

# Rwanda Country Report 2021

The African Seed Access Index

By

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**TASAI**  
The African Seed Access Index

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### December 2021

The findings in this report were presented to seed sector stakeholders in a TASAI dissemination meeting held in Kigali, Rwanda on December 7, 2021. The current version incorporates feedback from the meeting.

**Cite as:** Mabaya, E., Urinzwenimana, C., Ngerero, N.G., Waithaka, M., Mugoya, M., Tihanyi, K., Kanyenji, G. 2021. Rwanda Country Report 2021 - The African Seed Access Index (version December 2021).



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## LIST OF ACRONYMS:

|                |                                                                    |
|----------------|--------------------------------------------------------------------|
| <b>AGRA</b>    | Alliance for a Green Revolution in Africa                          |
| <b>API</b>     | Agro-Processing Industries                                         |
| <b>CIP</b>     | Crop Intensification Program                                       |
| <b>COMESA</b>  | Common Market for Eastern and Southern Africa                      |
| <b>DUS</b>     | Distinctness, Uniformity and Stability                             |
| <b>FFS</b>     | Farmer Field School                                                |
| <b>HHI</b>     | Herfindahl-Hirschman Index                                         |
| <b>ISTA</b>    | International Seed Testing Association                             |
| <b>MINAGRI</b> | Ministry of Agriculture and Animal Resources                       |
| <b>NGO</b>     | Non-Governmental Organization                                      |
| <b>NISR</b>    | National Institute of Statistics of Rwanda                         |
| <b>NVRC</b>    | National Variety Release Committee                                 |
| <b>OAF</b>     | One Acre Fund                                                      |
| <b>OPVs</b>    | Open Pollinated Varieties                                          |
| <b>RAB</b>     | Rwanda Agriculture and Animal Resources Development Board          |
| <b>RICA</b>    | Rwanda Inspectorate, Competition and Consumer Protection Authority |
| <b>VCU</b>     | Value for Cultivation and Use                                      |



# 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. 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, 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 Rwanda's formal seed sector. Whenever relevant, the study also provides comparisons to the previous study conducted in Rwanda in 2018. TASAI studies focus on the four grain and legume crops important to a country's food and nutritional security (the "four focus crops"). In Rwanda, these crops are maize, bean, wheat, and soya bean. In addition, the above crops, especially maize and bean, are widely produced in the country. According to the Seasonal Agricultural Survey for 2020, the four crops account for 80% of the harvested area of cereal and legume crops (NISR 2020). While the production of soya bean and wheat remains limited, there is unmet market demand for these two crops as they constitute the primary raw materials for local oil processing (soya bean) and flour milling (wheat) industries.

## OVERVIEW OF RWANDA'S FORMAL SEED INDUSTRY

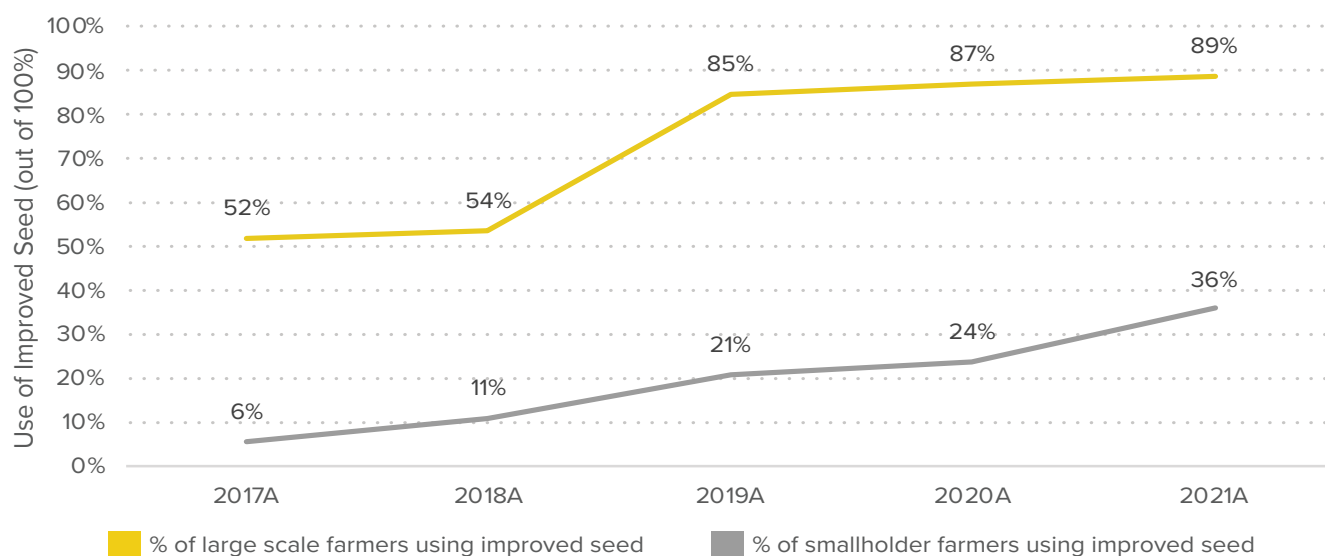
Like most other African countries, Rwanda's seed industry consists of two systems: the informal and formal system. This Country Report focuses almost exclusively on the formal seed system.

**The informal system** 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 & 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 and physical and sanitary quality.

The annual Seasonal Agricultural Surveys carried out between 2017 (NISR 2017) and 2021 (NISR 2021) reveal that the informal seed system is still the main source of seed for small-scale farmers. However, over this period, the percentage of small-scale and large-scale farmers using improved seed has increased steadily in the main cropping season (Season A). These trends are presented in Figure 1 and are discussed in the following section.

**The formal system** 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. Since 2018, there has been a steady increase in the percentage of both small-scale and large-scale farmers who use improved, certified seed in Rwanda (Figure 1). According to data from the National Institute of Statistics of Rwanda (NISR), the percentage of small-scale farmers using improved seed has increased from 6% in 2017 to 36% in 2021. The proportion of large-scale farmers using improved seed has also increased steadily, from 52% in 2017 to 89% in 2021. This upturn has largely been fueled by government efforts to encourage private-sector involvement and investment in the seed industry. These efforts include permitting private seed companies to sell seed directly to farmers, rather than requiring them to sell through government entities, the creation of the seed certification agency, the Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA), and the creation of a government subsidy program that increases farmers' access to improved seed. In addition, there is increased funding for public research to develop improved varieties of key staple food crop.





**Figure 1: Percentage of farmers using improved seed (2017A-2021A)<sup>1</sup>**

Source: National Institute of Statistics of Rwanda 2017, 2018, 2019, 2020 and 2021

<sup>1</sup> Note: 2017A stands for the first season in year 2017.

Table 1 lists the agencies in charge of various aspects of Rwanda's formal seed sector. The Rwanda Agriculture and Animal Resources Development Board (RAB) is responsible for research and development and technical aspects of agricultural extension. RICA is responsible for seed certification, plant variety registration and protection. Other important players are seed companies and agro-dealers and non-governmental agencies and development partners.

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

| ROLE                               | KEY PLAYERS                                                                                                                                                                                                                               |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research and breeding              | Rwanda Agriculture and Animal Resources Development Board (RAB), International Centre for Tropical Agriculture (CIAT), International Maize and Wheat Improvement Centre (CIMMYT), International Institute for Tropical Agriculture (IITA) |
| Variety release and regulation     | National Variety Release Committee (NVRC), Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA), Ministry of Agriculture and Animal Resources (MINAGRI)                                                              |
| Seed production and processing     | Seed companies, seed cooperatives, individual seed producers, seed processing plants, One Acre Fund (OAF), RAB                                                                                                                            |
| Education, training, and extension | RAB, AGRA, United States Agency for International Development (USAID), Non-Governmental Organizations (OAF, Hinga Weze, World Vision)                                                                                                     |
| Distribution and sales             | Seed companies, NGOs (OAF, AGRIFOP), agro-dealers, Agro-Processing Trust Corporation (APTC)                                                                                                                                               |



## 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). While these indicators are common to all studies, during the inception phase of a study, countries may suggest sub-indicators that they wish to track. In this study, an examination of seed production and processing capacity were added at the request of local stakeholders. 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 |
|----------------------------------------------------------------------------|---------------|-----------------------|
| <b>A RESEARCH AND DEVELOPMENT</b>                                          |               |                       |
| 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>B INDUSTRY COMPETITIVENESS</b>                                          |               |                       |
| 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           | +                     |
| <b>C SEED POLICY AND REGULATIONS</b>                                       |               |                       |
| 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            | +/-                   |
| <b>D INSTITUTIONAL SUPPORT</b>                                             |               |                       |
| D1 Performance of national seed association                                | No            | +                     |
| D2 Adequacy of seed inspection services                                    | No            | +                     |
| <b>E SERVICE TO SMALLHOLDER FARMERS</b>                                    |               |                       |
| 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 examine the development of Rwanda's seed sector, the present country report draws comparisons with the findings of the 2018 TASAI Rwanda study (with performance data primarily from 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 producers were the 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**.

There are three categories of seed producers in Rwanda. The first category consists of individual seed producers,

who are registered as seed multipliers. The second are seed cooperatives, each of which is registered as a single seed producer, but which comprises several members who operate together. The third category is made up of seed companies and includes both locally-owned and foreign-owned companies. All active seed producers are registered by RICA. In 2020, RICA registered 54 maize seed producers, 31 bean seed producers, 20 wheat seed producers and 14 soya bean producers (Table 3). The survey sampled 50 seed producers, of which 23 were seed companies and 27 were either seed cooperatives or individual seed producers. Seed producers were included in the sample based on the following three criteria: first, that the seed producers consistently produced seed in the three consecutive cropping seasons of 2019A, 2019B and 2020A; second, that the seed producers produced seed on more than 10 ha each season (the current limit to qualify as a seed producer is 5 ha); third, seed producers who were only out-growers for other seed producers were excluded to avoid double counting.

**Table 3: Breakdown of respondents' activity by crop (2020)**

| Crop                                                                                          | Number of seed producers registered by RICA | Number of registered seed producers surveyed* (TASAI data) |
|-----------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------------------|
|  Maize     | 54                                          | 25                                                         |
|  Bean      | 31                                          | 24                                                         |
|  Wheat     | 20                                          | 8                                                          |
|  Soya bean | 14                                          | 18                                                         |
| <b>Total</b>                                                                                  |                                             | 50                                                         |

\*The same producer may be listed under multiple crops.

In addition to the seed producers, information was collected from government entities, centers of the Consultative Group on International Agricultural Research (CGIAR) that are active in Rwanda, development partners, NGOs, and other stakeholders as listed below.

- **Government entities:** the RAB (heads of breeding programs/ lead breeders), experts from the Ministry of Agriculture and Animal Resources (MINAGRI); the University of Rwanda (seed system expert); RICA (the Director General).
- **Centers of the Consultative Group on International Agricultural Research (CGIAR)** that are active in Rwanda: the International Centre for Tropical Agriculture (CIAT), which operates in partnership with Harvest Plus to promote biofortified beans; the International Maize and Wheat Improvement Centre (CIMMYT), whose work focuses on maize, and the International Institute for Tropical Agriculture (IITA), which focuses on cassava and soya bean.

