

Ethiopia Country Report 2021

The African Seed Access Index

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TASAI
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CONTENTS

INTRODUCTION	1
RESEARCH AND DEVELOPMENT.....	5
INDUSTRY COMPETITIVENESS	13
SEED POLICY AND REGULATIONS	18
INSTITUTIONAL SUPPORT	21
SERVICE TO SMALLHOLDER FARMERS	24
CONCLUSION	28
REFERENCES.....	29



LIST OF ACRONYMS:

AGRA	Alliance for a Green Revolution in Africa
ARARI	Amhara Regional Agricultural Research Institute
ASE	Amhara Seed Enterprise
ATA	Agricultural Transformation Agency
BoA	Bureau of Agriculture
CIMMYT	International Maize and Wheat Improvement Centre
COMESA	Common Market for Eastern and Southern Africa
DUS	Distinctiveness, Uniformity and Stability
DSM	Direct Seed Marketing
EABC	Ethiopian Agricultural Business Corporation
EGS	Early Generation Seed
EIAR	Ethiopian Institute of Agricultural Research
ESA	Ethiopian Seed Association
ICARDA	International Center for Agricultural Research in the Dry Areas
IQQO	<i>Institiitii Qorannoo Qonna Oromiyaa</i> / Oromia Agricultural Research Institute
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
NVRC	National Variety Release Committee
OSE	Oromia Seed Enterprise
QDS	Quality Declared Seed
SARI	South Agricultural Research Institute
SNNPR	Southern Nations, Nationalities and People's Region
SOPARI	Somali Pastoral and Agro-pastoral Research Institute
SSE	South Seed Enterprise
TARI	Tigray Agricultural Research Institute
VCU	Value for Cultivation and Use



INTRODUCTION

The increased use of productivity-enhancing technologies, including mechanization, irrigation, fertilizer, and improved seed,¹ is critical to improving food and nutritional security across Africa. 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, 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 Ethiopia's formal seed sector. TASAI studies focus on the four cereal crops important to a country's food and nutritional security (the "four focus crops"). In Ethiopia, these crops are wheat, maize, teff, and sorghum. Cereals are cultivated on 81% (nearly 10.5 million ha) of the total grain crop area in the 2019 cropping seasons in Ethiopia, with the cultivation of teff, maize, sorghum, and wheat covering 24%, 18%, 14%, and 14% of the grain crop area, respectively (Central Statistical Agency 2020).

OVERVIEW OF ETHIOPIA'S FORMAL SEED INDUSTRY

While seed systems in most African countries consist of a formal and an informal sector, the Ethiopian seed industry consists of three systems: the informal, intermediate, and formal sectors (FDRE and ATA n.d.). This Country Report focuses almost exclusively on the formal seed sector.

The informal system refers to a system in which seed is produced, maintained, and distributed through unmonitored channels. 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 as well as physical and phytosanitary quality,²

as the quality of the seed in this system is not monitored. In Ethiopia, about 80% of the seed used by farmers comes from the informal system.

The intermediate system comprises business-oriented, community-based groups (producer cooperatives or unions) that are engaged in the multiplication and distribution of non-certified seed of either modern or traditional local varieties. The system includes organized farmer groups, who access basic seed from the formal seed system and who produce and distribute seed to other farmers, both through informal arrangements and through local markets. Multiplication and distribution generally takes place within the local community and nearby areas (as opposed to seed producers in the formal system, who may scale beyond the local community). These groups are not formally registered but have the option of applying for a newly introduced seed regulatory scheme for Quality Declared Seed (QDS). Introduced as part of the Seed Proclamation 2013, QDS is a less stringent quality standard and is meant to complement the existing formal quality control system (Federal Democratic Republic of Ethiopia 2013). In this system, only 10% of all seed is inspected, thereby putting less pressure on the Regional Bureaus of Agriculture (BoAs) which supervise quality control. This system emerged in 1997 with a farmer-based seed production and marketing scheme supported by the World Bank (Thijssen et al. 2008). The intermediate system shares features with both the formal and informal seed systems, yet it is distinct from both (MoA and ATA 2017). For example, farmers in this system do not require a license to produce seed. They access basic seed system primarily through projects and organizations that support the production of quality seed. As a result of the assistance they receive, many farmers are able to produce high-quality seed and serve as out-growers to other producers.

The formal system is a structured and regulated value chain for the production of seed of improved 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 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. The formal seed system contributes less than one fifth of the total amount of seed used by farmers in Ethiopia (Borman et al. 2020).

1 TASAI uses "improved seed" as the short form of "seed of improved varieties".

2 See seed system definitions at <https://www.agrilinks.org/post/seed-system-definitions>.



In Ethiopia, variety development is the responsibility of public research institutes including the Ethiopian Institute of Agricultural Research (EIAR), the *Institiutii Qorannoo Qonna Oromiyaa* (Oromia Agricultural Research Institute) (IQQO), the Amhara Regional Agricultural Research Institute (ARARI), the South Agricultural Research Institute (SARI), the Somali Pastoral and Agro-Pastoral Research Institute (SOPARI), the Tigray Agricultural Research Institute (TARI) and local universities. The international research centers that have a mandate for the four crops, among them the International Maize and Wheat Improvement Center (CIMMYT), the International Center for Agricultural Research in the Dry Areas (ICARDA), and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) for sorghum provide considerable support to Ethiopia's national research institutes. Apart from a few multinational companies that primarily release maize varieties, the major seed producers are public seed enterprises, cooperative unions, and local private seed companies. The different stages of improved seed production are regulated by governments based on approved regulations and standards. In Ethiopia, the system is regulated by the Federal Ministry of Agriculture (MoA)³ (responsible for variety release and registration, quality assurance for imports and exports, and phytosanitary certification), regional agricultural input regulatory authorities (Amhara, Oromia, the Southern Nations, Nationalities and People's Region (SNNPR), and Benishangul-Gumuz), and the BoA in Tigray for local seed production and use. The sales of seed from this system take place mainly through government seed allocation and Direct Seed Marketing (DSM).⁴ Table 1 lists the agencies in charge of various aspects of Ethiopia's formal seed industry.

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

ROLE	KEY PLAYERS
Research and breeding	Ethiopian Institute of Agricultural Research (EIAR), Oromia Agricultural Research Institute (IQQO), Amhara Regional Agricultural Research Institute (ARARI), South Agricultural Research Institute (SARI), Tigray Agricultural Research Institute (TARI), Somali Pastoral and Agro-Pastoral Research Institute (SOPARI), Higher Learning Institutes (HLI), International Maize and Wheat Improvement Centre (CIMMYT), International Center for Agricultural Research in the Dry Areas (ICARDA)
Variety release and regulation	Ministry of Agriculture (MoA); regional regulatory authorities
Seed production and processing	Public seed enterprises, cooperative unions, private local seed companies, and multinational companies
Education, training, and extension	Public universities, MoA, regional bureaus of agriculture
Distribution and sales	Seed producers, MoA, regional bureaus of agriculture, cooperative unions, primary cooperatives, individual agents, agro-dealers

³ Administratively, Ethiopia is divided into 11 regions and 2 cities <http://www.ethiovisit.com/ethiopia/ethiopia-regions-and-cities.html>

⁴ Direct Seed Marketing (DSM) focuses extensively on strengthening cooperatives and private agents to become more effective distribution channels. Agent certification and training is a crucial component of DSM in areas such as separate storage of chemicals and seed, proper ventilation, and cleanliness. DSM implementing partners provide basic training in, among others, internal quality control, financial management, and customer service and education, so that the agents understand and cater to farmer needs, and provide recommendations for the use of certified seed.

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 the year for which the 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 Ethiopia's formal seed sector, this Country Report draws comparisons between the 2017 TASAI Ethiopia study (with performance data primarily from 2016) (Mabaya et al. 2017). In addition, since TASAI has conducted similar studies in 20 other African countries, this report also draws relevant cross-country comparisons.

Using TASAI survey tools, data collection focused on three key seed industry players: seed producers, plant breeders, and representatives of government entities active in the country's seed sector. Of these, seed companies constitute the study's primary source of information. For several indicators, TASAI supplemented quantitative data with self-reported average levels of industry satisfaction on a scale of 0-100, 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**.

Ethiopia has four different types of seed producers. The first group comprises parastatals, which are government-owned institutions at the federal level (the Ethiopian Agricultural Business Corporation (EABC)) and state levels (the Oromia Seed Enterprise (OSE), the Amhara Seed Enterprise (ASE), and the South Seed Enterprise (SSE)). The second group consists of local private companies, which are often small in size and rely on public varieties. The third group includes cooperative unions, which produce seed mostly through their member cooperatives.⁵ The fourth group consists of multinational companies, which either produce seed locally or import certified seed for sale. For the purposes of this report, the term 'seed company' is used for seed producers, but whenever it is necessary to make further distinctions, the entity will be specified. Data from the regional state regulatory authorities indicate that, in 2020, a total of 54 producers were registered to produce seed for at least one of the four focus crops (Table 3). Of the 54 producers, 26 were surveyed in this study.

In selecting the seed producers to be interviewed for this study, efforts were made to consider the administrative structure within which the producers operate, the type of producers, the size of their production, and their willingness to be interviewed. For this study, 26 seed producers were interviewed (4 parastatals, 11 private seed companies, and 11 cooperative unions) from 3 regional states (10 from Oromia, 7 each from Amhara and the SNNPR, and 2 operating nationally). The sample included 48% of the producers who together produce over 90% of seed produced in Ethiopia for the focus crops (91% for wheat, 94% for maize, and 90% for teff). All three producers of sorghum seed were interviewed.

⁵ Primary cooperatives comprise of ten or more members. Two or more primary cooperatives form a cooperative union. See <file:///C:/Users/Admin/Downloads/164469-Article%20Text-424917-1-10-20180109.pdf> Accessed 19 October 2021

Table 3: Breakdown of respondents by crop (2020)

Crop	Number of seed producers surveyed (TASAI data)	Number of registered seed producers (government data)
 Maize	19	34
 Wheat	16	27
 Teff	13	16
 Sorghum	3	3
Total*	26	54

*Totals by crop may not add up because some seed companies deal with many crops.

In addition to seed producers, six research institutes and one university that engaged in breeding and Early Generation Seed (EGS) production were interviewed. Similarly, the regulatory authorities in the regional states, and the MoA, were interviewed as key informants (Table 4). The federal MoA is responsible for variety release and registration, quality assurance for imports and exports, and phytosanitary certification. Other key informants included experts in different programs, including the Agricultural Transformation Agency (ATA) which supports the seed sector, as well as seed experts in the MoA and the BoAs. The regional agricultural input regulatory authorities and the BoA in Tigray are responsible for implementing seed quality control and quality assurance as well as providing license for seed producers operating within respective regions.

