed companies produce and sell a limited range of staple crops and the government and NGOs are still significant players in the seed sector. A growing number of local and regional seed companies are entering the seed market. The agro-dealer network that supports the distribution of seed to smallholder farmers is also expanding.

Tanzania has significant potential and competitive advantages over the neighboring countries to develop a vibrant seed sector. The large amount of available arable land, good weather conditions and its geographical location, with transport networks to reach the Eastern, Central and Southern African markets, make Tanzania a potential hub for seed production in the region. In addition, the country has a well-established private seed sector. Several areas have improved substantially by 2020 as compared to the last TASA study conducted in 2016. However, a number of challenges remain.

Under the **research and development** category, the study noted an increase in the number of breeders, including those from the private sector. However, public breeders rely heavily on collaboration with CGIAR centers. This reduces the capacity of local breeders to produce varieties, and in some cases, the varieties developed through this collaboration may not be adapted to the needs of farmers in Tanzania. There has also been an increase in the number of new varieties released between 2018 and 2020, 70% of which were released by the private sector. Of the newly released varieties, less than 32% had climate-smart features, which may prove inadequate, given the quickly evolving challenge of global warming.

In the **industry competitiveness category**, Tanzania has 43 seed companies producing and marketing seed for at least one of the four focus crops examined in the present study, two of which are government entities. Over 70% of the seed market is controlled by the private sector. In fact, for maize and bean, the private sector controls 96% and 93% of the market, respectively. However, government entities control larger market shares in the rice seed market (82%).

Tanzania's **seed policy** has contributed to a significant improvement in the seed business environment between 2018 and 2020. One of the recent amendments to the seed regulations reviewed the fees for services rendered by TOSCI; yet to be implemented, the amendment is expected to improve TOSCI's funding situation. Tanzania was accredited to ISTA in 2018, allowing seed produced and certified in Tanzania to enter regional and international markets. Similarly, a new Plant Health Act was enacted in 2020, which simplifies the processes of obtaining import and export permits. Likewise, digital solutions are being introduced for field inspections, seed certification, and labeling by TOSCI. When fully rolled out, the innovations will improve the efficiency and transparency of these processes. Put together, these efforts have improved the regulatory performance of the seed sector and have contributed to a slight decline in the length of the variety release process. Similarly, the number of counterfeit



seed cases reported by seed companies declined from 18 to 5 cases during the same period, while the level of seed industry satisfaction with inspection services and efforts to eradicate counterfeit seed increased between 2016 and 2020. However, the variety release process remains longer than necessary. As mentioned in the relevant section, stakeholders believe it would be possible to reduce it to as little as 12 months if the current processes are streamlined.

Under **institutional support** for the seed sector in Tanzania, seed companies reported increased confidence with the services provided by TASTA, as shown both by the increase in membership as well as the satisfaction ratings reported by members in the 2016 and 2020 TASA studies. TASTA has clearly identified the need for balanced government involvement in the seed sector that allows private sector growth.

Service to smallholder farmers through extension services is an important part of a well-functioning seed sector where farmers benefit from the use of seed of improved varieties. Unfortunately, this aspect has not improved since the last TASA study. In fact, the number of the public extension officers decreased by 221 between 2016 and 2020. Although the number of extension officers employed in the private sector has increased, the increase is not sufficient to meet the needs of Tanzania's smallholder farmers. Seed industry satisfaction with extension services remained "fair", indicating that deliberate efforts by the government are required to enable extension services to effectively serve farmers.

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REFERENCES

AGRA. 2021. Assessment of Implementation of Seed Related Policies, Laws and Regulations by Local Government Authorities in Tanzania.

Ariga, J., Mabaya, E., Waithaka, M., Wanzala-Mlobela, M. 2019. Can improved agricultural technologies spur a green revolution in Africa? A multicountry analysis of seed and fertilizer delivery systems" *Agricultural Economics*. 50:63–74.

Feed the Future. 2016. Southern African Region Seed Sector Assessment. The US Government's Global Hunger and Food Security Initiative.

Mabaya, E., Ajayi, S.A., Waithaka, M., Tihanyi, K., Mugoya, M., Kanyenji, G. 2021. Nigeria Country Report 2020. The African Seed Access Index.

Mabaya, E., Dagnoko, S. Waithaka, M., Tihanyi, K., Mugoya, M., Kanyenji, G. 2021. Mali Country Report 2020. Update Study. The African Seed Access Index.

Mabaya, E., Mburu, J. Waithaka, M., Tihanyi, K., Mugoya, M., Kanyenji, G. 2021. Kenya Country Report 2020. The African Seed Access Index.

Mabaya, E., Waithaka, M., Tihanyi, K., Adzivor, S.A., Wobil, J., Mugoya, M., Kanyenji, G. 2021. Ghana Country Report 2020. The African Seed Access Index.

NBS (National Bureau of Statistics). 2021. National Sample Census of Agriculture 2019/20. Key Findings Report.