- **Development partners and NGOs:** One Acre Fund – Tubura, which supplies seed and other inputs and services to smallholder farmers; the Alliance for a Green Revolution in Africa (AGRA), which supports the Government of Rwanda in its various activities in the agricultural sector; Cultivating New Frontiers in Agriculture (CNFA), which runs a project called “Feed the Future Rwanda - Hinga Weze,” whose aim is to sustainably increase smallholder farmers’ income and improve their nutritional status.
- **Other stakeholders:** the IMBARAGA farmers’ organization (*Ubuhinzi N’ubworozi Bw’umwuga Imbarutso Y’iterambere*), the National Farmer Organization, and the Private Sector Federation - Rwanda<sup>2</sup>, a professional organization dedicated to promoting and representing the interests of the Rwandan business community.

<sup>2</sup> The Private Sector Federation – Rwanda (PSF) <https://www.psf.org.rw/about.html>

# 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. 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 producers with the public breeding programs. The latter often reflects the ability of active breeders in public institutions to produce new varieties.

In Rwanda, all the active breeders work within the public breeding programs of the RAB. Breeding programs are organized as broad commodity research-based programs, such as cereals (maize, rice, wheat, and sorghum), pulses and oil crops (bean, soya bean, peas, sunflower, and groundnut), and roots and tubers (cassava, potato, and sweet potato). Under this program structure a breeder is assigned to a specific crop.

Table 4 shows the number of active breeders in Rwanda in 2020, broken down by crop, as well as satisfaction levels with these breeders, as reported by the seed producers surveyed. In 2020, the RAB employed 12 breeders, 5 of whom were maize breeders. Three of the 12 breeders (25%) were women, all of whom were working on bean.

The maize breeding program focused on developing hybrid maize varieties adapted to low, medium and high-altitude ecologies, with specific traits of resistance to Fall Army Worm (FAW) and Maize Lethal Necrosis Disease (MLND), as well as drought tolerance. The bean program had four breeders, who focused on developing varieties with nutrition-enhanced and high-yielding traits. The soya bean program had only one breeder, who focused on developing varieties with a high oil and protein content. The wheat program had two breeders. In 2020, the crop-based breeding programs had the required facilities and equipment, and the breeders were active in setting and implementing breeding objectives.

Seed producers reported a high level of satisfaction with the adequacy of active breeders. This reflects the fact that seed producers can easily contact the breeders to obtain basic seed for their operations. Basic seed from the RAB is available without royalty payments in order to encourage private sector players in the seed industry to venture into seed production. Current limitations include the inavailability of land, lack of breeder seed, and minimal funding for basic seed production.

Between 2018 and 2020, the number of breeders increased by one breeder for the maize, bean, and soya bean programs, but remained unchanged for wheat. Between 2018 and 2020, seed producers' ratings improved from 67% to 77% for maize, from 60% to 77% for bean, and from 67% to 76% for soya bean. However, their rating for wheat breeders declined from "excellent" (86%) to "good" (79%).

**Table 4: Number of active breeders**

| Crop                                                                                          | Number of active breeders in 2018 |        | Number of active breeders in 2020 |        |       | Satisfaction rating in 2018 (out of 100%) | Satisfaction rating in 2020 (out of 100%) |
|-----------------------------------------------------------------------------------------------|-----------------------------------|--------|-----------------------------------|--------|-------|-------------------------------------------|-------------------------------------------|
|                                                                                               | Public                            |        | Public                            |        |       |                                           |                                           |
|                                                                                               | Male                              | Female | Male                              | Female | Total |                                           |                                           |
|  Maize     | 4                                 | 0      | 5                                 | 0      | 5     | 67%                                       | 77%                                       |
|  Bean      | 3                                 | 0      | 1                                 | 3      | 4     | 60%                                       | 77%                                       |
|  Wheat     | 2                                 | 0      | 2                                 | 0      | 2     | 86%                                       | 79%                                       |
|  Soya bean | 0                                 | 0      | 1                                 | 0      | 1     | 67%                                       | 76%                                       |
| Total                                                                                         | 9                                 | 0      | 9                                 | 3      | 12    |                                           |                                           |



# VARIETIES RELEASED IN THE LAST THREE YEARS

The number of varieties released in a given period is a good measure of the performance of the variety development and release system. This indicator (number of varieties released in the last three years) is crop specific, and 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.

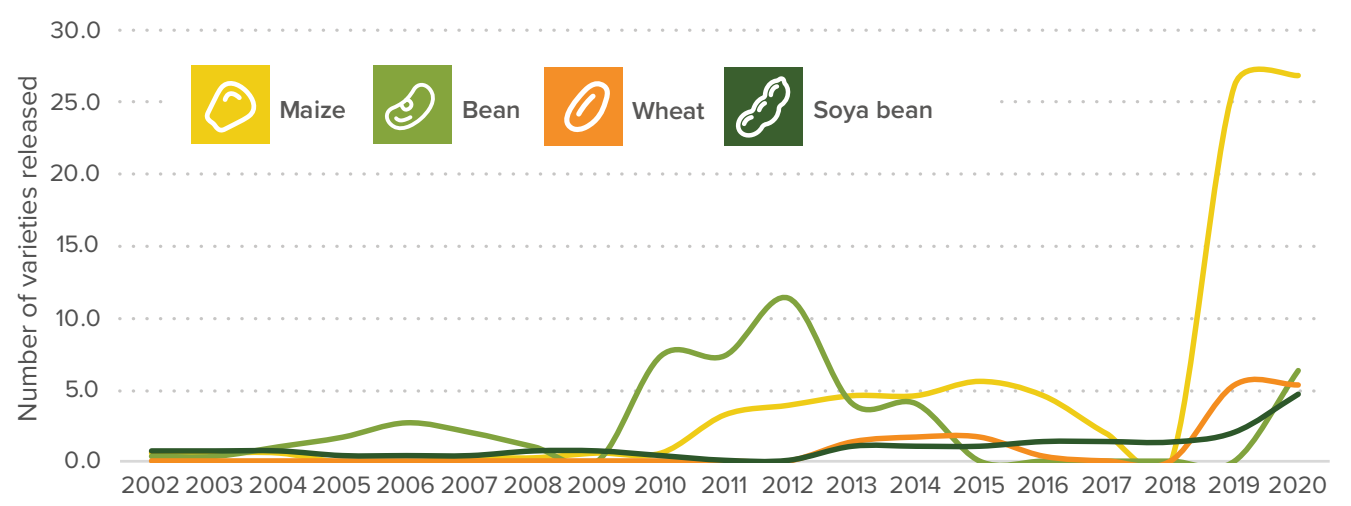
Between 2018 and 2019, a total of 101 varieties - 79 for maize, 6 for soya bean, and 16 for wheat - were submitted by public and private breeders and were cleared by the NVRC for release and registration (MINAGRI 2021a, b, c).

All breeders who had submitted variety release applications were notified of the NVRC's decision about their application. However, the list of the new varieties released between 2018 and 2020 is yet to be published. This is because the list of released varieties is published in the official government gazette, which is a lengthy process.

The NVRC has put in place mechanisms to manage varieties that were evaluated in the period preceding the promulgation of the law on seed on seed and plant varieties.

Figure 2 shows the three-year moving average of varieties released between 2000 and 2020. The number of varieties released has been very low for the four crops over this 20-year period. However, there was a spike in bean variety releases between 2010 and 2012. This was due to a sudden increase in funding to the RAB's bean breeding program. The funding was provided by Harvest Plus and AGRA and was intended to promote the development and release of nutrition-enhanced bean varieties.

Figure 2: Trend in the number of varieties released (3-year moving average)



# VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics, for instance climate-smart, use-related (e.g., fast-cooking or 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 common

climate-smart features are drought tolerance, early maturity, or extra-early maturity. Although information on the varieties released between 2018 and 2020 is available, all details of their characteristics are not available because the variety catalogue has not yet been published. However, 9 bean varieties were fortified with iron and zinc, 7 wheat varieties had good baking quality, and 8 soya bean varieties had high oil and protein content.

## 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 13 maize varieties, 9 bean varieties, 8 wheat varieties, and 2 soya bean varieties were sold to farmers in 2020 (Table 5). All the varieties of bean and soya bean were owned by the RAB. Most maize and wheat varieties were owned by the RAB, with the remaining varieties were owned by private seed companies. The most commonly sold maize variety, RHM1407, was sold by 44% of all seed producers. The reasons for the wide acceptance of this variety are that it is high-yielding and drought tolerant. The other commonly sold maize varieties also belonged to the RHM series. RWR2245 is the most commonly sold bean variety, sold by 58% of bean seed producers. This variety is a high-yielding bean variety with the nutrition-enhanced characteristic of high iron content. This variety has been popularized among bean seed producers by Harvest Plus. Nyaruka and Gihundo are the most commonly

sold wheat varieties, grown by 63% and 38% of wheat seed producers, respectively. The reason for their wide acceptance is their high resistance to rust and their superior baking quality. The most commonly sold soya bean variety was Peka6, grown by 78% of soya bean seed producers. The reason for the wide acceptance of this variety is that it is early maturing, compared to the second most commonly sold soya bean variety, SB24. However, breeders noted that there is little choice among soya bean varieties as only two varieties were sold in 2020.

According to the Head of the Seed Division in RAB, there are other varieties which are widely accepted by seed producers and farmers. These include bean varieties from the climber bean group such as MBC23, RWV1129, RWV3317 (sugar bean), RWCB191 (sugar bean-Injamani), Mwirasi, Rwibarura and RWV2350. Most of these varieties are part of a batch of 19 iron bio-fortified bean varieties which have recently been released. Another commonly sold bean variety is RWR3194, a bush variety like RWR2245, which has increased resistance to anthracnose disease. This variety is considered a potential substitute for variety RWR2245.

**Table 5: Name and age of commonly sold varieties (2020)**

| Crop                                                                                                 | Number of varieties sold in 2020 | Name of commonly sold variety | % of seed producers producing the variety in 2020 | Age of commonly sold variety (years) in 2020 |
|------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|---------------------------------------------------|----------------------------------------------|
|  <b>Maize</b>     | 13                               | RHM1407                       | 44%                                               | 5                                            |
|                                                                                                      |                                  | RHM1409                       | 20%                                               | 5                                            |
|                                                                                                      |                                  | RHM104                        | 16%                                               | 5                                            |
|  <b>Bean</b>      | 9                                | RWR2245                       | 58%                                               | 10                                           |
|                                                                                                      |                                  | MAC44                         | 25%                                               | 10                                           |
|                                                                                                      |                                  | RWV1129                       | 17%                                               | 10                                           |
|  <b>Wheat</b>     | 8                                | Nyaruka                       | 63%                                               | 5                                            |
|                                                                                                      |                                  | Gihundo                       | 38%                                               | 5                                            |
|                                                                                                      |                                  | Kibatsi                       | 25%                                               | 5                                            |
|                                                                                                      |                                  | Njoro                         | 25%                                               | 5                                            |
|                                                                                                      |                                  | Rengerabana                   | 25%                                               | 5                                            |
|  <b>Soya bean</b> | 2                                | Peka6                         | 78%                                               | 35                                           |
|                                                                                                      |                                  | SB24                          | 39%                                               | 12                                           |



## AVERAGE AGE OF VARIETIES SOLD

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

Table 7 in the previous section shows the ages of the commonly sold varieties of each crop and the average age of the commonly sold varieties (note that these are simple averages that are not weighted by volumes sold). In 2020, all commonly sold maize and wheat varieties were 5 years old, and all commonly sold bean varieties were 10 years old. The most commonly sold soya bean variety, Peka6, is 35 years old. Despite its age, the Peka6 variety is widely used among seed producers and farmers, in part because they have only two varieties to choose from.

## 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 foundation seed from public research institutions tends to limit the ability of seed companies to scale up production.