Table 4: Other surveyed seed sector actors

Category of actors	Actors and description
National Agricultural Research Institutes	Ethiopian Institute of Agricultural Research (EIAR), Oromia Agricultural Research Institute (IQQO), Amhara Regional Agricultural Research Institute (ARARI), the South Agricultural Research Institute (SARI), Somali Pastoral and Agro-Pastoral Research Institute (SOPARI), Tigray Agricultural Research Institute (TARI)
Other public institutions	Haramaya University, Agricultural Transformation Agency (ATA) input directorate
Regulator	The federal Ministry of Agriculture (MoA), regional agricultural input regulatory authorities (Amhara, Oromia, the Southern Nations, Nationalities and People's Region (SNNPR), and Benishangul-Gumuz), the Bureau of Agriculture (BoA) in Tigray
Ministry of Agriculture	Regulatory department, Alliance for A Green Revolution in Africa (AGRA) desk, BENEFIT extension program, delivery unit
Private sector	Ethiopian Seed Association (ESA)

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.⁶ In addition to tracking the number of active breeders working on the four focus crops, this study also measures seed producers' levels of satisfaction with public breeding programs. The latter often reflects the ability of active breeders in public institutions to produce new varieties.

In Ethiopia, all breeders work in public research institutes and universities, and all local producers use varieties released by these institutions. Multinational companies do not have local breeders but instead import basic seed from abroad. In 2020, there were 122 breeders in Ethiopia (110 men and 12 women). Given the size of the country and its dependence on agriculture,⁷ the 122 breeders are not sufficient to meet the country's needs. The number of active breeders by crop is 42 (wheat), 31 (sorghum), 27 (maize), and 22 (teff) (Table 5). Sixty-one of these breeders work at the country's national agricultural research institute, the EIAR, while the rest work

in ARARI, SARI, the IQQO, TARI, SOPARI, and universities. The public universities employ a few breeders, but there are no active breeding programs for any of the focus crops at present. The number of breeders in 2020 increased significantly from the 74 breeders reported in 2017. The most notable increases were seen among wheat breeders (from 20 to 42 breeders) and sorghum breeders (from 16 to 31 breeders). Among the factors contributing to these increases are the recruitment of staff, partly related to a change of management in the EIAR, which recruited about 100 new staff members in 2018. Further, the IQQO had upgraded some of its research centers from soil laboratories to fully-fledged research centers. In addition, the country's research institutes introduced new employment incentives in 2014/15. This has helped retain more breeders.

The levels of satisfaction with the adequacy of breeders reported by seed producers in 2020 was "good" for all crops: 72% for maize, 65% for wheat, 68% for teff and 63% for sorghum. Since the adequacy of breeders was not rated as "excellent" for any of the four crops, this implies that there is room to improve on the adequacy of the public breeders in the country.

⁶ 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.

⁷ Ethiopia's economy is dependent on agriculture, which accounts for 40% of the GDP, 80% of exports, and an estimated 75% of the country's workforce. However, just five percent of land is irrigated and crop yields from small farms are below regional averages. Market linkages are weak, and the use of improved seeds, fertilizers and pesticides remains limited. <https://www.usaid.gov/ethiopia/agriculture-and-food-security> accessed 10 November 2021.

Table 5: Number and adequacy of active breeders in Ethiopia

Crop	Number of active breeders in 2020	Number of active breeders in 2017	Satisfaction rating in 2020 (out of 100%)
 Maize	27	23	72%
 Wheat	42	20	65%
 Teff	22	15	68%
 Sorghum	31	16	63%
Total*	122	74	

extremely poor poor fair good excellent

*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.



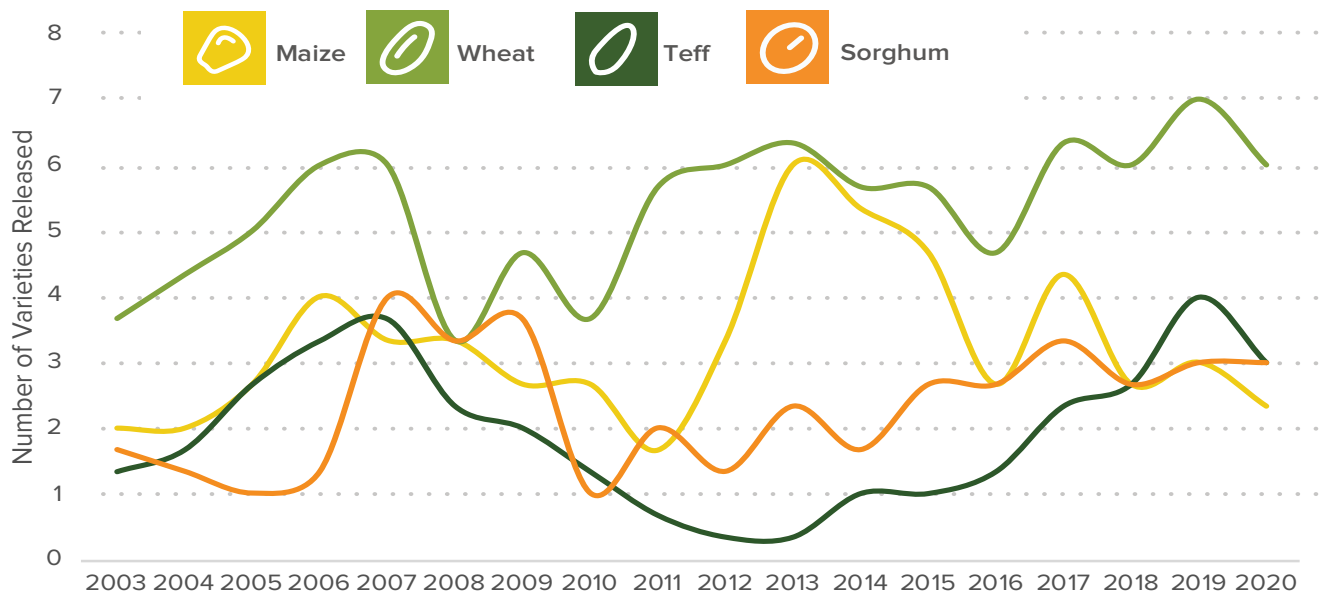
VARIETIES RELEASED IN THE LAST THREE YEARS (2018-2020)

The number of varieties released is a good measure of how functional the variety development and release system are. In addition to higher yields, new varieties often carry desired climate-smart, disease/pest resistant, and nutritionally enhanced traits. A total of 258 varieties of the four crops were released between 2001 and 2020: 65 maize varieties, 107 wheat varieties, 39 teff varieties, and 47 sorghum varieties. This indicates that all four breeding programs are active. Between 2018 and 2020, a total of 43 varieties were released: 7 maize varieties, 18 wheat varieties, 9 teff varieties, and 9 sorghum varieties. The number of wheat varieties is high because several wheat breeding institutions in the

country focus on developing new varieties that are resistant to the different variants of the wheat rust disease.

Figure 1 shows the three-year moving average of variety releases during this period. The trend shows that there were more varieties released for wheat than for the other three crops. Over the last decade, there has been a downward trend in maize variety releases and an upward trend for teff releases. While most varieties were developed by public breeders, over the last five years, several multinational private seed companies have released hybrid maize varieties.

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



VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics. They may have climate-smart, use-related (e.g., fast-cooking or nutrition-enhanced), or industry-demanded features. Given 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 (droughts, floods, and frost) that affect current farming practices. Examples of common climate-smart features are drought

tolerance, early maturity, and extra-early maturity. As indicated in Table 6, only 2 of the 18 wheat varieties released in the last three years had special attributes: one variety released in 2018 was tolerant to moisture stress and the other variety, released in 2020, was early maturing. None of the varieties had fast-cooking, nutrition-enhanced, or industry-demanded features.

This indicates that breeders place a low emphasis on special features of varieties, relative to yield maximization.



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

Attribute/ feature	Description of feature	Number of varieties released 2018 - 2020				
		Maize	Wheat	Teff	Sorghum	TOTAL
All varieties released		7	18	9	9	43
All varieties released with special features		0	2	0	0	2
Climate- smart features	All climate-smart features	0	2	0	0	2
	Drought tolerant	0	1	0	0	1
	Early / extra-early maturing	0	1	0	0	1

NUMBER OF VARIETIES SOLD IN 2020

An increase in the number of varieties sold in a country often results in an increase in the choice of varieties available to farmers. In 2020, 73 varieties of the four crops were sold to farmers: 28 wheat varieties, 24 maize varieties, 11 sorghum varieties, and 10 teff varieties. Table 6 shows the number and age of commonly sold varieties in Ethiopia in 2020 based on share of total production. Despite the high number of varieties released for the four crops, a small number of varieties dominate seed production in the country. This can be partly attributed to the low level of promotion of newly released varieties. In the case of maize, the top five varieties account for 87% of all maize seed production. For wheat and sorghum, the top five varieties account for 75% and 93% of seed production, respectively, while the top four teff varieties account for 98% of all teff seed production. These findings imply that most of the varieties are not widely grown, despite the fact that Ethiopia has a wide range of agro-ecologies. Among the commonly sold varieties, the Quncho variety of teff accounts for 52% of the teff seed supply, while the Melkam variety of sorghum accounts for 48% of sorghum production. The production shares of BH661 (which accounts for 29% of maize seed production) and the Ogolcho variety of wheat (which accounts for 29% of the wheat seed supply) are also considerable. For teff, sorghum, and maize, farmers prefer the commonly sold varieties mainly because of their resistance to diseases and yield advantage over other varieties. In the case of wheat, there is a relatively more frequent change of commonly sold varieties because of high disease pressure.



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

Crop	Number of varieties sold in 2020	Name of commonly sold variety	% production share	Age of variety (years) in 2020	Average age (weighted by volume produced)
 Maize	24	BH661	28.9%	9	12
		Limu	18.0%	8	
		Shone	15.4%	14	
		BH546	12.5%	7	
		BH540	11.9%	25	
		Total	87%		
 Wheat	28	Ogolcho	28.7%	8	8
		Danda'a	13.3%	10	
		Kingbird	12.6%	5	
		Wane	10.3%	4	
		Kakaba	9.7%	10	
		Total	75%		
 Teff	10	Quncho	52.2%	14	20
		Tseday	31.8%	36	
		Bosat	9.8%	8	
		Etsub	4.2%	12	
		Total	98%		
 Sorghum	11	Melkam	48.3%	11	24
		Gambella-1107	34.1%	44	
		Teshale	4.4%	18	
		Abishir	3.6%	20	
		Girana-1	3.0%	13	
		Total	93%		

Source: MoA data, 2020



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. TASAI tracks the average age of varieties by crop.