SADC (Southern African Development Community). 2008. Technical Agreements on Harmonization of Seed Regulations in the SADC Region. Seed Variety Release Seed Certification and Quality Assurance Quarantine and Phytosanitary Measures for Seed. SADC Secretariat, Gaborone, Botswana.

TOSCI (Tanzania Official Seed Certification Institute). 2020. Information on Released Crop Varieties in Tanzania <https://www.tosci.go.tz/uploads/publications/en1606988039-Variety%20Catalogue%20November%202020.pdf> accessed 3 November 2021.

URT (United Republic of Tanzania). 2007. The Seeds Act, 2003 (No. 18 of 2003) and The Seed Regulations 2007. http://www.saflii.org/tz/legis/num_act/sa200368.pdf <http://www.agriculture.go.tz/legislation%20and%20regulations/legislations/SEED%20REGULATIONS-FINAL%20DRAFT%202007.pdf>

———. National Agriculture Policy. Ministry of Agriculture Food Security and Cooperatives. Dar es Salaam, October 2013.

———. 2014. Part V. Amendment of the Seed Act (Cap 308). The Written Laws Miscellaneous Amendment Act 2014. No 4. 11 December 2014.

———. 2016. The Sunflower Sector Development Strategy 2016-2020.

———. 2017a. The Agricultural Sector Development Programme Phase II (ASDP II). United Republic of Tanzania.

———. 2017b. The Seeds (Amendment) Regulations, 2017. The Seeds Act (Cap. 308), 20 January 2017. Subsidiary legislation to the Gazette of the United Republic of Tanzania, No 3. Vol 98.

REFERENCES

- . 2020a. The Seeds (Control of Quality Declared Seeds) Regulations 2020. Government Notice No. 271, 24 April 2020. Gazette of the United Republic of Tanzania. No. 17. Vol. 101. Printed by the Government Printer, Dodoma by Order of Government.
- . 2020b. The Seeds (Amendment) Regulations, 2020. Government Notice No. 272, 24 April 2020. Gazette of the United Republic of Tanzania. No. 17. Vol. 101. Printed by the Government Printer, Dodoma by Order of Government.
- . 2020c. The Plant Health Act, 2020. Government Notice No. 272, 19 June 2020. Gazette of the United Republic of Tanzania. No. 4. Vol. 101. Printed by the Government Printer, Dodoma by Order of Government.
- . 2021. Budget Speech of the Minister of Agriculture, Honorable Prof. Adolf Faustine Mkenda on revenue estimated and expenditure of the Ministry of Agriculture for 2021/22 financial year.
- Waithaka, M., Mugoya, M., Mabaya, E., Tihanyi, K. 2021. Decentralized Seed Services in Africa: An Assessment of Tanzania and Uganda. In Borgemeister, C., von Braun, J., Denich, M., Stellmacher, T., Youkhana, E. (eds.) Working Paper 206. ZEF Working Paper Series, Center for Development Research, University of Bonn.

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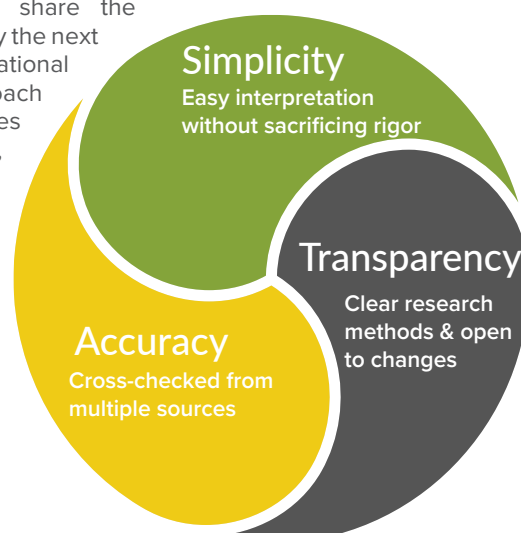


PILLARS OF COMPETITIVE SEED SECTORS

The African Seed Access Index (TASAI) is a seed industry research initiative that is coordinated by the nonprofit organization TASAI Inc. TASAI's goal is to encourage African governments and other seed industry players to create and maintain enabling environments that will accelerate the development of a vibrant private sector-led seed system serving smallholder farmers. It is this enabling environment that TASAI seeks to measure, track, and compare across African countries. The intended outcome of the index is improved access to locally adapted, affordable, and high-quality seed of improved varieties by smallholder farmers in Sub-Saharan Africa.

To assess the status of the seed industry value chain, TASAI tracks indicators in the following five categories: Research and Development, Industry Competitiveness, Policy and Regulations, Institutional Support and Service to Smallholder Farmers. By the end of 2021, TASAI studies will have been completed in 20 African countries: Burkina Faso, Burundi, the Democratic Republic of Congo, Ethiopia, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. In each country, TASAI works closely with local seed industry actors, government and international development agencies to share the TASAI findings and to identify the next steps for creating a vibrant national seed sector. TASAI's approach is guided by the principles of Simplicity, Transparency, and Accuracy.

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