In Rwanda, only registered seed producers are eligible to obtain basic seed. The producer declares the field to be used for seed production, after which it is inspected and registered by the RICA. Once all the requirements for registration have been met, seed producers may apply for basic seed for the upcoming planting season. At least two weeks' advance notice is required for maize seed, and between one and two-months' advance notice is needed for bean, wheat, and soya bean seed.<sup>3</sup> The RAB, in consultation with private seed multipliers, determines the price of basic seed and it also advises seed producers on the quantity of seed they need to buy, based on the size of the field that has been assessed for suitability for seed multiplication for the particular crop. The RAB generates a proforma invoice, and the seed producer makes the payment directly to the RAB's bank account. Following the payment, the seed producer collects the basic seed from the RAB store, which issues the seed producer with a delivery note. The delivery note specifies the quantity of seed, seed class, variety, and seed lot number. Seed producers are expected to show this delivery note to the seed inspector during the first field inspection visit.

Table 6 shows the different sources of basic seed for the focus crops in 2020 based on the number of transactions conducted for each crop. The RAB was the only source of basic seed for soya bean and wheat and accounted for 58% of maize transactions and 83% of bean transactions. The second most important source of basic seed were other seed companies which chose to produce basic seed (primarily for their own use) alongside certified seed. All foreign-owned seed companies in Rwanda use their own basic seed, sourced from the countries in which they are based. Some seed producers incorrectly believe that Harvest Plus (a representative of the CIAT) is a source of basic seed, while in fact it is merely an intermediary. Harvest Plus only promotes nutrition-enhanced crop varieties that have been developed by the RAB.

<sup>3</sup> The RAB is able to do this because it collaborates with private suppliers of basic seed and coordinate seed production activities. It projects seed demand based on historical data and produces the seed in advance. Once the RAB receives orders from seed producers, it allocates supplies based on its own supplies as well as what is available from other suppliers.



**Table 6: Source of basic seed by crop, number of transactions, and percentage of total transactions (2020)**

| Source              | Maize                  |            | Bean                   |            | Wheat                  |            | Soybean                |            |
|---------------------|------------------------|------------|------------------------|------------|------------------------|------------|------------------------|------------|
|                     | Number of transactions | % of total | Number of transactions | % of total | Number of transactions | % of total | Number of transactions | % of total |
| RAB                 | 21                     | 58%        | 20                     | 83%        | 8                      | 100%       | 18                     | 100%       |
| CIMMYT <sup>4</sup> | 1                      | 3%         | -                      | 0%         | -                      | 0%         | -                      | 0%         |
| Own                 | 4                      | 11%        | 1                      | 4%         | -                      | 0%         | -                      | 0%         |
| Other               | 10                     | 28%        | 3                      | 13%        | -                      | 0%         | -                      | 0%         |
| Totals              | 36                     | 100%       | 24                     | 100%       | 8                      | 100%       | 18                     | 100%       |

.....  
4 CIMMYT does not produce basic seed. It develops parental lines and facilitates exchange of varieties.

Table 7 shows seed producers' ratings of the quality, quantity and timeliness of delivery for basic seed for each source organization. For most organizations, the scores are above 80%. This means that, in most cases, seed producers are satisfied with the quality of basic seed that they received, the quantity of basic seed that they received and the timeliness of delivery of the seed. The only exception was basic bean seed from RAB. The variety RWR2245 was highly susceptible to the disease *anthracnose*. This led to rejections of the bean seed during field inspections, resulting in shortages and delays in supplying seed to the seed producers.

Figure 3 shows seed producers' overall satisfaction with the availability of basic seed from all the different sources of seed in 2018 and 2020. In both years, seed producers' satisfaction was high. Satisfaction ratings increased for maize, bean and wheat seed from "good" (between 75% and 77%) to "excellent" (between 82% and 92%). Satisfaction with the availability of basic seed for soya bean and wheat was "excellent" in both years.



**Table 7: Seed producer satisfaction of the quality, quantity, timeliness of basic seed by source organization (2020)**

| Crops                                                                                                      |                | RAB | CIMMYT | Own  | Other | Overall |
|------------------------------------------------------------------------------------------------------------|----------------|-----|--------|------|-------|---------|
|  <b>Maize (n=36)</b>      | Quality *      | 82% | 100%   | 100% | 85%   | 85%     |
|                                                                                                            | Quantity **    | 83% | 100%   | 90%  | 84%   | 84%     |
|                                                                                                            | Timeliness *** | 82% | 100%   | 100% | 87%   | 86%     |
|  <b>Bean (n=24)</b>       | Quality *      | 81% | -      | -    | 90%   | 83%     |
|                                                                                                            | Quantity **    | 77% | -      | -    | 97%   | 80%     |
|                                                                                                            | Timeliness *** | 83% | -      | -    | 87%   | 84%     |
|  <b>Wheat (n=8)</b>       | Quality *      | 86% | -      | -    | -     | 86%     |
|                                                                                                            | Quantity **    | 95% | -      | -    | -     | 95%     |
|                                                                                                            | Timeliness *** | 95% | -      | -    | -     | 95%     |
|  <b>Soya bean (n=18)</b> | Quality *      | 83% | -      | -    | -     | 83%     |
|                                                                                                            | Quantity **    | 92% | -      | -    | -     | 92%     |
|                                                                                                            | Timeliness *** | 85% | -      | -    | -     | 85%     |

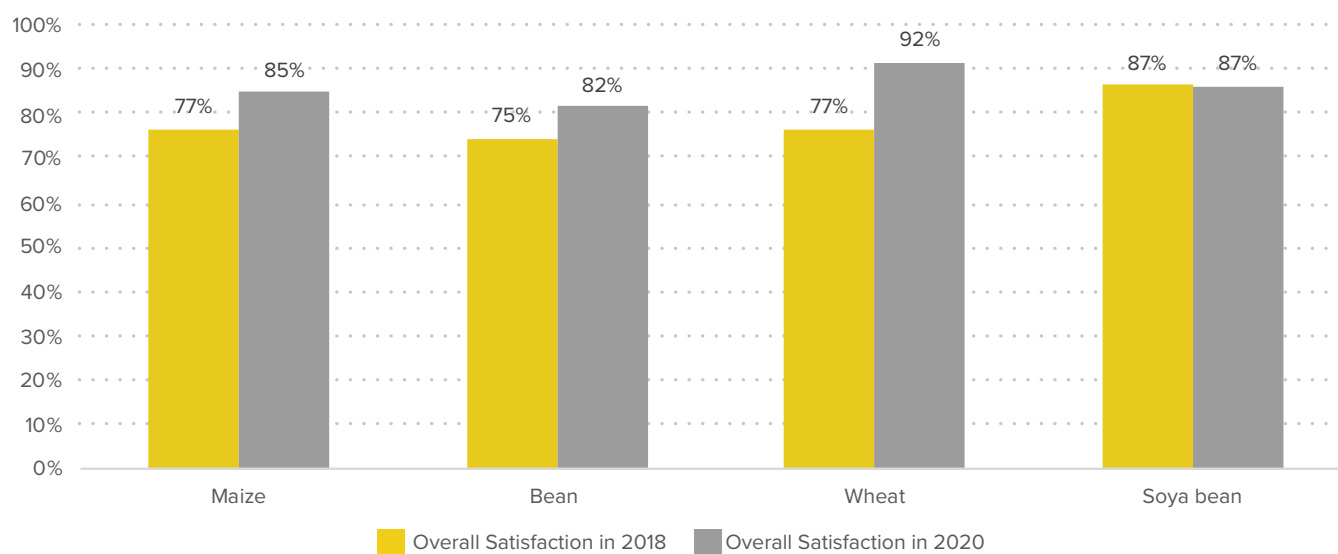
\*Quality of basic seed (opinion)

extremely poor poor fair good excellent

\*\*Quantity of basic seed (opinion)

\*\*\*Timeliness of basic seed (opinion)

**Figure 3: Overall satisfaction rating of the 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 service delivery. 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 four focus crops.

Prior to 2020, the government of Rwanda, through the RAB, was one of the main producers and distributors of certified seed through the country's subsidy program. Seed producers were mainly out-growers for the government, and the government subsidy program accounted for more than 95% of seed purchases for the key crops. In 2020, MINAGRI signed an agreement with the Private Sector Foundation (PSF) to encourage private companies to enter the seed sector. This agreement resulted from the government's Strategic Plan for Agricultural Transformation 2018-2024 (MINAGRI 2018). Under priority area 4 of this strategy, the government set out to create an enabling environment for agricultural transformation by transitioning from being a market player that is involved in seed production and sales to become a market enabler. By the start of agricultural season 2022 A in September 2021, Rwanda was set to have stopped importing maize seeds for distribution to citizens on government subsidy<sup>5</sup>. This shift has encouraged the participation of the private sector in the seed sector. In the 2022A season, Rwanda phased out subsidies on imported maize, wheat and soya bean seed meant for distribution to farmers. All seed that has been supplied for these crops maize was produced locally.

<sup>5</sup> <https://agra.org/wp-content/uploads/2021/03/success-story-rwanda.pdf>  
Accessed 9 November 2021.

As shown in Table 8, there were 23 seed companies producing or marketing at least one of the four crops in Rwanda in 2020. This is a significant increase from the 15 seed companies recorded by TASAI in 2017. Of the 23 companies, only two were foreign owned. Most of the seed companies produced maize (17 companies), bean (11 companies), soya bean (11 companies) and wheat (3 companies). In 2020, the number of seed producers and cooperatives was 534, which is a significant decrease from the 725 recorded in 2017. According to the RAB, the reason for the increase in the number of seed companies, even as the number of seed producers is declining, is that farmers are replacing OPV varieties with hybrid maize varieties. Individual seed producers and seed cooperatives do not have the capacity to produce hybrid maize seed, which demands adherence to stringent technical and management requirements.

**Table 8: Breakdown of active seed companies**

| Crop                                                                                          | Number of active seed companies in 2017 | Number of active seed companies in 2020 |
|-----------------------------------------------------------------------------------------------|-----------------------------------------|-----------------------------------------|
|  Maize     | 14                                      | 17                                      |
|  Bean      | 6                                       | 11                                      |
|  Wheat     | 1                                       | 3                                       |
|  Soya bean | 8                                       | 11                                      |
| <b>Total*</b>                                                                                 | <b>15</b>                               | <b>23</b>                               |

\* The total does not equal the sum of the rows (i.e., number of companies listed across the four crops) because many companies produce multiple crops.



## GENDER IN MANAGEMENT OF SEED BUSINESSES

TASAI tracks the number of women in management and ownership positions in seed companies. Table 9 shows that, overall, women occupied 27% of the management positions in the seed companies surveyed (32 out of 118 positions). At the same time, only 24% of the seed companies surveyed (5 out of 16 companies) had a female “top” manager, such as managing director or chief executive officer. Furthermore, 29% of seed companies surveyed (4 out of 14 companies) had a female owner.