Table 6 in the previous section shows the ages of the commonly sold varieties for the four crops, weighted by the production share of each variety. The weighted-average ages are: 12 years for maize, 8 years for wheat, 20 years for teff and 24 years for sorghum. The low average ages for maize and wheat are because the two crops are more commonly grown than teff and sorghum, and as a result more varieties of these crops are released (see Figure 1) and commercialized. This explains why the commonly sold varieties for these two crops such as BH661 (9 years) and Limu (8 years) for maize and Ogolcho (8 years) and Danda'a (10 years) for wheat are relatively younger than the commonly sold varieties for teff (Quncho, 14 years and Tseday, 36 years) and sorghum (Melkam, 11 years and Gambella-1107, 44 years). The Limu variety of maize and Ogolcho variety of wheat are commonly sold because they are high yielding.

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 tends to constrict the ability of seed companies to scale up production. The Ethiopian seed system recognizes four classes of seed: breeder, pre-basic, basic (foundation), and certified seed. While the production of breeder seed is the mandate of breeding institutions, the other classes of seed can be produced by other seed producers.

In Ethiopia, all seed companies source basic seed from local sources, with the exception of one international company, which imported its seed. Any licensed seed producer (i.e., one possessing a certificate of competence (CoC)) is eligible to obtain basic seed from public research institutions. Most seed producers obtain basic seed through the BoA and the MoA. Other seed producers contract directly with basic seed producers through the EGS contract supply system. These two avenues used to obtain basic seed are described below.

To obtain basic seed, companies submit their orders for basic seed to the BoA and the MoA a year in advance. Acting as a liaison between companies and producers of basic seed, the BoA compiles the orders sent by seed companies and sends these to the basic seed producers. In some instances, basic seed producers produce the basic seed before receiving the orders from the BoA. In such instances, the BoA advises the seed producers on how to allocate the basic seed to the different seed companies. Basic seed producers notify seed companies when and where to collect the basic seed. If there is excess supply, any interested seed company may purchase the remaining basic seed.

In addition to the BoA channel, basic seed is also marketed through EGS supply contract agreements between seed companies (buyers) and the suppliers (mainly public research institutions). Contracts are signed one year ahead of delivery and specify the crop, variety, seed class, and payment details. Once the basic seed is ready, seed companies are requested to pick up the seed from the producer. The payment is made directly to the research institution's bank account, either in advance or at the time of collection.

Seed companies source basic seed from three main sources: public entities, other private companies, or own seed. Three public seed enterprises are the main sources of basic seed. These are the EABC, OSE, and ASE. The public research institutions also include the EIAR, and the regional institutes (ARARI, the IQQO, and SARI). Five private seed companies also supply basic seed to other seed companies.

Table 8 shows the different sources of basic seed and the number and percentage of seed companies that sourced basic seed from each source.⁸ Public entities were the main source of basic seed for seed companies. The percentage of companies sourcing seed from the public entities ranged from 86% (for teff) to 100% for the other three crops. Other sources supplied between 13% of wheat and 29% of teff to seed-producing companies. The two federal institutions, the EIAR and EABC, were the two prominent public entities supplying basic seed to seed companies. The percentage of seed companies sourcing basic seed from these two entities ranged from 71% (for teff) to 83% (for maize).

⁸ In most instances, seed companies sourced basic seed from more than one source. Therefore, the percentages do not add up to 100%.





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

Source of basic seed	Maize		Wheat		Teff		Sorghum	
	Number of companies	% of total	Number of companies	% of total	Number of companies	% of total	Number of companies	% of total
Public national institutions*	15	83%	13	81%	10	71%	3	75%
Public regional institutions**	13	72%	7	44%	3	21%	3	75%
Other sources (include own sources)	3	17%	2	13%	4	29%	0	0
Total number of companies	18		16		14		4	
Public entities (combined)	18	100%	16	100%	12	86%	4	100%

* Public national institutions: the EIAR and EABC

** Public regional institutions: ARARI, the ASE, the IQQO, the OSE and SARI

Table 9 presents seed companies' level of satisfaction with the availability of basic seed with respect to quantity, quality, and timeliness of delivery. 'Quantity' refers to the percentage of seed companies that received the quantity of basic seed that they requested. 'Quality' refers to seed company satisfaction with the quality of basic seed received. 'Timeliness' refers to the percentage of seed companies that received their basic seed on time. To retain anonymity, average ratings based on only one company are excluded.

For maize, the satisfaction level for **quality of seed** was, on average, 78%, and ranged from 68% for the IQQO to 93% for private seed companies. For wheat, seed producers' average satisfaction level with the quality of seed they received was "excellent" (84%). For teff, quality ratings were 73% on average, with all ratings being "good". Average satisfaction

levels with the quality of sorghum seed were "excellent" (82%) and ranged from 80% for the EIAR to 83% for ARARI. The regional centers appear to be struggling with quality issues, especially for maize.

The average satisfaction with **quantity of seed** delivered for maize is 78%, and ranges from 40% for the ASE to 90% for the EABC. Average satisfaction levels with the quantity of wheat are "good" (70%). For teff, the average rating is "good" (70%) for all sources. For sorghum, average satisfaction levels are "good" (77%), ranging from "excellent" for ARARI to "good" for the EIAR.

The average satisfaction with timeliness of delivery is "excellent" for maize and teff (80%), and "good" for sorghum (78%) and wheat (77%).





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

Crops		ARARI	ASE	EABC	EIAR	OSE	IQQO	Private	Overall
Maize (n=39)	Quality *	-	87%	82%	78%	77%	68%	93%	78%
	Quantity **	-	40%	90%	73%	82%	74%	88%	78%
	Timeliness ***	-	83%	90%	70%	80%	74%	85%	80%
Wheat (n=27)	Quality *	--	-	83%	86%	87%	-	-	84%
	Quantity **	-	-	74%	63%	75%	-	-	70%
	Timeliness ***	-	-	79%	74%	75%	-	-	77%
Teff (n=17)	Quality *	-	-	70%	76%	-	-	-	73%
	Quantity **	-	-	77%	70%	-	-	-	70%
	Timeliness ***	-	-	80%	80%	-	-	-	80%
Sorghum (n=6)	Quality *	83%	-	-	80%	-	-	-	82%
	Quantity **	80%	-	-	73%	-	-	-	77%
	Timeliness ***	80%	-	-	77%	-	-	-	78%
extremely poor poor fair good excellent									

* Quality of basic seed (opinion ranking) **Quantity of basic seed (opinion ranking) ***Timeliness of basic seed (opinion ranking)

⁹ Organizations with only one transaction are excluded.

Seed companies' opinion of the availability of basic seed:

Table 10 presents the overall satisfaction levels with availability of basic seed by source. Satisfaction levels with the private suppliers were high (88%) for maize. However, for private seed producers, the number of transactions was generally low. With regard to the major suppliers, the overall satisfaction level for maize was high for the EABC (87%), OSE (79%), and IQQO (72%). The patterns are similar for wheat and sorghum, but satisfaction levels were lower for teff, except for own sources. The research institutes, whose primary mandate is research and development, have a low level of business orientation compared to the public seed enterprises. This needs to be improved for the seed sector to become vibrant.

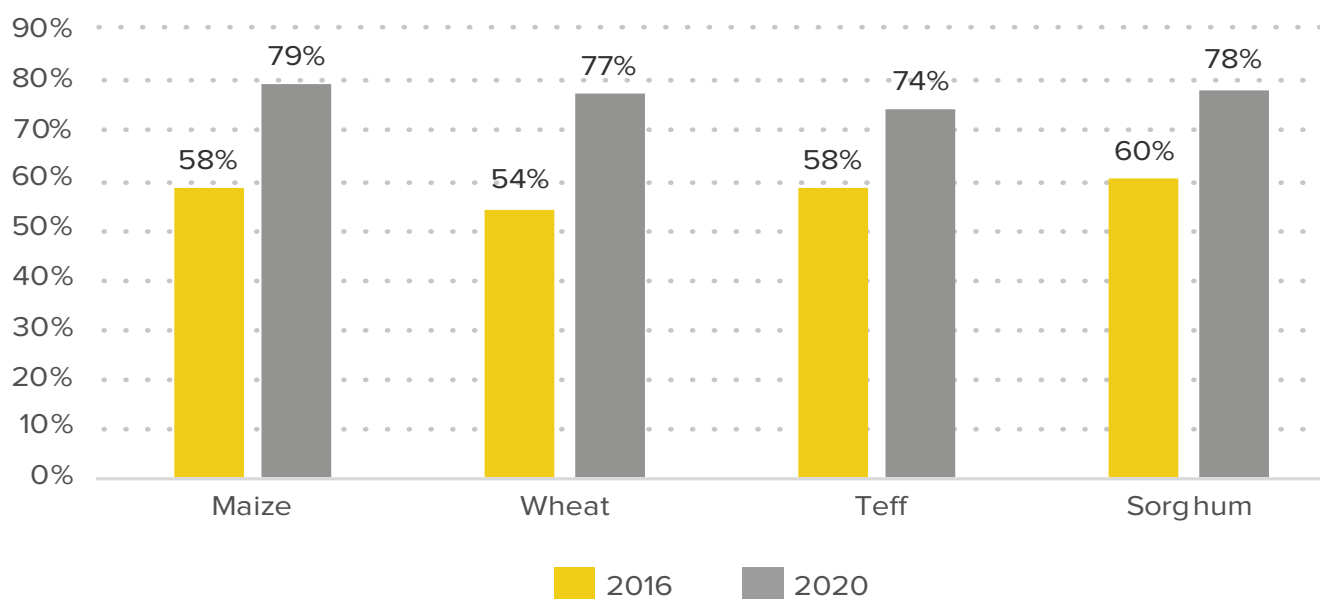
Seed companies' opinion of the availability of basic seed has improved for all crops (Figure 2). In 2020, the overall satisfaction level with the availability of basic seed was "good" for maize (79%), wheat (77%), teff (74%), and sorghum (78%). This was an improvement from the ratings in 2016 which were "fair" for maize, wheat and teff. Although the rating for sorghum remained "good", there was an 18-percentage point increase in 2020. This improvement is attributed to the introduction of the EGS contract supply system, which has improved the overall availability of basic seed to seed companies. In addition, some public institutions have engaged in capacity building in the form of training, building infrastructure and facilities, and land acquisition. For example, public institutions (e.g., ATA) and seed projects (e.g., ISSD) have provided a series of trainings on internal seed quality control.