Figure 4 compares women in seed management in countries studied<sup>6</sup> by TASAI. While overall the participation of women

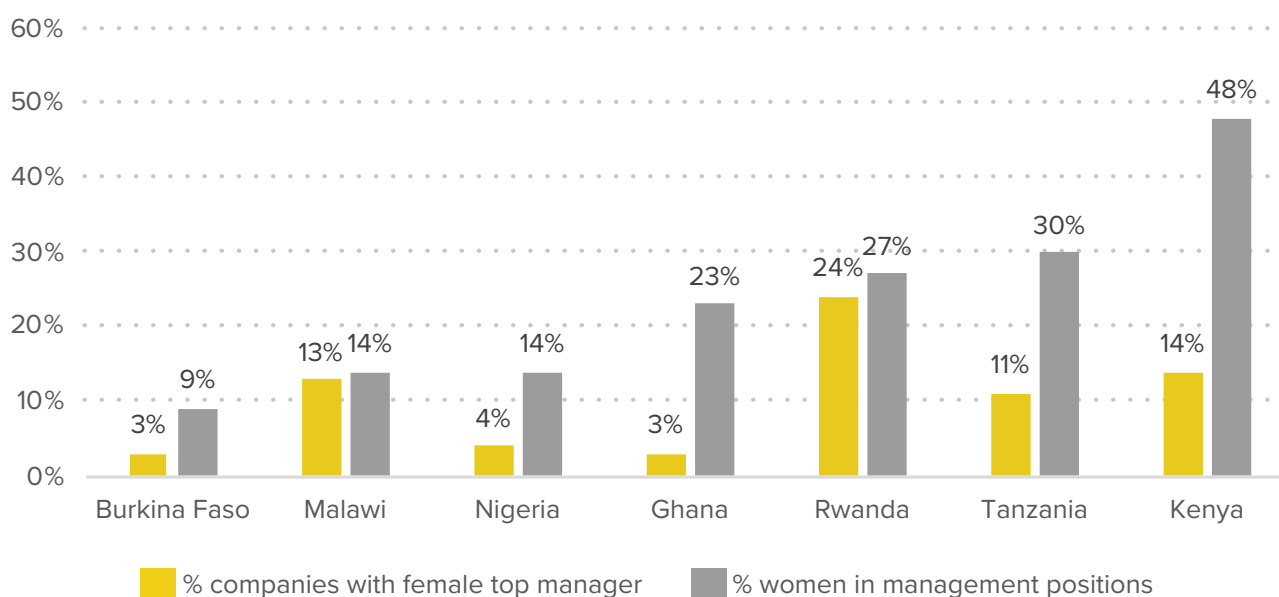
<sup>6</sup> Information for this indicator was collected for the first time in Rwanda in 2021; as such, a comparison with earlier data is not available.

in management of seed companies is low, Rwanda has the highest proportion of companies with female top manager and is third after Tanzania and Kenya when it comes to the percentage of women in management positions.

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

| Gender indicator                         | Number | %   |
|------------------------------------------|--------|-----|
| Women in management positions (n=118)    | 32     | 27% |
| Companies with female top manager (n=16) | 5      | 24% |
| Companies with female owner (n=14)       | 4      | 29% |

**Figure 4: Comparison of women in seed management in countries studied 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 producers.

As shown in the methods section, the survey covered 50 seed producers – 23 seed companies and 27 farmer or individual cooperatives. Table 10 lists the volume of seed produced and sold in 2020 based on TASAI data, as well as production figures based on government data. The 50 seed producers surveyed produced a combined total of 4,571 MT

of maize, 218 MT of bean, 351 MT of wheat, and 609 MT of soya bean seed. Data reported by the seed companies to TASAI shows higher volumes of maize and soya bean seed than the production volumes recorded by the government. The reason for this is that the government only reports the volume of seed sold to the government subsidy scheme. The volume of wheat seed produced, as reported to TASAI, is lower than the volumes indicated by government data, because several wheat seed producers did not participate in the survey, due to the fact that most of them are out-growers for cooperatives.

The 50 seed producers sold a combined total of 4,161 MT of maize seed, 209 MT of bean seed, 346 MT of wheat seed, and 561 MT of soya bean seed. Maize was by far the most dominant crop in seed sales, accounting for 79% of the total sales of the four focus crops.

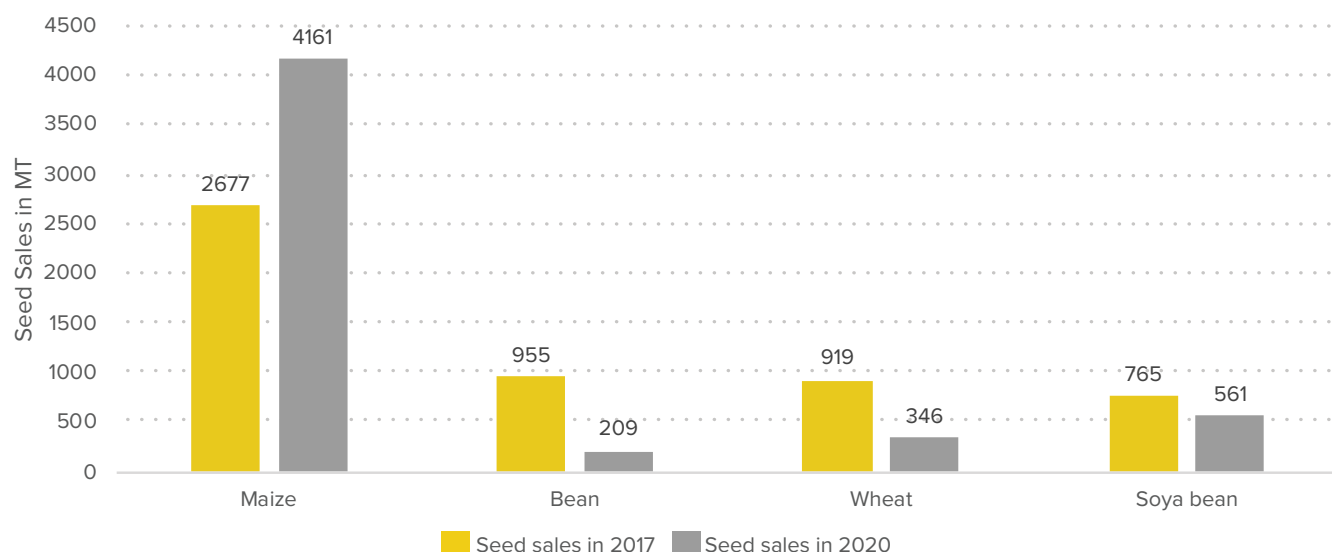
**Table 10: Seed production and sales**

| Crop                                                                                               | Seed production in 2020 in MT (TASAI data) | Seed production in 2020 in MT (government data) | Seed sales in 2020 in MT (TASAI data) |
|----------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------|---------------------------------------|
|  <b>Maize</b>     | 4,571                                      | 2,265                                           | 4,161                                 |
|  <b>Bean</b>      | 218                                        | 486                                             | 209                                   |
|  <b>Wheat</b>     | 351                                        | 696                                             | 346                                   |
|  <b>Soya bean</b> | 609                                        | 536                                             | 561                                   |

Figure 5 shows TASAI data for seed sales for the four crops in 2017 and 2020. Seed sales increased for maize but decreased for the other three crops. The increase in maize seed sales was due to the establishment of new seed companies that focused on hybrid maize varieties. The decrease in bean seed sales can be attributed to the closure of the Harvest Plus program in 2019. This program was the main buyer of

bean seed in Rwanda. The aggregate sales data collected during the survey is different from RAB data. According to RAB, three seed companies sold 1,320MT of wheat seed between July 2020 and June 2021. Of this, 440MT was sold between July and December 2020.

**Figure 5: Seed sales**



## 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 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).<sup>7</sup>

Table 11 shows the market shares of the top four seed producers in 2018 and 2020. The market share of the top four

wheat producers in 2020 was very high (98%), with two seed producers accounting for 93% of the market. The market shares for the other three crops were 74% for maize, 64% for bean and 78% for soya bean. These market shares signal that the maize and bean seed markets are not dominated by a few players, as is the case with the wheat and soya bean seed markets. The HHI scores were in the moderate range for maize, low for bean and soya bean, and extremely high for wheat. The HHI scores and the market shares point to the same conclusions: the maize, bean, and soya bean seed markets are relatively competitive, with no single seed producer or group of producers dominating the seed market. However, the wheat seed market is highly concentrated, dominated by a small number of seed producers.

<sup>7</sup> See below Table 12.

**Table 11: Market concentration (CR4 and HHI)**

| Crop                                                                                               | CR4 (%) (2018) | CR4 (%) (2020) | HHI (2018) | HHI (2020) |
|----------------------------------------------------------------------------------------------------|----------------|----------------|------------|------------|
|  <b>Maize</b>     | 63%            | 74%            | 1,257      | 2,018      |
|  <b>Bean</b>      | 40%            | 64%            | 952        | 1,239      |
|  <b>Wheat</b>     | 96%            | 98%            | 6,566      | 4,388      |
|  <b>Soya bean</b> | 98%            | 78%            | 2,639      | 1,931      |

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 PARASTATALS

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.

Rwanda has no active government parastatal engaged in the production and marketing of certified seed. The government plays a substantial role in the production of basic seed, but its policy is to privatize basic seed production while maintaining government research institutions as the producers and maintainers of nucleus seed (pre-basic seed) and breeder seed.

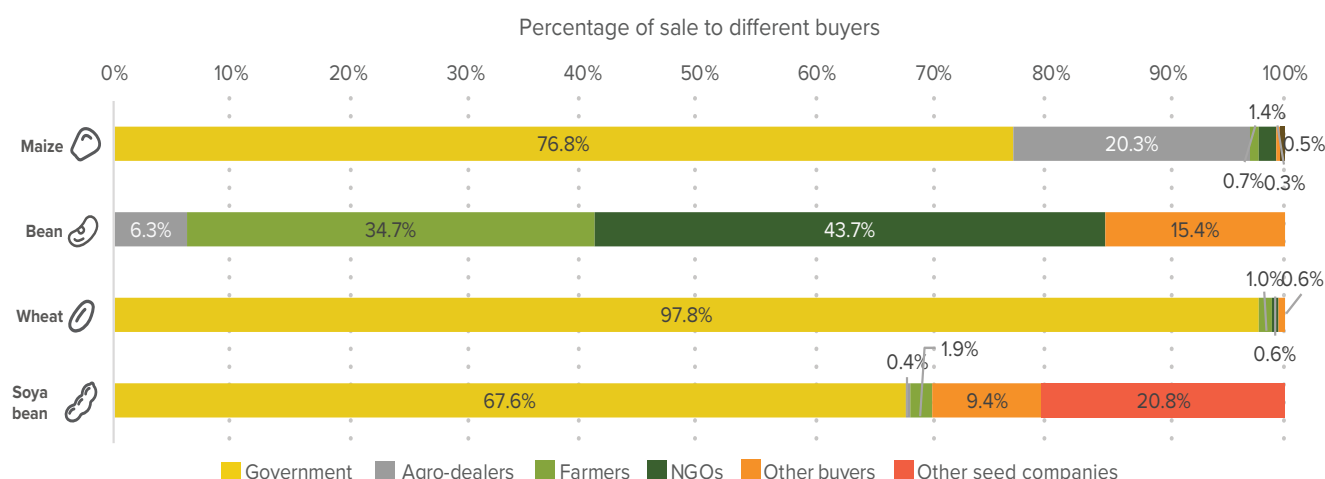
## SEED SALES BY CATEGORY OF BUYERS

The TASAI study tracked six different categories of seed buyers in Rwanda in 2020: government, agro-dealers, farmers, NGOs, other buyers, and other seed companies. Figure 6 shows the breakdown of seed sales by the different categories of buyers. The government is the most important buyer of wheat (98%), maize (77%), and soya bean seed (68%). From September 2020, Agro-Processing Industries (API)<sup>8</sup> was designated as the national and certified aggregator of soya bean seed in Rwanda. Consequently, all seed companies sold their soya bean seed to API. API is a subsidiary of the Agro-Processing Trust Corporation (APTC) Ltd., which is a government-owned company involved in multiple agricultural activities.

Seed sales to agro-dealers are quite low for all crops, ranging between 20% for maize seed and none for wheat seed. NGOs are key buyers of bean seed, accounting for 44% of sales. The NGO seed purchases are distributed to farmers in response to emergency situations like floods and droughts.

<sup>8</sup> API is a private seed company in Rwanda, established in 2009. The company started producing seed in 2014.

**Figure 6: 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.

The length of the import process in days is measured as the sum of the number of days used to obtain import documentation (import permit, phytosanitary certificates, and an International Orange Certificate,<sup>9</sup> if applicable) and the number of days to clear seed at the border. It excludes transportation time.

According to the Seed Law N° 005/2016 of April 2016 (Government of Rwanda 2016), seed dealers who intend to import or export seed must receive authorization from RICA and obtain a plant import permit, a phytosanitary certificate, and an International Orange Certificate from the source country.

Table 12 provides an overview of the seed imports in 2017 and 2020. Only two seed companies imported hybrid maize seed in 2020 under the government subsidy scheme on maize, a reduction from the five companies in 2017. The total volume of seed imported in 2020 was 3,060 MT. This represents a slight reduction from the 3,390 MT imported in 2017. All seed imports in 2020 came from the Common Market for Eastern

<sup>9</sup> 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 testing of the sample are carried out by the same laboratory.

and Southern Africa (COMESA) countries and carried the COMESA seed label, showing that Rwanda is adhering to the COMESA Harmonized Seed Trade Regulations. There were no imports of wheat or soya bean seeds, as all the required seed was supplied domestically.

The Rwandan government has committed to stopping the import of seed for staple crops under the government subsidy scheme by 2021. The data for imports reflects this effort for wheat and soya bean seeds. In the case of maize, while the volume of seed imports has only reduced by about 10%, the number of importing companies has decreased from 5 to 2. Two of the three companies that imported seed in 2017 now produce the seed locally.

It is important to note that while the quantity imported has changed little from 2017 to 2020, 2020 was marked by very high demand for seed by farmers in both seasons 2021A and 2021B. According to RAB, aggregate maize seed sales in 2021 was 7,207 MT, compared to 4,161 MT in 2020 and 3,498 MT in 2018 (seasons 2018A&B).

The average length of the seed import process reported by seed companies was only two days – one day to obtain the relevant documentation, including the import permit and phytosanitary certificate, and another day to clear the seed at the border point of entry. This is a significant reduction from the 17 days it took to import seed in 2017. The main reason for the reduction in import time was the introduction of One-Stop Border Posts (OSBPs). Prior to OSBPs, importers had to stop at two border posts – one on exit and another on entry. The OSBPs streamline the process by combining these two stops into one. Satisfaction with the import process is high, improving from a “good” rating (75%) in 2017 to an “excellent” rating (80%) in 2020.

**Table 12: Overview of seed imports**

| Indicators                                           | 2017           | 2020  |      |      |           |
|------------------------------------------------------|----------------|-------|------|------|-----------|
| Number of seed companies importing seed              | 5              | 2     |      |      |           |
| Sources of imports (countries)                       | Kenya, Zambia  | Kenya |      |      |           |
| Volume of imports (in MT), all from COMESA countries | 3,390          | 3,060 |      |      |           |
| % of imports from COMESA, carrying the COMESA label  | NA             | 100%  |      |      |           |
| Duration of the seed import process (in days)        | 17             | 2     |      |      |           |
| Satisfaction with import process                     | 75%            | 80%   |      |      |           |
|                                                      | extremely poor | poor  | fair | good | excellent |

## SEED COMPANY PRODUCTION AND PROCESSING CAPACITY

Seed companies' capacity to produce and process seed can be assessed at the production, processing or marketing stages of the seed supply chain. It is important for the government and industry planners to have a sense of the aggregate capacity of the seed companies in the country. This section assesses the estimated production and processing capacity of seed companies in Rwanda.

Table 13 shows seed producers' annual production in 2020 compared with the annual seed requirement. The annual seed requirement, which is the product of the total area cultivated and the seeding rate, is calculated by the National Institute of Statistics of Rwanda (NISR) in its Seasonal Agricultural Survey. The current production capacity of seed producers in Rwanda falls short of the annual requirement for all four crops. Seed producers currently meet just over half of the annual requirement for maize seed (62%) and wheat seed (55%) and fall short of meeting the requirement for soya bean

seed (32%) and bean seed (3%). The large shortfall for bean seed is due to two reasons: (i) bean is the only crop among the four that is not part of the seed subsidy program and ii) bean seed production used to be supported by Harvest Plus, which ended its activities in 2019, leading to a reduction in the volume of bean seed produced in 2020. This happens because of the predominant recycling of bean grain from certified seed as seed, which has led to a reduction in the volume of bean seed produced.

The TASAI study also collected data on seed processing capacity. The different activities involved in seed processing include threshing, drying, cleaning, sorting, weighing, coating, packaging and sealing. Some seed producers in Rwanda have obtained equipment for one or more of the above activities. However, there are only two fully-fledged processing plants that carry out all these activities. The two plants, both privately owned, are located in Masoro in Kigali and in Gabiro in Nyagatare district. Each plant has a processing capacity of 10,000 MT per annum. Their combined capacity is sufficient to meet the requirements of processed seed for the four crops in Rwanda. The two facilities are currently used by their respective owners but are also available for hire by other seed producers.

**Table 13: Seed company production capacity (2020)**

| Indicators                                                                                           | Seed production capacity (MT) | Actual seed production (MT) | Annual seed requirement (MT) | Seed production as % of annual requirement |
|------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------|------------------------------|--------------------------------------------|
|  <b>Maize</b>     | 4,670                         | 4,570                       | 7,336                        | 62%                                        |
|  <b>Bean</b>      | 218                           | 218                         | 7,762                        | 3%                                         |
|  <b>Wheat</b>     | 351                           | 351                         | 639                          | 55%                                        |
|  <b>Soya bean</b> | 609                           | 609                         | 1,916                        | 32%                                        |





# 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, which can adversely affect farmer choice. TASAI studies calculate the length of the variety release process from the date the variety is submitted to the NVRC to the date when the variety is approved for release. The calculation does not include the time the breeder spends developing the variety.

In Rwanda, Seed Law NO 005/2016 outlined new, more stringent rules for plant variety registration and release. According to the law, all plant varieties must undergo DUS and VCU tests before they can be released for commercialization in the country. The Plant Variety Registrar is responsible for overseeing these tests and adding varieties to the national variety catalogue. However, the law is not yet fully implemented and these steps are not followed. While VCU tests are conducted by RAB breeders, it is currently not possible to conduct DUS tests in Rwanda due to capacity limitations at MINAGRI. Under the Seed Law, RICA is responsible for seed certification, but it has not established this function with the required personnel and is therefore not yet operational.

The NVRC comprises of diverse disciplines that include plant breeding, extension, policy, plant pathology, farming and seed industry business. The committee is chaired by the member from the Ministry of Agriculture. The NVRC has set up a technical committee on the assessment of applications for variety release. The technical committee has been meeting regularly since 2018 and has provided reports for the NVRC.

To date, only local varieties that were released under RAB rules before the promulgation of the new law are registered in the National List. The varieties that were recommended for release between 2018 and 2020 are awaiting publication in the official gazette.

Rwanda is a member of COMESA and has adopted the COMESA Seed Trade Regulations (COMESA 2014) at the national level. According to the regulations, if a variety has been released in at least two COMESA member states, it can be adopted in other COMESA countries. To do this, the

breeder must present the results of the DUS tests in two other COMESA countries, after which the variety will only be subjected to one season of VCU testing. If a variety has been released in two COMESA countries and has already been registered in the COMESA Variety Catalogue, no additional testing is required.

## 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. According to Seed Law No 005/2016 of 2016, a variety must undergo DUS and VCU tests over two growing seasons in at least three locations. The law stipulates that the fee for a DUS test is US\$ 600 for the two seasons, while VCU tests cost US\$ 500 per season. However, DUS tests are not currently being conducted in Rwanda. As such, at present the stipulated fees are not paid either by public breeders or by private companies.

## STATUS 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. In Rwanda, the policy framework comprises the following instruments:

**The National Seed Policy** was approved by the Cabinet in 2007; the policy outlines the government's goals for the country's seed industry. The policy also broadly outlines the methods and principles to be used to achieve these goals. The policy was first reviewed and updated in 2015, and is currently under review again.

**The Seed Law No 005/2016** governing Seeds and Plant Varieties in Rwanda is the country's main seed law. The law covers the key areas in seed sector development, namely: plant variety evaluation, certification and registration; seed production, processing and marketing; importation and exportation of seed; seed certification; and plant variety protection and plant breeder's rights. In 2017, several ministerial orders were adopted by the Cabinet and published by the Minister of Agriculture in the Official Gazette. They serve as regulations and provide detailed guidelines on the implementation of various aspect of the seed law.



The seed law and the ministerial orders have all been harmonized to conform to the COMESA Harmonized Seed Trade Regulations. In addition, all national seed procedures and standards conform to the seed procedures and standards of the Organization for Economic Cooperation and Development (OECD) with respect to seed certification as well as International Seed Testing Association (ISTA) regulations regarding seed laboratory testing.

## 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.

As mentioned above, the procedures for variety evaluation and release are not fully implemented due to a lack of technical capacity. The Plant Variety Registrar has been appointed and is assisted by a part-time staff member attached to MINAGRI. RICA is fully established, and this position was moved from MINAGRI.

Article 5 of the Seed Law requires that the Minister of Agriculture publish the Plant Variety Catalogue (also called the "Plant Variety List") every year. Further, Article 9 of the ministerial orders determining *The Procedures for Evaluation, Certification and Registration of Plant Varieties* specifies that updating the Plant Variety List is the responsibility of the Plant Variety Registrar (MINAGRI 2017). At present, the Catalogue is awaiting the publication of the official government gazette.

Articles 2 and 3 of the ministerial orders determine the procedures for seed inspection, testing, and the issuance of seed certificates, respectively. To date these procedures are only partially implemented as evidenced by the following: (i) the number of seed inspectors remains insufficient, which has created delays in seed inspections and the issuance of seed certificates; (ii) the government is not yet using the recommended seed labels on seed packages; and (iii) there is a lack of clear institutional arrangements regarding the national seed testing laboratory. In response to these challenges, MINAGRI has supported private seed inspectors and plans to complete their accreditation in 2022. Some of the trained inspectors are attached to private seed companies to support internal management of seed quality. In addition, RICA is in the process of upgrading the national seed testing laboratory to meet ISTA standards for accreditation. Rwanda already has ISTA membership.

Article 9 of the COMESA Harmonized Seed Trade Regulations requires countries to have a national seed authority in charge of implementing their seed law and regulations. The Rwandan government established RICA as its national seed authority (Government of Rwanda 2017). RICA oversees seed inspection, seed certification and variety release.

Article 28 of the COMESA regulations allows for varieties that are already registered in at least two member states to be released in other COMESA countries. This provision is strictly followed in Rwanda. The varieties registered in the COMESA Variety Catalogue have been accepted for registration and have been added to the list of accepted plant varieties in Rwanda. They will be added to the Plant Variety Catalogue when it is updated and published.

The COMESA regulations recognize four seed classes, namely, pre-basic seed, basic seed, first-generation certified seed and second-generation certified seed. These seed classes, in addition to Quality Declared Seed (QDS), are recognized in the Rwanda Seed Law.

Articles 15 and 16 of the COMESA Harmonized Seed Trade Regulations require that member states use COMESA seed labels for seed that is traded under its regulations. The Rwanda law uses the same label specification as specified in the COMESA regulations. However, RICA has not yet issued any COMESA seed labels for seed varieties that have been released in Rwanda and that are also listed in the COMESA Variety Catalogue.