Table 10: Overall satisfaction rating of availability of basic seed by source organization (2020)

Organization	Availability of basic seed (overall opinion in %)			
	Maize (n=39)	Wheat (n=27)	Teff (n=17)	Sorghum (n=6)
EABC	87%	79%	76%	
EIAR	74%	74%	73%	77%
ARARI	-	-	-	81%
ASE	70%	-	-	
OSE	79%	79%	-	
IQQO	72%	-	-	
Private	88%	-	-	

extremely poor poor fair good excellent

Figure 2: Overall satisfaction rating of the availability of basic seed



INDUSTRY COMPETITIVENESS

NUMBER OF ACTIVE SEED PRODUCERS

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 producers that produced and marketed seed of one or more of the focus crops.

Ethiopia registered 54 active seed producers for the four crops in 2020: 27 private seed companies, 4 public entities

and 23 seed cooperatives (Table 11). Most of these entities produced maize seed (33 producers) or wheat seed (21 producers). The number of seed producers has increased for three crops – maize, wheat and teff – between 2017 and 2020. The number has not changed for sorghum, indicating a low level of interest in the crop from both government and the private sector. According to the Ethiopian Seed Association (ESA), there are very few sorghum seed companies because there is little effort by government to promote public sorghum varieties. Most of the promotion is focused on maize varieties.

Table 11: Breakdown of registered and active seed producers¹⁰

Crop	Number of active seed producers in 2017	Number of active seed producers in 2020 by type				Number of sampled companies
		Private companies	Public entities	Cooperative Unions	Total	
 Maize	18	21	4	8	33	19
 Wheat	8	3	4	14	21	16
 Teff	9	4	3	6	13	13
 Sorghum	3	1	2	0	3	3
Total	-	24	4	22	50	26

¹⁰ In some cases, producers produced more than one crop, so the total number of producers under each category is not equal to the sum of producers of each crop.

GENDER IN MANAGEMENT OF SEED BUSINESSES

TASAI also tracks the number of women in management and ownership positions in seed companies. In Ethiopia, seed companies are managed by individuals or groups depending on the size of the seed company. Table 12 shows that, overall, the representation of women in seed company management is quite low. While 62% of the seed companies had at least one woman in a management position, women occupied only 13% of all management positions overall. None of the surveyed companies had a female manager or owner.

Table 12: Gender in management of seed businesses (2020)¹¹

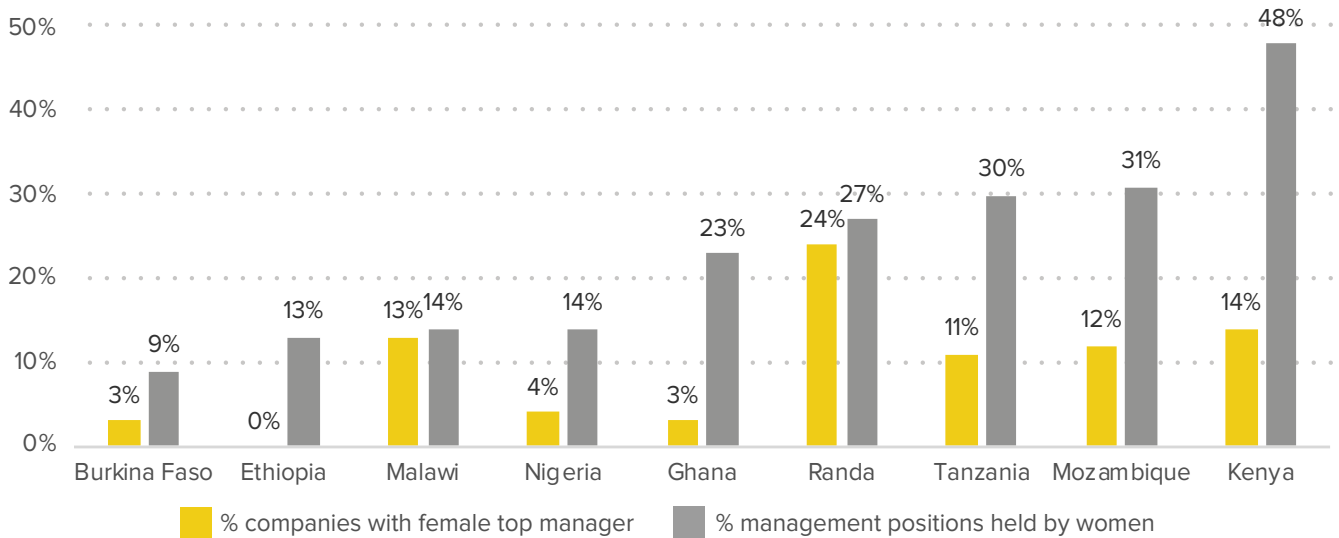
Gender indicator	Number	%
Women in management positions (n=178)	24	13%
Number of seed producers with at least one woman in management position (n=26)	16	62%
Producers with female top manager (n=26)	0	0%
Producers with female owner (n=26)	0	0%

¹¹ TASAI first collected data for this indicator in 2020. In Ethiopia, it was first collected in the 2021 study. As such there is no comparison with earlier data.



When compared with other African countries, Ethiopia performs poorly in terms of women's participation in seed company management and ownership. Figure 3 shows that, while women's overall participation in seed company management in African countries is low, Ethiopia is second to last, after Burkina Faso, in terms of the percentage of women in management positions.

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 is presented as aggregate quantities in metric tons (MT) of certified seed sold in the data collection year, as reported by active seed companies.

Table 13 shows aggregate seed production as reported by the surveyed seed companies, the MoA and the regional regulatory authorities. Maize and wheat are the dominant crops in terms of seed production in Ethiopia, accounting for over 95% of combined sales (by volume) of the four focus crops. According to the MoA, in 2020, seed companies produced 30,747 MT of maize seed, 39,553 MT of wheat seed, 2,976 MT of teff seed, and 284 MT of sorghum seed. Data from the regional regulatory authorities closely follow data from the MoA, with the exception of sorghum. TASAI production data, when compared to the MoA and regional regulatory authorities' data, is higher for wheat and teff, and lower for maize and sorghum.

There are several reasons for the differences between the TASAI and MoA data. First, MoA data on seed production is slightly higher than TASAI's aggregate data for maize and sorghum due to sampling differences. The TASAI

sample only covers 26 seed companies, while the MoA data covers all the registered seed companies. Second, TASAI data indicates higher levels of wheat production than the MoA, because one wheat seed company did not report its production output to the MoA. This company reported producing more than 10,000 MT of wheat seed in 2020. The same applies for teff. Several seed companies reported producing more teff seed during the survey than they reported to the MoA. For sorghum, seed companies reported lower volumes of sorghum seed production than what was reported to MoA but none were reported to the regional regulatory authorities.

The difference between the MoA data and the data from the regional regulatory agencies is that the MoA data is arranged according to variety and is compiled from company declarations at the time of seed inspection. The data from the regulatory agencies is arranged by seed company and is compiled at the time of certification.

In 2020, the 26 surveyed seed companies sold 28,177 MT of maize seed, 41,646 MT of wheat seed, 3,069 MT of teff seed, and 106 MT of sorghum seed. For all crops, these were modest increases from seed sales recorded in 2016.

Table 13: Seed production and sales

Crop	Seed production in 2020 in MT (TASAI data)	Seed production in 2020 in MT (Ministry of Agriculture data*)	Seed production in 2020 in MT (Regional regulatory authorities)	Seed sales in MT (TASAI)	
				2020	2016
 Maize	28,782	30,747	30,114	28,117	27,756
 Wheat	49,346	39,533	41,338	41,646	40,544
 Teff	4,089	2,976	2,410	3,069	2,654
 Sorghum	80.8	284	0	106	60

* Government data was sourced from the MoA and regional regulatory authorities. There is a high degree of inconsistency between the two data sets because the MoA reports production data by variety, while the regional regulatory authorities organize production data by producers.

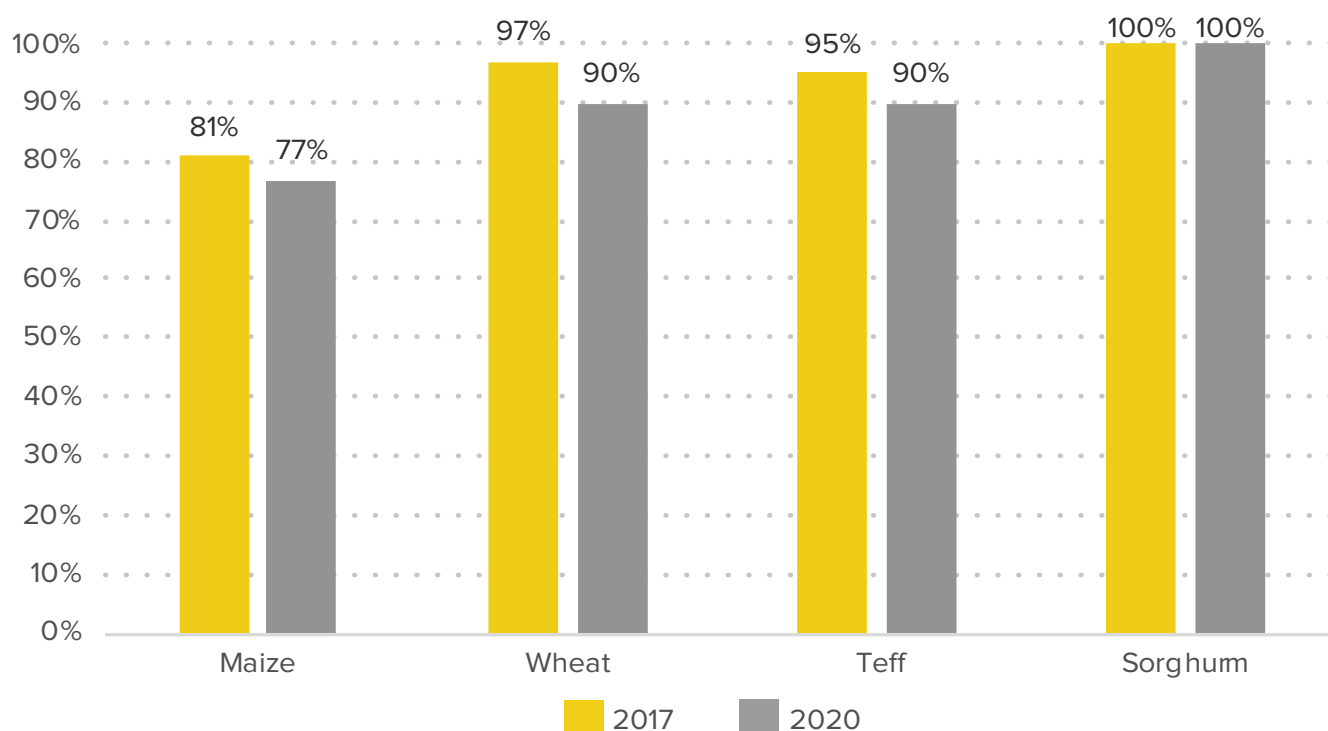
MARKET SHARE OF TOP SEED COMPANIES

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 producers, to calculate the market share of the four largest firms, also known as four-firm concentration ratio (CR4), and the Herfindahl-Hirschman Index (HHI).¹²

¹² See below Table 14 on pg. 16.