## 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 due to cases in which farmers unknowingly plant inferior quality grain labeled as certified seed. Second, it threatens the success of efforts to increase the adoption of improved varieties, because farmers are not sure of which seed is genuine. TASAI tracks the number of cases of counterfeit seed reported by seed companies and the government in the data collection year and asks seed companies to report their level of satisfaction with government efforts to eliminate counterfeit seed.

In 2020, the seed companies surveyed reported 16 cases of counterfeit seed, compared to 28 cases in 2018 (Table 14). The government did not receive any reports of counterfeit seed in 2020. One of the measures the government uses to track counterfeit seed is re-testing of the carry-over stocks that were not sold in the previous season, that is, about six months after the seed certification test. In addition, seed under the government subsidy scheme must have satisfactory quality testing certificates. Further, the government monitors seed distribution for the potential introduction of counterfeit seed. The government also encourages farmers to report any cases of counterfeit seed sold by seed companies or agro-dealers. However, according to the RAB, sometimes farmers incorrectly attribute the non-performance of varieties in the field to counterfeit seed. Further investigation of these cases reveals that farmers did not follow the planting protocols, leading to poor performance.

The government has adopted several measures to improve seed quality assurance. These are:

- Strict implementation of the regulations concerning seed inspection (in the field and in warehouses), seed sampling and seed testing. Seed that does not meet the standards is rejected and not sold.

- Occasional training sessions for seed producers, agro-dealers and farmers on various aspects of seed quality.
- Seed producers or agro-dealers who are caught dealing in counterfeit seed are blacklisted and are unable to continue their work in the seed business.
- Article 51 of the Seed Law stipulates a fine of up to US\$ 5,000 for any person who is caught contravening the provisions of the law.
- In some cases, farmers are discouraged from reporting cases of counterfeit seed due to the long and arduous court process to resolve the case. To address this, the government has arranged to arbitrate the cases to ensure that farmers who purchase counterfeit seed receive adequate compensation.

As a result of these efforts, seed companies' satisfaction with government efforts to combat counterfeit seed was "excellent" (80%) in 2020, an increase from 72% in 2018.

**Table 14: Industry satisfaction with government efforts to address counterfeit seed**

| Indicators                                                                                   | 2018 | 2020      |
|----------------------------------------------------------------------------------------------|------|-----------|
| Number of cases of counterfeit seed (seed companies)                                         | 28   | 16        |
| Seed industry satisfaction with government efforts to address counterfeit seed (out of 100%) | 72%  | 80%       |
| Interpretation of satisfaction                                                               | Good | Excellent |

## USE OF GOVERNMENT SUBSIDIES

Seed subsidies are often 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 their 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.

The Rwanda government launched the Crop Intensification Program (CIP) in 2006/07 with the intention of increasing crop production and productivity. Agricultural inputs are a part of the program's focus in the form of subsidies. The program provides farmers with both seed and fertilizer for maize, wheat and soya bean, and provides fertilizer for bean. At the start of the program, farmers received seed and fertilizer for free. However, from 2011, the government subsidized 75% of the seed price and 50% of the fertilizer price. In 2020, the government of Rwanda spent US\$ 30 million on the CIP, of which US\$ 9 million was spent on seed and US\$ 21 million was spent on fertilizers. This represents a subsidy of around \$1.5 per kg of maize seed. Based on their current practices, farmers receive a 66% subsidy on local soya bean seeds (Miklyaev et al. 2021).

Prior to 2019, the subsidy program was fully managed by the RAB, which made payments to seed companies in three instalments. The first instalment of 40% was made after the seed had reached the agro-dealers. The second payment of 40% was made after the seed had been sold to farmers. The last payment of 20% was made upon evidence that the farmer had utilized the seed. This process was long and bureaucratic, often resulting in delayed payments to seed companies of up to 36 months after the companies had supplied the seed. The process has now been decentralized to the districts. The district officers pay the full amount to the agro-dealers after they purchase the seed from the seed company/supplier and proof of seed delivery to agro-dealers in the receiving district.





Currently, the program is managed by the MINAGRI through the RAB. Seed prices are jointly determined by the RAB and seed producers. The RAB sends the agreed prices to MINAGRI as proposals for validation and publication. The published price includes the cost of selling and distributing the seed and the retail price. The subsidy varies by crop and category of seed - certified versus quality declared seed. For certified seed, the subsidy as percentage of retail price is 20-21% for maize, 29-32% for wheat and 30-33% for soya bean. The administration of the subsidy program follows the following steps:

- At the beginning of every season, MINAGRI, through the RAB, publishes the guidelines for the subsidy program that year. These guidelines include the final seed price and the percentage of the price to be contributed by the farmer and government, respectively, for each seed variety or type of fertilizer.
- Through an online system called “Smart Nkunganire”, farmers indicate the crop area for which they intend to obtain subsidized seed or fertilizer. The system automatically generates the quantity of seed and fertilizer to be purchased and the amount to be paid. Farmers can also provide this information on a template using their mobile phones or through an agro-dealer shop.
- The sector agronomist validates the area to be planted for all farmers in his or her sector.
- At the national level, the officer in charge of the subsidy program validates all the data and submits it to the Agro-Processing Trust Corporation (APTC), which is in charge of seed distribution. The APTC is a government-owned company that is engaged in several agricultural activities.
- Farmers submit their orders for seed and fertilizer to agro-dealers, who compile and submit the orders to the APTC. The agro-dealer pays the subsidized price (that is, the farmer price). The agro-dealer receives a receipt

for payment which is taken to the seed company, which supplies the seed.

- Once the seed is offloaded at the agro-dealer shop, the farmers are informed. Farmers can then collect the seed after payment. Both the agro-dealer and the farmer inform the sector agronomist, who then reports to the district agronomist.
- After the consolidation of all seed sales, the district agronomist processes the payment to the seed and fertilizer companies.

The surveyed seed producers rated their satisfaction with the implementation of the CIP’s seed procurement process with respect to openness and transparency, and predictability. Table 15 compares seed producers’ levels of satisfaction with the implementation of the government subsidy program in 2018 and 2020. In 2020, seed producers’ satisfaction with the openness and transparency of seed procurement process was “excellent”, just as it was in 2018. The high rating is due to the fact that each farmer is eligible to benefit from the program if he produces any of the specified crops. Further seed producers are shortlisted and the list is sent to the Rwanda Public Procurement Authority (RPPA). This process helps to eliminate seed companies that are not eligible to participate. Seed producers’ satisfaction with the predictability of seed procurement process was also “excellent” (83%), an improvement from the “good” rating (77%) given in 2018. The reason for the high rating is the assurance that seed companies will benefit from the program once they have been shortlisted and their names are submitted to the RPPA. Seed producers’ main complaint about the implementation of CIP pertains to the inefficiency of payments. Although the payment process has improved since 2018 due to its decentralization to the district level, some districts delayed in making payments to the seed producers. This usually happened when there were many seed producers and large volumes of seed being sold.

**Table 15: Seed companies’ opinion of the government subsidy program**

| Aspect of the government seed subsidy program             | Satisfaction rating out of 100% |      |
|-----------------------------------------------------------|---------------------------------|------|
|                                                           | 2018                            | 2020 |
| Openness and transparency of the seed procurement process | 87%                             | 89%  |
| Predictability of the seed procurement process            | 77%                             | 83%  |
| Efficiency of payments                                    | 53%                             | 63%  |

extremely poor

poor

fair

good

excellent

# 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 cooperatives, seed associations, and, at times, agro-dealers.

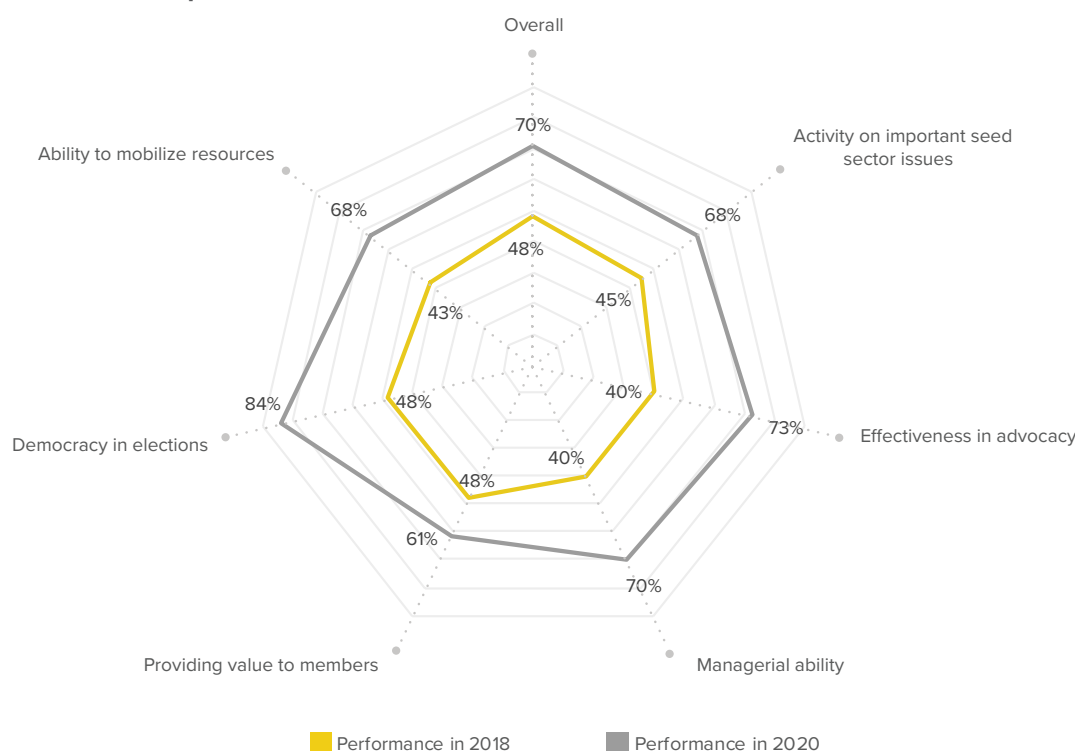
Formed in 2015, the National Seed Association of Rwanda (NSAR) is a member-based association serving seed producers in Rwanda. The NSAR strives to bring together all stakeholders in the seed industry to work together to ensure easy access to quality seed locally. The NSAR currently has 69 members and is actively recruiting new members. The association is gradually building its profile to ensure that it is recognized by the main government institutions, including the RAB and MINAGRI. Currently, the NSAR is a member of the Rwanda Private Sector Federation and the African Seed Traders Association (AFSTA).

In 2020, only 8 of the 23 seed companies that were surveyed were members of the NSAR. Overall, members were satisfied with its performance, giving it an overall performance rating of “good” (70%), as indicated in Figure

7. Out of the six service areas, the highest rating was given for democracy in elections and decision-making (84%), while all other areas were rated “good” – between 61% and 73%. The ratings in 2020 represent a significant improvement from the ratings in 2018. The main reason for this improvement is the NSAR’s successful engagement and advocacy with the government. For example, the NSAR has advocated for seed companies to directly distribute and market their seed to farmers to increase their profit margins and interactions with farmers. In addition, the NSAR has advocated for the development and strengthening of the relationship between seed companies and agro-dealers as per government policy efforts to increase private sector participation in the seed sector. Initially, emerging seed producers were hesitant to embrace this policy shift and wished to continue selling seed through the government since this was a guaranteed market. Furthermore, the organization successfully mobilized its members to start a private seed company which is now an important player in local seed production. This initiative has increased its members’ confidence in the association.

In addition to surveying NSAR members, the TASAI study also asked seed producers that are not currently members of the association to share their reasons for not joining the NSAR: out of the 42 non-members, 29 were not aware of its existence. Most of the seed producers are members of another association, the Rwanda Seed Multipliers’ Organization (RWASMO). In addition, three respondents cited their distrust of the NSAR’s management and leadership as their reason for not joining the association.

**Figure 7: Members’ opinion of the NSAR**



## 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.

Prior to July 2020, seed inspection services in Rwanda were the mandate of the RAB. Currently RICA is in charge of coordinating seed inspection activities, as stipulated by Law No 31/2017 (Government of Rwanda 2017). The role of seed inspectors is two fold: on one hand, they certify seed fields and conduct regular seed field inspections, on the other, they collect seed samples from seed producers and submit them to the national seed testing laboratory for analytical and germination testing.

Table 20 shows the number of seed inspectors in the country as recorded in the two TASAI studies. In 2020, Rwanda had eight public inspectors. The number had not changed since 2018. According to the Director of RICA, the institution estimates a workload of 200 hectares per inspector per year, Rwanda will need at least 48 seed inspectors. Recognizing the shortage of inspectors, RICA has begun to certify private inspectors through intensive training to equip them with the knowledge and skills required for seed certification. A total of 65 candidates are being trained and it is intended that they will graduate by the end of 2021.

Table 16 also reveals the level of satisfaction with the adequacy of seed inspectors as reported by seed producers. The rating increased slightly from 70% in 2018 to 75% in 2020. According to the seed producers, this modest increase can be attributed to the increased availability of seed inspectors to conduct field inspections, as in 2018, seed inspectors were also involved in the supervision of seed production and multiplication activities, reducing their availability for field inspections.

**Table 16: Number and rating of the adequacy of public seed inspectors**

| Indicators                                                            | 2018 | 2020               |
|-----------------------------------------------------------------------|------|--------------------|
| Number of public seed inspectors                                      | 8    | 8 (4 men, 4 women) |
| Number of private seed inspectors                                     | 0    | 0                  |
| Seed industry satisfaction with the adequacy inspectors (out of 100%) | 70%  | 75%                |

extremely poor   poor   fair   good   excellent

To further increase the effectiveness of seed inspectors, RICA has launched a project to digitize its seed services, including the registration of all the actors in the seed sector, the application for import and export permits, requests for seed inspection, and the issuance of seed certificates. This progress notwithstanding, seed inspection services still face two main challenges:

- Irregular visits to the seed fields: seed inspectors do not always follow the calendar of inspections, resulting in seed not being inspected at the required stages. When the inspection is late, it can lead to failures to observe anomalies in the crop, which in turn may lead to losses for the seed producer, if the seed fails to meet the quality requirements.
- Delays in communicating seed test results to seed producers: seed producers reported that it may take up to 8 weeks to receive a certificate of seed analysis from the national testing laboratory. According to RAB, the duration should not exceed 3 weeks. This long duration may affect various activities along the supply chain, such as the redrying of the seed (in case the moisture content of the seed needs to be reduced), seed packaging and distribution.

# 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 number of extension officers by sector (public and private) and gender; it is not crop-specific.

In 2014, Rwanda established the *Twigire Muhinzi* agricultural extension system, which is implemented by the RAB under the supervision of MINAGRI. The *Twigire Muhinzi* system works in 30 districts and 416 sectors, which are under the supervision of the Ministry of Local Government (MINALOC). Day-to-day coordination is conducted by district officials, while the RAB provides technical support. The *Twigire Muhinzi* extension model relies on the farmer-promoter (FP) and the farmer field school approaches. The model aims to:

- **Quickly reach all farmers** to provide access to inputs and basic agricultural extension messages through farmer mobilization and the use of demonstration plots. Each village identified one farmer-promoter through a participatory exercise, who works with agro-dealers to ensure that farmers in the village receive the requested subsidized inputs commensurate with the size of their land. In addition, the farmer-promoter mobilizes farmers to consolidate their land, plant in time and use inputs appropriately. Initially a total of 14,200 farmer-promoters were trained to disseminate basic extension messages to farmer groups.
- **Gradually reach all farmers** with in-depth knowledge by offering 'learning by discovery' (Ruganzu et al. 2015). Farmers are organized in Farmer Field School (FFS) groups which are facilitated by 2,350 FFS facilitators. The FFS approach builds the skills and capacity of farmers to identify and analyze problems, and to conduct experiments aimed at developing appropriate local solutions to local challenges.

There are a total of 17,016 agricultural extension officers operating under the *Twigire Muhinzi* model. These officers, listed in Table 17, are deployed at the different levels of administration from the national (RAB staff) to the village level (FFS facilitators).

**Table 17: Breakdown of the number of agricultural extension officers under *Twigire Muhinzi***

| Type of actor       | Institution     | Number        | Responsibility                                          |
|---------------------|-----------------|---------------|---------------------------------------------------------|
| RAB staff           | RAB             | 20            | Overall coordination, development of extension messages |
| District agronomist | District        | 30            | Coordination at district level                          |
| Sector agronomist   | Sector          | 416           | Day-to-day coordination of extension services           |
| Farmer promoter     | Sector/ village | 14,200        | Mobilization of farmers, training through demo plots    |
| FFS facilitator     | Village         | 2,350         | Facilitation of learning through the FFS approach       |
| <b>Total</b>        |                 | <b>17,016</b> |                                                         |

Table 18 compares the number and adequacy of agricultural extension officers in 2018 and 2020. The total number of extension officers has not changed significantly between 2018 and 2020: the number of extension officers employed under the RAB and the district local government has remained the same, while the number of farmer-promoters and FFS facilitators has increased slightly. In 2017, Rwanda had 2,165,000 agricultural households (NISR 2017), resulting in a 1:124 ratio of extension officers to agricultural households. Since the number of agricultural households was not available for 2020, the present study used the country's population growth rate to estimate the number of agricultural households. Rwanda's average annual population grew by 2.6% during the 2017-2020 period (World Bank Data 2021). Applying this rate to the number of agricultural households for 2020 gives a ratio 1: 136 of extension officers to agricultural

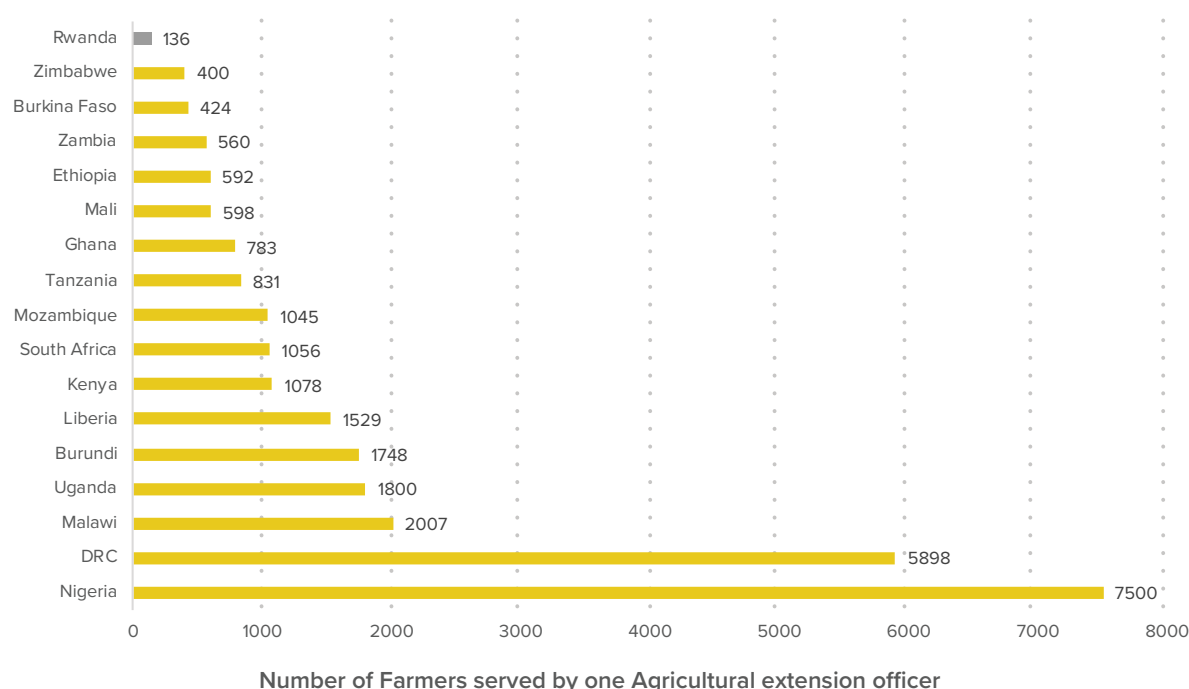
households. In both years, seed producers' satisfaction with the adequacy of extension services has been "good": 67% in 2018 and 72% in 2020.

The satisfaction rating with extension services in Rwanda in 2020 is the highest among countries in which the TASAI study has been conducted. Other countries with similarly high satisfaction ratings for extension services are Burkina Faso, Mali, and Zimbabwe, all of which also have low ratios of extension officers to agricultural households. Rwanda's ratios for both 2017 and 2020 are the lowest among African countries surveyed by TASAI (Figure 8). Rwanda's relatively low ratio means that Rwandese farmers have better access to extension services when compared to their counterparts in other African countries surveyed.

**Table 18: Number and adequacy of agricultural extension services**

| Indicators                                                                                           | 2018   | 2020   |
|------------------------------------------------------------------------------------------------------|--------|--------|
| Number of public extension officers employed by the government (RAB, district and sector agronomist) | 466    | 466    |
| Number of extension officers under <i>Twigire Muhinzi</i> but not employed by the government         | 16,500 | 16,550 |
| Number of private extension officers employed by seed companies                                      | -      | 212    |
| Total number of extension officers                                                                   | 16,966 | 17,228 |
| Ratio of extension officers to agricultural households                                               | 1:124  | 1:136  |
| Seed industry satisfaction with extension officers (out of 100%)                                     | 67%    | 72%    |
| Interpretation of satisfaction                                                                       | Good   | Good   |

**Figure 8: Comparison of number of farmers served by one extension officer**



## CONCENTRATION OF THE AGRO-DEALER NETWORK

Agro-dealers play a key role extending Africa's seed distribution systems to farmers and 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. This indicator tracks the number of agro-dealers and, if the data are available, it is disaggregated between registered and non-registered agro-dealers.

RICA is responsible for the training and registration of agro-dealers in Rwanda. As of 2021, the process of training the agro-dealers is ongoing, and only a few have been registered. According to the manager of the subsidy program, the RAB, there are 2,871 agro-dealers in the country. Of these, 1,461 work exclusively under the Tubura program of the One Acre Fund (OAF). The OAF is a not-for-profit social enterprise that provides services to farmers. The program is run in six African countries, including Rwanda. As a result of the program, the number of agro-dealers in Rwanda has increased from 1,460 in 2018 to 2,870 in 2020 (Table 19).

Only about one third of the seed producers surveyed (17 out of 52) worked with agro-dealers in 2020. The number of agro-dealers with which these seed producers worked ranged from 2 to 315. On average, each of these 17 seed producers worked with 55 agro-dealers. However, this number is skewed by three large seed companies that work with more than 100 agro-dealers each. More than half of the 17 seed producers (9 out of 17) worked with fewer than 20 agro-dealers.

Seed producers' satisfaction with the agro-dealer network increased from "fair" (51%) in 2018 to "good" (76%) in 2020. The increase in satisfaction is due to the training offered by RICA, RAB and OAF's Tubura program.