Figure 4 shows the market shares of the top four seed companies in 2017 and 2020. In 2020, the top four seed companies accounted for 77% of the maize seed market, 90% of the wheat and teff seed market and 100% of the sorghum market. In both 2017 and 2020, there were less than four sorghum-producing companies as a result of which the CR4 was 100% in both years. Although the market shares for the top four companies declined slightly for maize, wheat and teff between 2017 and 2020, overall, the high market shares indicate that the seed sector in Ethiopia is dominated by a few producers.

Figure 4: Market share of the top four seed companies



Another way to assess the competitiveness of a market is to look at the level of market concentration. TASAI research uses the Herfindahl-Hirschman Index (HHI). The lower the HHI scores, the more competitive a market is. Table 14 presents the HHI scores for the four crops in 2017 and 2020. The HHI scores in 2020 are “moderate” (2,295) for maize and “high” for wheat (3,823), teff (3,002), and sorghum (3,885). The seed markets for wheat, teff and sorghum are not competitive, as they are dominated by a few players. However, the seed market for maize is relatively more competitive, due to the fact that there are many seed companies producing maize seed. In addition, one private seed company has steadily increased its presence in the country through aggressive seed production and marketing.

The HHI scores and the market shares point to the same conclusion: for all four crops, the markets are highly concentrated. However, it is worth noting that while the market shares for the top four companies have decreased from 2017 to 2019 for maize and wheat the HHI has increased over the same period. This means that while the top four companies might have lost some of their market shares, the overall market is moving towards increased concentration, i.e., less competition.

Table 14: Market concentration (HHI)

Crop	HHI (2017)	HHI (2020)
 Maize	1,940	2,295
 Wheat	3,009	3,823
 Teff	3,898	3,002
 Sorghum	3,337	3,885

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.

Ethiopia has four government-owned parastatal seed companies that are active in the seed market: one national entity, the EABC, and three regional entities - the OSE, ASE, and SSE. Although the Somali regional state has also established one public seed enterprise, it is not currently active.

Table 15 shows the combined market share of government parastatals in 2017 and 2020. Data from surveyed seed producers shows that the government parastatals dominate the wheat and teff seed markets. The dominance is also reflected in the data from the regulatory authority. However, the parastatals account for 41% of the maize seed market, a decline from 59% in 2017. This decline is attributed to the increasing market share of private seed companies over the years. In the two other countries in the region with active parastatals involved in seed marketing, Tanzania and Kenya, the government parastatals' shares in the maize seed market are 4% and 64%, respectively.

Table 15: Market share of government parastatals

Crop	TASAI data (2017)	TASAI data (2020)	Government data* (2020)
 Maize	59%	41%	41%
 Wheat	77%	90%	84%
 Teff	62%	78%	67%
 Sorghum	83%	53%	-

* Government data was derived from MoA data.

SEED SALES TO DIFFERENT CATEGORIES OF BUYERS

The TASAI study tracked five different categories of seed buyers in Ethiopia in 2019: government institutions, agro-dealers, farmers who bought seed directly from seed companies, Non-Governmental Organizations (NGOs), and other buyers.

The Ethiopian seed marketing system has changed over the last decade, from a system in which seed distribution was managed by the government to a system in which multiple actors are involved in seed distribution. In 2020, seed buyers included the government, agro-dealers, farmers, NGOs, other buyers and other seed companies. Figure 5 shows the breakdown of seed sales according to the different categories of buyers. The government and agro-dealers are the main buyers of seed in Ethiopia. The government purchases most of the teff seed (92%) and sorghum seed (53%) produced in the country. It is worth noting that the government is not necessarily a buyer of seed, but a facilitator of seed distribution. The government allocates seed that has been produced by seed companies



to different administrative units (regions and districts). These units then assign an intermediary, which is usually a multi-purpose farmers' cooperative union (not a seed cooperative union), but which can also be a different government entity, to buy the seed and sell it to the farmers. In addition to linking seed companies to the administrative units, the government also facilitates the purchase of seed by providing credit to a multi-purpose farmers' cooperative when needed.

In contrast to teff and sorghum, most of the maize and wheat seed sales took place outside the government allocation system - 83% and 63%, respectively. This is important, because the two crops constitute the bulk of seed produced and sold in Ethiopia. These percentages are consistent with the data from the MoA, which estimates that about 67% of the seed for the four crops is sold outside the government allocation system. Senior officials from the ATA attribute this high percentage to the DSM initiative that has promoted direct sales from seed producers to farmers in the major crop-producing woredas (districts).

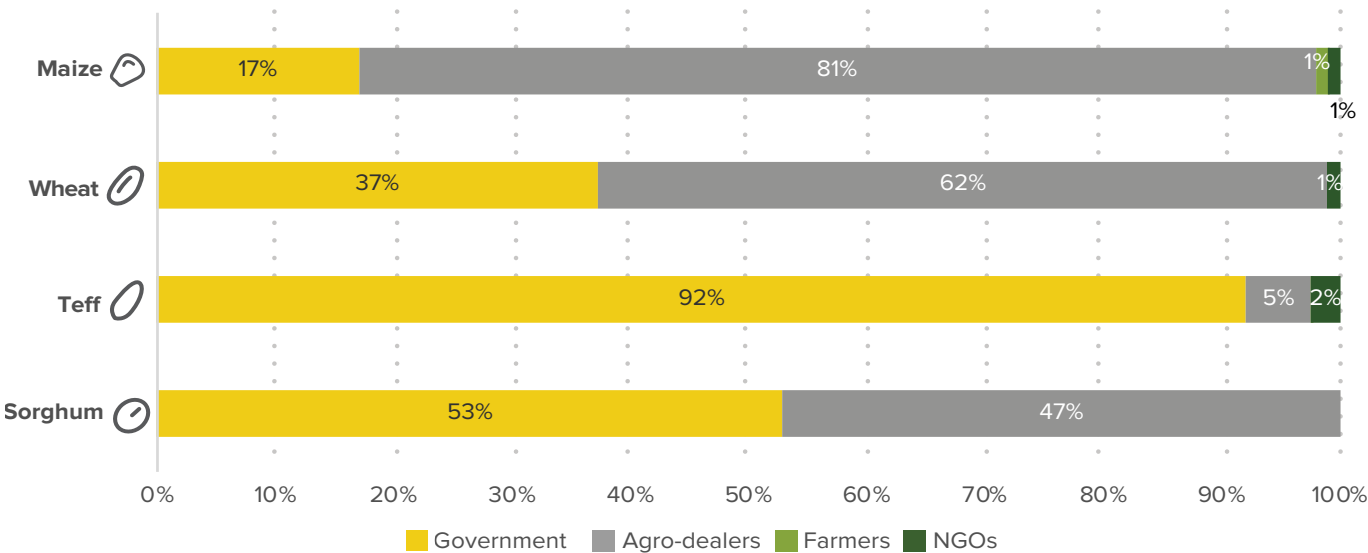
SEED IMPORT AND EXPORT PROCESS

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. The length of the import process in days is measured as the sum of the number of days needed to obtain import documentation (import permit, phytosanitary certificates, and an International Orange Certificate,¹³ if applicable) and the number of days to clear seed at the border. It excludes transportation time.

To import seed, it is necessary to obtain an import permit from the MoA. This takes one day and is straightforward. The next step is to obtain foreign currency so as to open a letter of

¹³ The International Orange Certificate is issued by a laboratory accredited by the International Seed Testing Association (ISTA) when both sampling from the seed lot and the testing of the sample are carried out by the same laboratory.

Figure 5: Seed sales by category of buyers (2020)



credit, which is required along with the import order. Opening a letter of credit takes one day. However, obtaining the letter of credit can take several months, as many companies rely on the government to allocate them foreign currency. As a result, importers prefer to secure foreign currency before they obtain the import permit.

Most international seed trade in Ethiopia concerns vegetable seed (this excludes cereals and legume pulses). In 2020, one company imported basic seed for maize, and only vegetable seed was exported from Ethiopia. The company that imported seed in 2020 arranged for its own source of foreign currency to open a letter of credit. Clearing the consignment at the border point of entry may take up to 12 days, primarily due to the lengthy paperwork involved. The seed company imported through Moyale, which is on the Ethiopia-Kenya border. The importing seed company rated the import process as “good” at 60%.



SEED POLICY AND REGULATIONS

LENGTH OF VARIETY RELEASE PROCESS

Plant variety release is the process by which new varieties undergo various tests for yield, Value for Cultivation and Use (VCU), and Distinctiveness, 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 and consistent variety release system that is well understood by the relevant actors and is followed diligently. The length of the variety release process is calculated from the date the application for variety release is submitted to the variety release committee to the date when it is approved for release. The calculation does not include the time the breeder spends developing the variety.

The variety release and registration process in Ethiopia is regulated by the Seed Proclamation No. 782 of 2013 (Federal Democratic Republic of Ethiopia 2013). To operationalize this proclamation, the MoA has established two committees – the Variety Evaluation Committee (VEC), which is referred to as the Technical Committee, and the NVRC. The VEC evaluates the performance data of varieties which have been submitted by a breeder for release. Then the VEC evaluates the Variety Verification Trials (VVT) planted on the research plot and 3-5 farmers' plots. These are jointly managed by breeders and respective farmers. Based on these two sources of data, the VEC makes a recommendation (i.e., full release, provisional release, repeat the VVT for one more season or reject) to the secretariat of the NVRC at the MoA. Then the NVRC reviews the reports of the VEC and receives the response from the breeders before making a decision. The MoA registers varieties approved for release in the Crop Variety Register which is published annually.

The Seed Regulations (No. 375/2016) (Ministry of Agriculture 2016) require that all varieties must be subjected to both DUS and VCU tests before being released for production. Article 4 of the Seed Proclamation (No. 782/2013) requires the MoA to provide details of the procedures and formalities for variety release. However, the MoA has not published the procedures and allows applicants to plant the candidate varieties in different locations to be evaluated by the VEC. In addition, DUS tests are not carried out in Ethiopia.

Breeders from the research institutions, universities, and international seed companies are required to apply to the MoA to register and release new varieties. The application should be submitted before the start of the planting season. For locally developed varieties, the company/breeder submits an application together with the variety's field performance data generated from two seasons' data in three locations of the country.

Once an application is accepted, the applicant is required to conduct VCU trials in three locations. Seed companies that want to release varieties must work with one of the local research institutes or universities to generate data for the VCU tests. The VCU trials are evaluated by the VEC, and the NVRC provides the final approval based on the recommendations of the VEC.

For varieties that are already registered in other countries, the applicant is required to submit proof of their registration elsewhere. Thereafter, the applicant is permitted to conduct the VCU trial in six locations. The VEC evaluates the performance of the variety during the VCU trials. Based on the report of the technical committee, the NVRC recommends the variety for release. The MoA notifies the applicant of the decision within a year of the initial application. The average length of variety release in 2020 was 12 months.

Breeders' levels of satisfaction with the variety release process, listed in Table 16, are "good" (66%). The variety release process has not been harmonized with the Common Market for Eastern and Southern Africa (COMESA) seed trade regulations. These regulations stipulate that if a variety is registered in at least two of the COMESA member countries, it will be automatically registered in other member countries (COMESA 2014). Since the Ethiopian seed law has not been amended to accommodate the requirements of this regulation, no variety has been registered under the COMESA seed regulations.

Table 16: Average length of variety release process¹⁴

Indicators	2020
Average length of variety release process (in months)	12
Satisfaction with variety release process (out of 100%)	66%
extremely poor poor fair good excellent	

¹⁴ There has been no change in the regulations or process of variety release over the last three years. However, the process is interpreted differently. The ministry requests data for six locations (two seasons in three locations or one season in six locations) to accept an application for release. Once accepted, only one season of VCU testing is required, which lasts a maximum of 12 months. The 2017 TASAI data might have considered the time of generating variety's field performance data that accompanies the application. In other countries studies by TASAI, the time taken to generate data for the application is counted as part of the release process.

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. Ethiopia's Regulation No. 361/2015 states that the cost of the VCU test is Ethiopian Birr (ETB) 11,000 (US\$ 275) per variety, season, and site (Federal Democratic Republic of Ethiopia 2015). However, in practice, no charge is levied since the MoA does not conduct the VCU tests. Instead, research institutions conduct the VCU test on their own and cover the cost of a VEC member's travel to the different test sites. While research institutions conduct VCU tests on their own, private companies are expected to work with research institutions to conduct the tests for them. In such cases, the research institutions do not charge the standard fee stipulated in Regulation No. 361/2015, as they are not mandated to carry out VCU tests and are therefore not required to follow the regulation and charge fees. Furthermore, while the EIAR used to charge US\$ 100 per variety per site to conduct the VCU tests for maize, recently they have changed to US\$ 30 per 2 rows of 5 meters per site. Assuming 100m² per site, the VCU tests now cost more than 10 times the fees indicated in the regulation.

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. Ethiopia has a comprehensive seed strategy to guide overall seed sector development (FDRE and ATA n.d.). Currently, the Ethiopia Seed Proclamation No. 782/2013 is the main seed legislation for the country (Federal Republic of Ethiopia 2013). The 2013 proclamation introduces rules for systematic production and control of seed quality and prescribes field and seed standards for different seed classes. Based on the law, Seed Regulation No. 375/2016 (Ministry of Agriculture 2016) was gazetted and is fully operational. Regulation No. 361/2015 (Federal Democratic Republic of Ethiopia 2015), which sets fees for variety testing/release/registration and rates for seed quality assurance services, is not implemented fully. There are also several ministerial directives - certificate of competence, follow up of rejected seed lot, production of unregistered varieties, seed marketing, quality declared seed, and production of unregistered variety - which aim to facilitate the smooth functioning of the seed sector.

The Plant Breeder's Rights Proclamation that was adopted in 2006 was amended in 2017 (No. 1068/2017) (Federal Democratic Republic of Ethiopia, 2018). The Plant Breeder's Right Directive No 769/2021 by the MoA was approved and released in January 2022. This Directive will facilitate the implementation of the Proclamation.

QUALITY AND ENFORCEMENT OF SEED REGULATIONS

Seed regulations give structure to the formal seed sector. TASAI studies assess 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.

Implementation of the Ethiopia's Seed Regulations:

In Ethiopia, the BoA under the MoA is responsible for implementing key seed services such as seed quality assurance and the registration of seed producers. At the regional level, four out of ten states have established regulatory authorities to date. Ethiopia has not yet started to implement regional regulations, as the amendment to the seed law that will accommodate these regulations is awaiting approval.

Implementation of the harmonized COMESA seed trade regulations:

Ethiopia's seed law is not yet harmonized with COMESA regulations, and therefore the provision of releasing varieties locally that are registered in two other COMESA countries without additional testing is not yet in place in Ethiopia. Amendments to the Seed Proclamation No. 782/2013, which deal with, among other things, issues related to harmonization with COMESA seed regulations, are awaiting approval.





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.

The regional regulatory authorities have the mandate to address the challenge of counterfeit seed in Ethiopia. There is no formal procedures to track and report cases of counterfeit seed either at seed companies or the regulatory authorities level. However, the regional regulatory authorities have various experiences with regard to the issue of counterfeit seed. The Amhara regional regulatory authority does not have any laid-down procedure for tracking and recording cases of counterfeit seed. According to the head of the Amhara regulatory authority, cases of contraband seed are more common than counterfeit seed. Contraband seed is seed that is acquired and sold illegally. In most cases, the seed is either smuggled from another region or a contract out-grower does not deliver all the seed to the contracting seed company. In both cases, the seed is sold to farmers informally, without being inspected or certified.

The SNNP regional regulatory authority does not have any procedures for tracking counterfeit seed. However, it receives information of the potential distribution of counterfeit seed at the district level. This information usually comes from

agricultural extension officers. In such cases, the seed would be taken to the regional seed laboratory for testing. The regional authority recently received one case of suspected counterfeit haricot bean seed, but it has not received any reports related to the four focus crops.

The Oromia regional regulatory authority does not have any laid-down procedure for tracking counterfeit seed, and did not receive any reports of counterfeit seed in 2021. However, if they were to receive any reports, they would test the seed at the regional seed laboratory. Any culprit would be taken to court. According to the regulations, the punishment for selling seed that is not registered is imprisonment for a period of 3 to 5 years and a fine of between ETB 50,000 (US\$ 1,043)¹⁵ to ETB 100,000 (US\$ 2,086) (Federal Democratic Republic of Ethiopia 2013). Satisfaction with the government's efforts to combat counterfeit seed in 2020 was "fair" (52%). This is a slight decline from the satisfaction rating of 57% in 2017.

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 Ethiopia between 2018 and 2021.

¹⁵ In December 2021, 1 US\$ was equivalent to ETB 47.95.

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, seed producers, seed cooperative unions and, at times, agro-dealers.

The ESA was established in 2008 as an umbrella organization for seed producers. By 2020, the ESA had 42 members, which include government parastatals, private seed producers, multi-national seed companies, seed cooperative unions and seed importers. The association often partners with other institutions on matters related to seed sector development. For example, between 2018 and 2020, in collaboration with the Alliance for a Green Revolution in Africa (AGRA), the association commissioned studies to identify policy and non-policy constraints impeding the seed sector.¹⁶ The results were presented to the government and most recommendations were included in the amendment of the seed law that is awaiting approval.

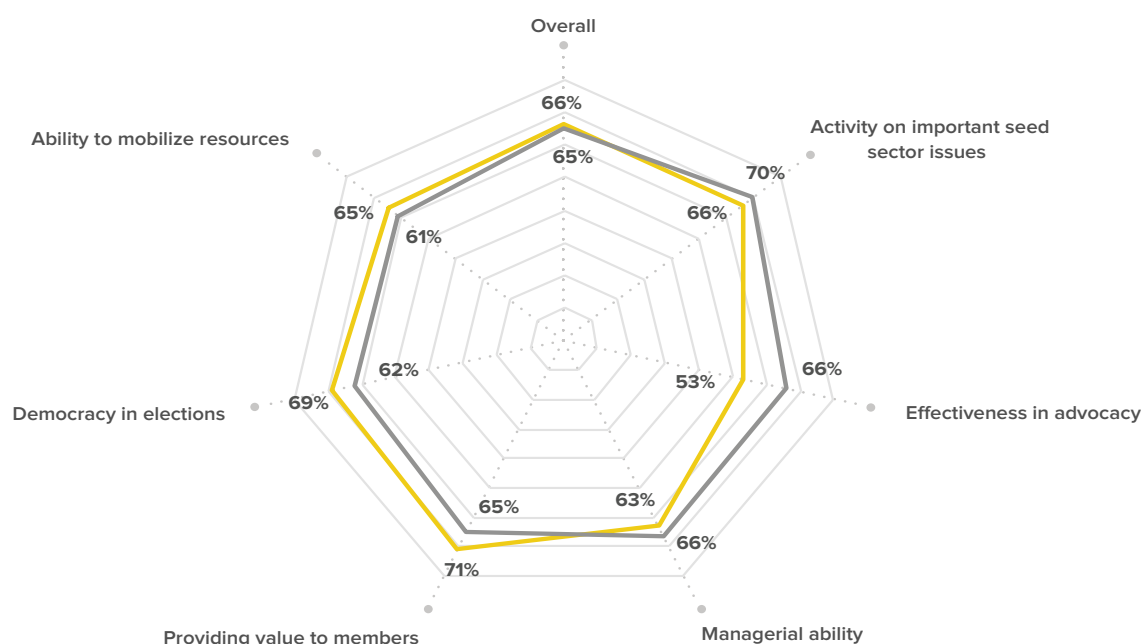
Only 10 out of the 26 seed producers who were interviewed

16 <https://ethiopianseedassociation.wordpress.com/2019/02/05/746/>

for this study are members of the ESA. Figure 6 compares the members' satisfaction with the ESA in 2017 and 2020. In 2020, the members rated their overall satisfaction with the association as "good" (65%), a slight decrease from the rating in 2017 (66%). Between 2017 and 2020, members' satisfaction improved with respect to "activity on seed sector issues" and "effectiveness in advocacy". The improved ratings are likely due to the association's active participation in the policy studies. This increased the association's visibility and enhanced its profile as a platform for the private sector. The ESA's ratings for "managerial ability" and "ability to mobilize resources" also improved. However, the ESA members' rating on "providing value to members" and "democracy in elections" declined.

Of the 16 surveyed seed companies which were not members of the ESA, seven indicated that they were not aware of the association's existence. The other nine knew of the association, but they were uncertain about the role of the association and benefits to its members. This shows that the association had not created sufficient awareness of its activities at the national level.

Figure 6: Members' opinion of the ESA





ADEQUACY OF SEED INSPECTORS

Seed inspection services ensure that certified commercial seed meets the 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 Ethiopia, seed inspectors are employed by the Plant Health and Regulatory Directorate in the MoA at the national level and by the various regional regulatory authorities. In 2020, the government had 52 seed inspectors (44 male and 8 female), an increase from the 32 inspectors in 2017. Of the 52 inspectors, only 5 are employed at the national level, while 47 are employed at the various regional regulatory authorities (Table 17). The increase is the result of additional seed inspectors being hired when the Oromia Agricultural Regulatory Authority was established in 2020. AGRA is working with the MoA to introduce a system for private seed inspection and certification. However, for this to be done, there is need to amend the Seed Proclamation first. After the Proclamation has been amended, then the appropriate Ministerial Decrees will be passed.