In 2017, there were 2,165,000 agricultural households in Rwanda (NISR 2017). Based on the estimated number of agricultural households in 2020, the ratio of agro-dealers to agricultural households reduced from 1:1,440 in 2018 to 1:814 in 2020.

**Table 19: Number of agro-dealers and satisfaction with agro-dealer network**

| Indicator                                                         | 2018    | 2020  |
|-------------------------------------------------------------------|---------|-------|
| Number of agro-dealers                                            | 1,460   | 2,871 |
| Ratio of agro-dealers to agricultural household                   | 1:1,440 | 1:814 |
| Average number of agro-dealers per seed company                   | -       | 55    |
| Seed industry satisfaction with agro-dealer network (out of 100%) | 51%     | 76%   |
| Interpretation of satisfaction                                    | Fair    | Good  |

## AVAILABILITY OF SEED IN SMALL PACKAGES

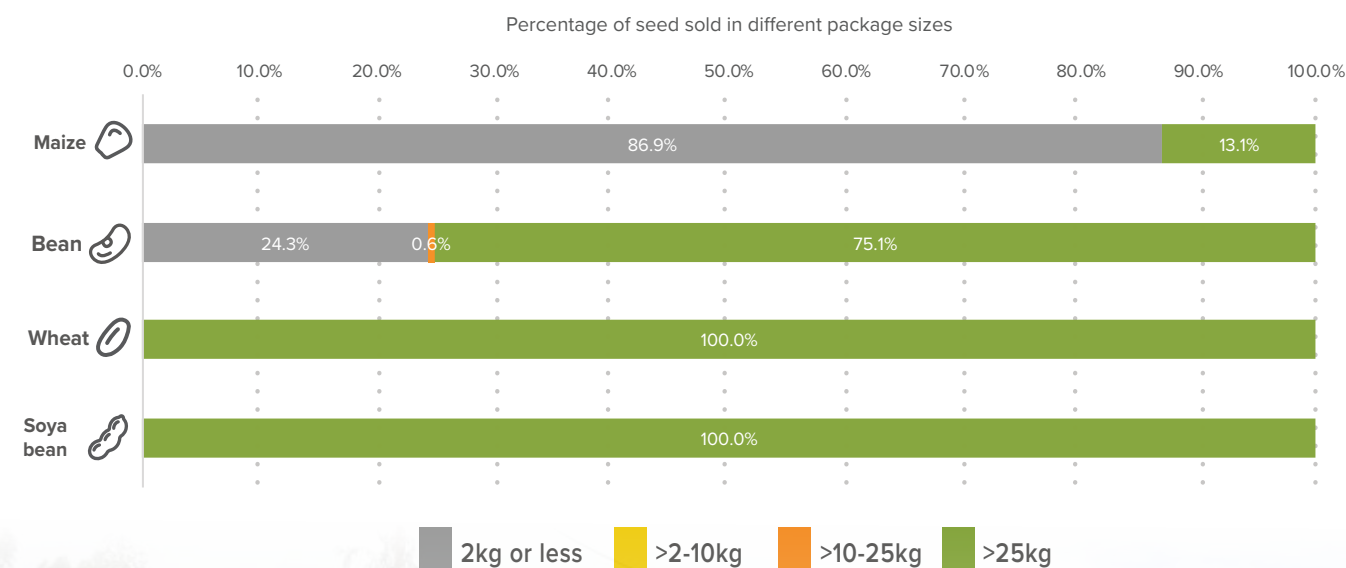
Because most farmers in Sub-Saharan Africa operate on a small scale, making seed available in small, more affordable packages is a good way to increase adoption rates of improved seed. TASAI tracks the percentage of seed sold in different package sizes, i.e., 2 kg and below, 2-10 kg, 10-25 kg, and above 25 kg.

Figure 9 shows the percentage of seed sold in the different package sizes in 2020. In 2020, only maize and bean seed were sold in small packages of 2 kg or less. Specifically, 87% of maize seed and 24% of bean seed was sold in small packages. This represents a significant increase in the case

of maize, of which only 54% was sold in small packages in 2018. It is noteworthy that in 2018 only imported maize seed (all hybrid) was sold in small packages, while by 2020 a number of new, local seed companies had invested in the production and commercialization of hybrid varieties, which they packaged in small sizes to cater to farmers who have small plots of land. Only 24% of bean seed was sold in small packages in 2020. Nonetheless, this is a significant increase from 2018, when all bean seed was sold in large packages of 50 kg.

All wheat and soya bean seed was sold in large packages of 50 kg in 2020. The large package size has to do with the recommended seeding rate for these two crops, which is 80-100 kg per hectare for wheat and soya bean.

**Figure 9: 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.

Maize hybrid seed is the most expensive seed among the four crops, costing more than 9 times the price of maize grain. There were no sales of maize OPV seed in 2020. The seed-to-grain price ratios for the other crops were: 2.3:1 for bean, 3:1 for wheat and 2.1: 1 for soya bean seed (Table 20). Seed producers opine that some of these crops were not profitable. However, they continue to produce them for two main reasons. First, legume crops are very good for crop rotation. Second, the existence of the government subsidy program, which provides a guaranteed market for the seed. The seed prices are fixed by the government in joint consultation with seed producers at the start of the year.

**Table 20: Seed-to-grain price ratios**

| Crop                                                                                                      | Prices in 2020 (RWF/kg) |                     | Seed-to-grain price ratio |       |
|-----------------------------------------------------------------------------------------------------------|-------------------------|---------------------|---------------------------|-------|
|                                                                                                           | Average seed price      | Average grain price | 2020                      | 2018  |
|  <b>Maize (hybrid)</b> | 2,430                   | 250                 | 9.1:1                     | 9.9:1 |
|  <b>Maize (OPV)</b>    | -                       | -                   | -                         | 3.2:1 |
|  <b>Bean</b>           | 1,305                   | 600                 | 2.3:1                     | 2.4:1 |
|  <b>Wheat</b>          | 1,246                   | 600                 | 3.0:1                     | 2.0:1 |
|  <b>Soya bean</b>      | 1,400                   | 600                 | 2.1:1                     | 1.6:1 |



# CONCLUSION



Rwanda's formal seed sector is in the early growth stage of development. The early growth stage is characterized by budding breeding programs and evolving seed policy environments (Ariga et al. 2019). Seed producers and companies produce and sell a limited range of staple crops.

While governments and NGOs are still significant players in the sector, the entry of local and regional seed companies in the seed market is increasing. The agro-dealer network that supports the distribution of seed to smallholder farmers is also emerging.

Under the **research and development** category, the number of public breeders has not changed much between 2018 and 2020 and the satisfaction rating was "good" for the four crops. The absence of private breeders indicates the nascent status of most local seed companies. The average ages of some varieties in Rwanda are high. These old varieties should be replaced by newer, improved varieties that have higher value for use. The RICA should speed up the operationalization of the variety release process. The absence of private breeders indicates the nascent status of most local seed companies.

In the **industry competitiveness** category, the government's transition away from seed production and marketing has improved levels of competition in Rwanda's seed sector. The growth in the number of seed companies represents an important milestone in the creation of functional private-sector-led seed systems. The fact that regional seed companies have entered the Rwandan market and have started local seed production indicates the attractiveness of Rwanda's seed market.

**Seed policy** in Rwanda aims to shift the production and distribution of certified seed from the government to the private sector. Most of the seed policy instruments, including the Seed Law and Regulations, have been enacted and harmonized with COMESA standards. Furthermore, the creation of RICA and the separation of the variety development and certification mandates from the RAB show the government's willingness to create an enabling seed business environment by rationalizing service delivery. However, RICA should strengthen the inspection capacity, speed-up the gazetting of the national seed catalogue and fast-track compliance of the national seed testing laboratory to ISTA standards to obtain accreditation. NVRC members should be appointed on the basis of technical competence and individual capacities as per the provisions of the law and relevant regulations.

Rwanda's Crop Intensification Program was rated "excellent" with respect to openness and transparency in 2018 and 2020. In addition, seed producers' satisfaction with the predictability of seed procurement process has improved from "good" in 2018 to "excellent" in 2020. This is exemplary and needs to be maintained. However, the efficiency of payments needs to be improved.

Under **institutional support** for smallholder farmers, the National Seed Association of Rwanda has improved its services substantially and thereby increased its members' satisfaction with its services between 2018 and 2020. Seed companies are making tangible and significant contributions to increasing the availability and distribution of quality seed to farmers. However, they require support in the form of updated training on quality seed production, as well as enhanced seed inspection services to produce and sell quality seed. These measures will enable seed companies to become more competitive both nationally and in regional markets.

The low number of public seed inspectors is a major constraint on the delivery of seed certification services and may create loopholes for the sale of low-quality seed in the market. To address this problem, RICA should enhance quality assurance along the seed value chain. Efforts to certify private seed inspectors should be continued. This initiative, together with the digitalization of seed certification services, will help to improve certification services and the quality of the seed supplied on the market.

**Services to smallholder farmers** are at a satisfactory level. Rwanda's seed sector has an adequate number of extension agents present at all levels of both central and local administration, giving it the lowest ratio of extension officers to agricultural households in all African countries whose seed sectors have been studied by TASAI. In addition, the recent increase in the number of trained and registered agro-dealers will strengthen the seed distribution system and hence improve smallholder farmers' access to quality seed.

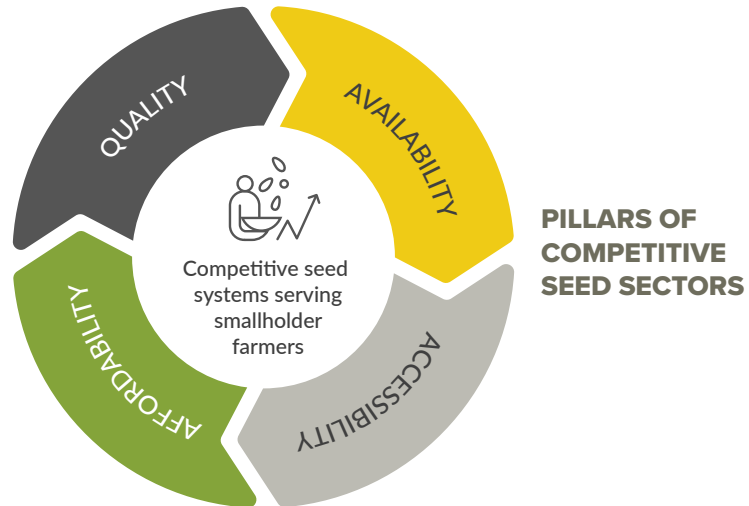
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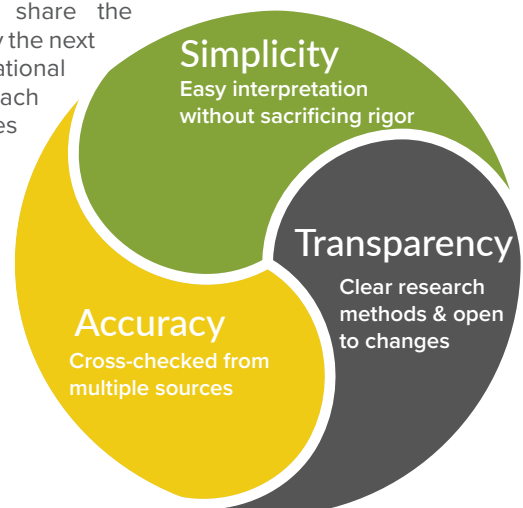
# ABOUT TASAI



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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