Table 17: Number of federal and regional seed inspectors

Breakdown of seed inspectors	Male	Female
Regional Regulatory Agencies: Total	43	4
Amhara	11	1
SNNNP	12	2
Oromia	18	1
Tigray	2	0
National (Ministry of Agriculture): Total	1	4
TOTAL (national and regional)	44	8



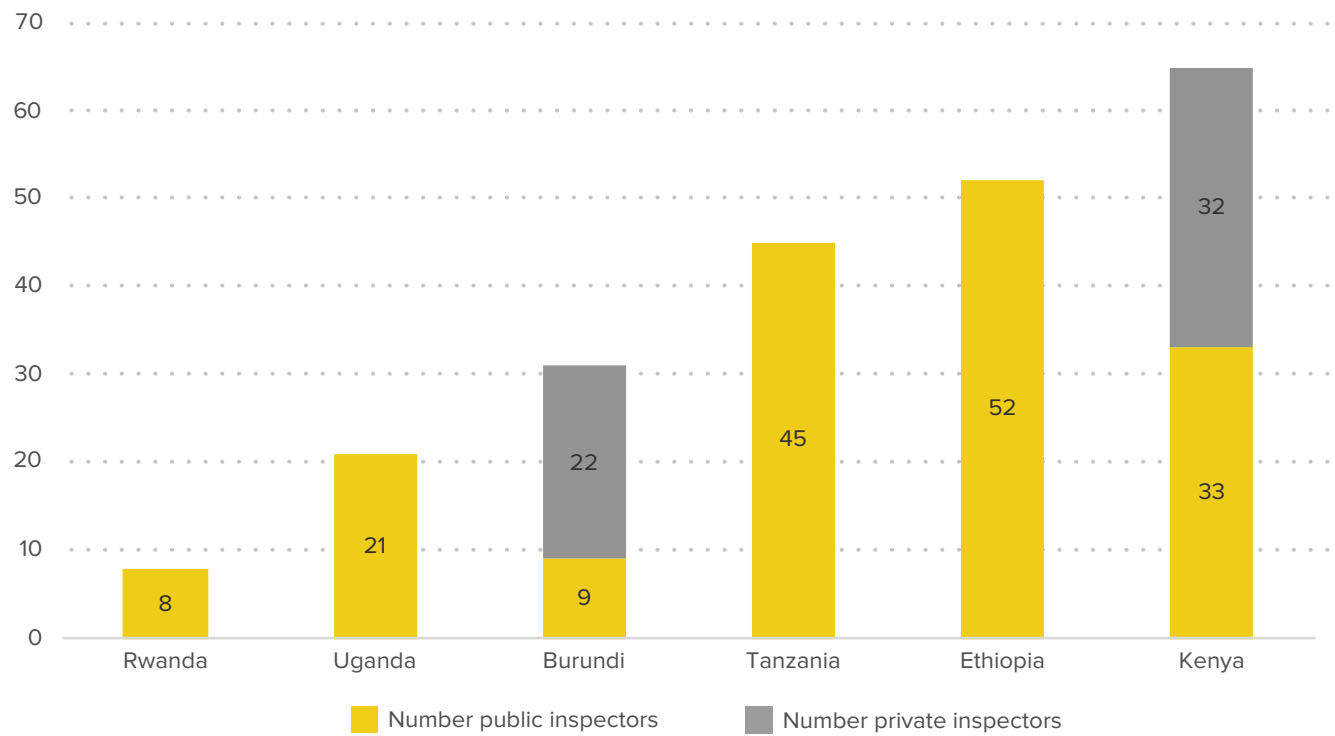


Seed companies' satisfaction with the adequacy of inspection services in 2020 was "good" at 78%, an increase from 68% in 2017. Despite the relatively high satisfaction rating, seed companies and the regulatory authorities acknowledge that seed inspectors face the challenge of inadequate transport facilities to reach all the field sites. They also lack laboratory equipment for seed testing and analysis. These logistical challenges are compounded by the inadequate training seed inspectors receive. While seed inspectors hold degrees in plant science or agronomy, they do not receive any formal training on seed inspection. Instead, they receive on-the-job training from their senior officers.

In Ethiopia, there are no private seed inspection services. Article 6 of Seed Proclamation No. 728/2013 requires that all seed producers have an internal quality control system. As a result, most of the seed companies have trained agronomists who have a good understanding of seed production to oversee internal quality control.

Figure 7 shows the number of seed inspectors in the Eastern African region 2021. Ethiopia has the highest number of public inspectors, and the second highest total number of seed inspectors, after Kenya. Public seed inspection services in Kenya and Burundi are complemented by private seed inspectors who have been authorized seed inspectors.

Figure 7: Number of seed inspectors in the Eastern Africa region (2021)



SERVICE TO SMALLHOLDER FARMERS

ADEQUACY OF EXTENSION SERVICES

Well-functioning agricultural extension services are critical to the successful promotion and subsequent adoption of improved seed by smallholder farmers. TASAI tracks the average number of agricultural households served by one extension agent. 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 agents by sector (public and private) and gender; it is not crop-specific.

In Ethiopia, the regional state bureaus of agriculture are responsible for providing public extension services to farmers. The Federal MoA provides policy and technical support. Private extension services are not common, except in the case of some industrial crops, and the service provided focuses primarily on the marketing of varieties of those crops. Only 20% of the interviewed seed companies have their own extension officers; the rest rely heavily on the public extension system. All local seed companies use public varieties without exclusive user-rights to the varieties. The companies also access extension services for these varieties as public goods. For this reason, seed companies do not invest in promotional services, since these would benefit other companies.

Public extension agents are assigned at the kebele (municipality) level, which is the lowest administrative unit in Ethiopia. These agents are supervised by the district office of agriculture. According to the MoA, there are 71,473 extension officers, of whom approximately 21% are female. This translates to a ratio of one extension officer for every 237 agricultural farming households (Table 18). The government aims to assign three development agents with different agricultural backgrounds (e.g., crop science, animal science, and natural resource management) to each kebele in regions with a high agricultural potential (FDRE and MoA 2014).

Seed companies rated their satisfaction with the adequacy of the agricultural extension officers as “fair” (53%). This is because the extension officers do not have adequate transportation facilities, such as vehicles, to enable their movement around the districts. Other agencies that offer extension services are also constrained by a lack of resources. For example, there are 14,065 Farmer Training Centers (FTCs), whose aim is to enhance the knowledge base of farmers and to provide the institutional framework for increasing the efficiency and effectiveness of agricultural

advisory services (Omer 2021). However, only 28% of the FTCs are sufficiently resourced with adequate equipment, land for demonstration (2.5 ha) and training manuals. Similarly, of the 19 Agricultural Technical and Vocational Education and Training (A-TVET) colleges in the country, only 12 colleges have sufficient staff, facilities, and financial resources to provide adequate training.

At present, public extension officers are not making use of any new or innovative/digital tools. The ministry relies on radio programs to relay agriculture-related information to farmers. However, some programs like the ATA are piloting the use of Interactive Voice Response (IVR) phones as part of their extension services. In addition, Digital Green¹⁷ uses ICT to connect farmers and share videos to demonstrate best practices. Moreover, the Advanced Maize Seed Adoption Program (AMSAP) (funded by USAID and implemented by ACDI/VOCA) has greatly contributed to a wide-scale adoption of maize hybrid varieties in Ethiopia. As a result, old varieties of hybrid maize have been replaced. BH660 has been replaced by BH661, and BH540 has been replaced by BH546 and BH547.

Table 18: Number and adequacy of agricultural extension services

Indicators	2020
Number of public extension officers	71,400
Number of private extension officers	13
Total number of extension officers	71,413
Ratio of extension officers to agricultural households	1:237
Seed industry satisfaction with extension officers (out of 100%)	53%
Interpretation of satisfaction	Fair

¹⁷ Digital Green is a global development organization that empowers farmers to escape poverty by harnessing technology and grass-roots partnerships: <https://www.digitalgreen.org/about-us/>

CONCENTRATION OF THE AGRO-DEALER NETWORK

Agro-dealers play a key role expanding the reach of 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 and non-registered agro-dealers. This indicator tracks the number of agro-dealers in the country.

In 2011, the Ethiopian government introduced the DSM approach, through which the seed producers (both public and private) led seed production and marketing. This has marked a shift away from a centralized seed market under government auspices (Mekonnen et al. 2021). The approach aims to increase the supply of improved varieties and quality seed to spatially dispersed farmers (FDRE and ATA n.d.). Through this system, the seed of grain crops sells through agents (appointed by specific companies to sell their seed) or agro-dealers (who sell seed from many seed companies and may also sell other agricultural inputs). The

number of agents/agro-dealers increased from 800¹⁸ in 2017 to 1,620¹⁹ in 2020 (Table 19). The number of woredas (districts) covered by DSM increased from 132 in 2017 to 290 in 2019. (Mekonnen et al. 2021). Most of the surveyed seed companies (73%) use agents/agro-dealers to sell their seed. The number of agents per company varies from as low as 2 to as high as 263. While most of the agents/agro-dealers work with more than one company, 47% of the seed companies in Ethiopia have exclusive agents. Since the agent/agro-dealer model is not yet well established, some agents follow the rules and regulations, while others view the business as an opportunity to be exploited, partly contributing to the challenge of counterfeit seed. The seed producers' level of satisfaction with the agents/agro-dealers is "good" (65%), an improvement from the "fair" satisfaction rating (47%) given in 2017.

¹⁸ Mekonnen, D., Abate, G.T., Yimam, S., Benfica, R., Spielman, D.J., Place, F. 2021. The Impact of Ethiopia's Direct Seed Marketing Approach on Smallholders' Access to Seeds, Productivity, and Commercialization. IFPRI Discussion Paper 01998. Washington, DC.

¹⁹ Number provided by BoA's in response in the TASAI survey.

Table 19: Number of agro-dealers and satisfaction with the agents/agro-dealer network

Indicator	2017	2020
Number of agents/ agro-dealers	800	1,620
Average number of agro-dealers per seed company		51
% of companies with exclusive agro-dealers	-	47%
Seed industry satisfaction with agro-dealer network (out of 100%)	47%	65%

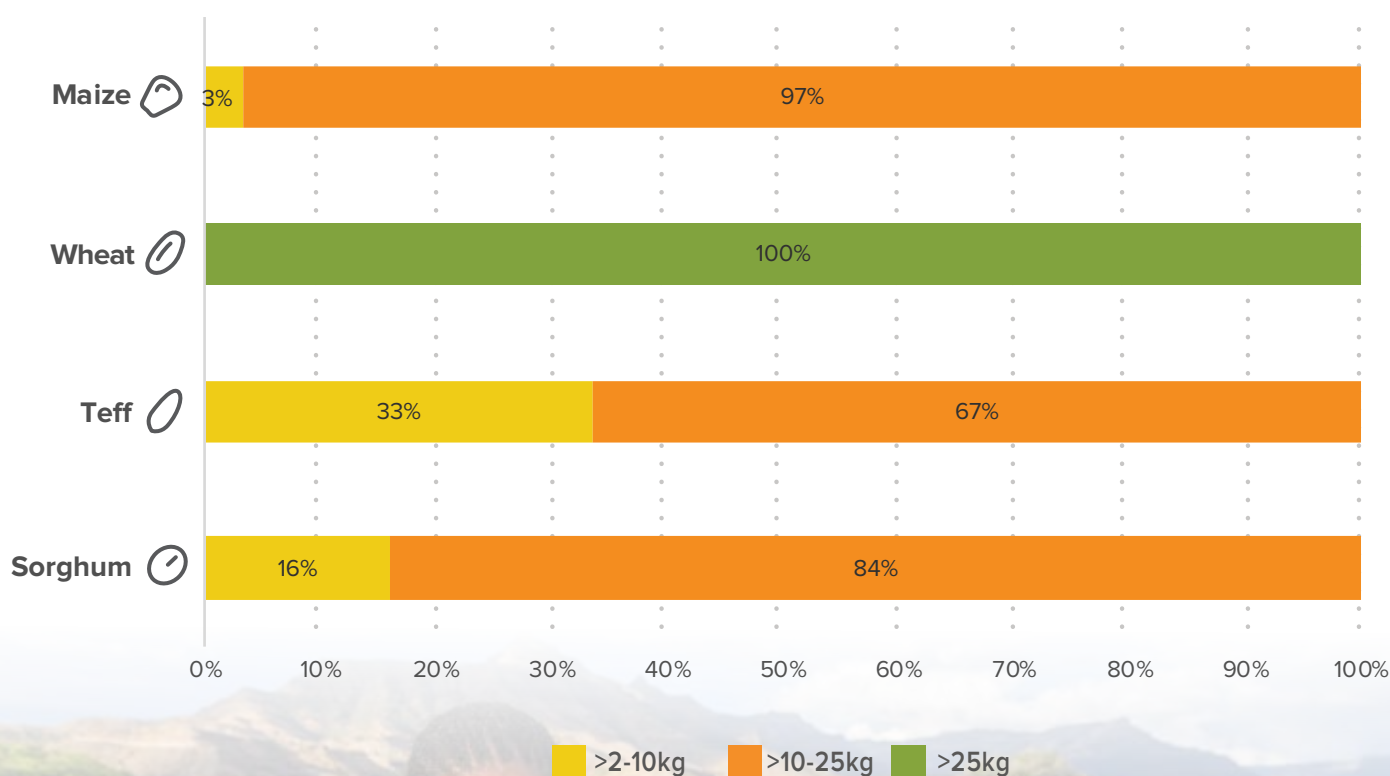
AVAILABILITY OF SEED IN SMALL PACKAGES

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 improved seed. TASAI tracks the percentage of seed sold in different package sizes, i.e., 2 kg and below, 2-10 kg, 10-25 kg, and above 25 kg. In Ethiopia, seed is packaged in standard sizes for half a hectare of land. This results in different packages for different crops: 12.5 kg for maize, 50 kg for wheat, 15 kg for teff, and 10 kg for sorghum.

Figure 8 shows the percentage of seed that is sold in different package sizes. Seed companies largely follow the standard package sizes when selling their seed. The only exception is

teff, of which 33% is sold in package sizes of between 2 kg and 10 kg, and not the standard 15 kg package. These deviations have been driven by projects and external partners. For example, the Integrated Seed Sector Development (ISSD) program and CIMMYT supported the use of small packages from 2016-2020 (ISSD 2020). However, for the most part, this promotion has not yet yielded results, as most companies still use the standard package sizes. The Seed Proclamation No. 782 of 2013 requires seed producers to put information about the variety as well as their company name on the package (Federal Democratic Republic of Ethiopia 2000). All seed companies follow this requirement.

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 quality seed. This data point is important since 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.

The seed-to-grain price ratios, listed in Table 20, are high for hybrid maize seed (3.5:1 for publicly owned hybrids and 6.9:1 for privately owned hybrids) but low for wheat (1.2:1). Despite the relatively high price of the privately owned hybrid maize varieties - which cost nearly twice the price of publicly owned hybrids - demand for them is still very high. There is

a relatively low seed-to-grain price ratio for public varieties because public seed companies set the same price for the same variety that they sell in order to avoid competition. The price setting is conducted in the presence of an observer from the MoA. The average cost of production is often used to determine the price. This places the seed entities that work with out-grower schemes at a disadvantage, compared to entities who own their own land and do not work with out-growers. According to the MoA records, 97% of maize seed produced is of hybrid varieties (Ministry of Agriculture 2020). This is because farmers appreciate the quality of the hybrid varieties (AGRA 2019). The ratios for the other crops, which are all open-pollinated varieties (OPVs), are all low: 2.7:1 for OPV maize and 1.3:1 for both teff and sorghum.

Table 20: Seed-to-grain price ratios

Crop	Prices in 2020 (ETB/kg)		Seed-to-grain price ratio
	Average Seed price	Average grain price	
 Maize (hybrid, public) ²⁰	33.2	9.5	3.5:1
 Maize (hybrid, private)	65.6	9.5	6.9:1
 Maize (OPV)	25.5	9.5	2.7:1
 Wheat	23.0	19	1.2:1
 Teff	51.3	38.5	1.3:1
 Sorghum	24.25	18	1.3:1

²⁰ The price of privately-owned hybrid maize seed varieties (ETB 65.6 /kg) is nearly double the price of those that are publicly owned (ETB 33.2 /kg). For this reason, the two have been disaggregated to give a more accurate picture of price ratios.

CONCLUSION

Ethiopia's formal seed sector is in the early growth stage of development. The early growth stage is characterized by, among other factors, active role of the public sector across the seed value chain, relatively weak private sector, established breeding programs and evolving seed policy environments. Seed companies produce and sell a limited range of staple crops. While governments and NGOs are still significant players in the seed sector, there is a growing agro-dealers' network that supports the distribution of seed to smallholder farmers (Ariga et al. 2019).

Under the **research and development** category, the role of public organizations is significant in the Ethiopian seed sector. All crop breeding in the country is carried out by public research institutes and public universities; there is no private breeding program in Ethiopia. Over the last three years, an average of six wheat varieties, two maize varieties and three teff and sorghum varieties each have been released per year. These numbers are insufficient considering the diversity of Ethiopia's agro-ecologies. Although as many as 28 varieties of seed are marketed for a single crop, a small number of varieties dominates the market. The weighted average age of varieties ranges from 9 years for wheat to 23 years for sorghum. The major suppliers of foundation seed are two public seed enterprises and two research institutes. Seed producers are more satisfied with the services of EGS-producing companies than they are with the services of research institutes. Changing the management of foundation seed distribution from central allocation to contract-based distribution has improved its availability and buyers' satisfaction levels.

Under the **industry competitiveness** category, maize and wheat are the main crops, and a few producers dominate the seed markets. Except for maize, the share of the four parastatals is high, up to 90%. Market concentration is high for all crops, approaching monopoly conditions, with the exception of maize. The seed marketing system has been changing over the last decade from a centralized distribution system towards multiple channels of marketing. Though varying greatly across the surveyed crops, only 39% of the seed was centrally allocated by the government in 2020, and the remaining seed was sold through different

channels by producers. There were no seed exports, and seed imports were also very limited for the focus crops. In general, the seed industry is not very competitive.

The **seed policy** environment in Ethiopia is evolving, with the core instruments in place and the regulations to affect their implementation awaiting approval. The process of variety release only takes one year after the submission of an application. In absence of a fully autonomous institution to lead variety release and registration, the variety release process is dominated by breeding institutions. In addition, the variety release process requires that private seed companies work with breeding institutions, which are their competitors. Although there are regulations in place to determine the costs of VCU testing, these are only partially implemented. At the federal level, there is insufficient capacity to register and protect varieties, limiting the interest of companies to register their best varieties. There are reports of counterfeit seed and the systems to combat counterfeit seed are limited to reactionary measures.

Institutional support for the formal seed sector in Ethiopia is weak. Given the low development of the seed sector, particularly in terms of the participation of the private sector, the ESA is not strong enough to protect the interests of its members. Currently, it is working with different development partners to increase the capacity of its members and represent the interests of its members to the government. Members of the association rate it "good" overall. The association needs to work to improve its visibility and contribution to the seed sector. Although the number of seed inspectors has increased since 2017, their ability to be effective is limited and this affects the quality of the seed reaching farmers. All inspection services are all provided by the government. There are no licensed private seed inspectors.

Service to smallholder farmers in Ethiopia relies heavily on public services. Except for multinational seed companies, all the other seed companies use public varieties, and put little effort into the promotion of these varieties. All seed companies rely on government extension services, which are not effective given that they are under-resourced. Most seed producers are using agents/agro-dealers to market their seed. Thanks to the increased coverage of Direct Seed Marketing approach, the number of agents/agro-dealers has increased significantly. However, seed producers' levels of satisfaction with the agro-dealer network remains relatively low.

Efforts to provide seed in package sizes that better serve the needs of smallholder farmers remain limited. Nonetheless, there have been some improvements in this area in the case of teff and sorghum, though this has not been the case for maize.



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ABOUT TASAI



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.

TASAI PRINCIPLES

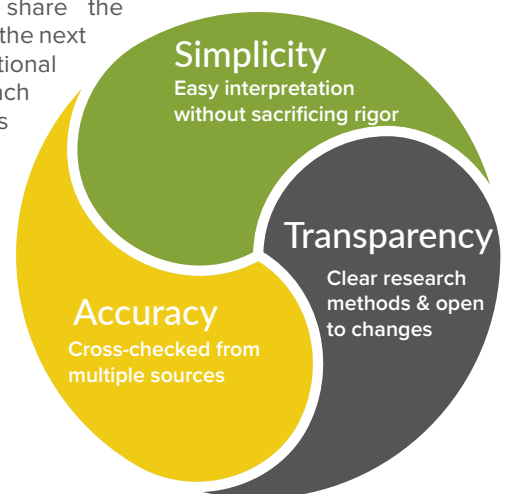


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