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# Ghana Country Report 2020

The African Seed Access Index

By  
Edward Mabaya, Michael Waithaka,  
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**TASAI**

The African Seed Access Index

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### By

Edward Mabaya

Michael Waithaka

Krisztina Tihanyi

Samuel Yao Adzivor

John Wobil

Mainza Mugoya

George Kanyenji

### Reviewed by

Eric Bentsil Quaye, Solomon Gyan Ansah,

Thomas Havor, Amos Rutherford

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## LIST OF ACRONYMS:

**CGIAR** - Consultative Group on International Agricultural Research

**CIMMYT** – International Maize and Wheat Improvement Centre

**CRI** – Crop Research Institute

**DUS** – Distinctiveness, Uniformity and Stability

**ECOWAS** – Economic Community of West African States

**GLDB** – Grains and Legumes Development Board

**GSID** – Ghana Seed Inspection Division

**IITA** – International Institute for Tropical Agriculture



**KIS** – Kpong Irrigation Scheme

**KNUST** – Kwame Nkrumah University of Science and Technology

**LCIC** – Legacy Crop Improvement Centre

**MOFA** – Ministry of Food and Agriculture

**NASTAG** – National Seed Trade Association of Ghana

**NSC** – National Seed Council

**NVRRRC** – National Variety Release and Registration Committee

**OPV** – Open Pollinated Variety

**PFJ** – Planting for Food and Jobs

**PPRSD** – Plant Protection and Regulatory Services Directorate

**SARI** – Savanna Agricultural Research Institute

**SEEDPAG** – Seed Producers Association of Ghana

**VCU** – Value for Cultivation and Use

**WACCI** – West Africa Centre for Crop Improvement



# 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 offering higher yields, disease and pest resistance, climate change adaptation, reduced post-harvest losses, and improved nutrition. To deliver 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 2020 to appraise the structure and economic performance of Ghana's formal seed sector. TASAI studies focus on the four grain and legume crops important to a country's food and nutritional security (the "four focus crops"). In Ghana, these crops are maize, rice, soya bean, and cowpea. The cultivation of these four crops covers 68% of the country's harvested area<sup>1</sup> under cereals and pulses<sup>2</sup>. In addition, the focus crops match four of the six selected food crops under Planting for Food and Jobs (PFJ), the government's subsidy program (MOFA 2019).

## OVERVIEW OF GHANA'S FORMAL SEED INDUSTRY

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

**The informal sector** refers to a system in which seed is produced, maintained, and distributed through informal networks. These activities "tend to be decentralized and might revolve around local entrepreneurship, seed banking, community-based seed production, or seed villages" (McGuire & Sperling, 2016). In many cases, farmers keep seed from the harvest and exchange it with neighbors, relatives, and through rural markets. Seed from this system is of variable varietal purity, physical and sanitary quality.<sup>3</sup> In Ghana, about 80% of farmers rely on the informal seed sector as the primary source of their seed (Republic of Ghana 2013).

**The formal sector** is a structured and regulated value chain for the production of improved seed varieties. This process involves many actors and institutions, from breeding varieties to the multiplication, processing, and distribution of certified seed. The different stages of improved seed production are regulated by governments, based on approved regulations and standards. The sale of seed from this system takes place through limited distribution channels such as registered seed growers/companies and agro-dealers. This system produces seed of the highest varietal purity, physical and sanitary quality. Ghana's seed policy sets the pace for the growth of the formal seed sector through the objective of gradually integrating the large informal seed sector into the formal seed sector (Republic of Ghana 2013).



1 This excludes areas where crops were planted but where no harvest has taken place, either due to damage (from pests or diseases) or crop failure (as a result of floods or drought).

2 FAOSTAT <http://www.fao.org/faostat/en/#data/QC>

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



Table 1 lists the agencies in charge of various aspects of Ghana’s seed industry. The Plant Protection and Regulatory Services Directorate (PPRSD) under the Ministry of Food and Agriculture (MOFA) is the government department responsible for regulating the seed industry in Ghana. The Directorate of Crop Services (DCS) is responsible for variety release and registration. The Grains and Legumes Development Board (GLDB) produces and supplies basic seed. The Crops Research Institute (CRI) and the Savanna Agricultural Research Institute (SARI) are both agricultural research institutions with active breeding programs. Other important players are seed growers and agro-dealers. Established in November 2015, the National Seed Trade Association of Ghana (NASTAG<sup>4</sup>) brings together players involved in improved seed production. These range from registered private entities involved in the production, processing and marketing of seed to registered private seed associations, NGOs involved in extension services and the distribution and marketing of seed, input suppliers, public institutions involved in seed research and development, and other organizations or individuals dealing with seed (NASTAG 2017). The Seed Producers Association of Ghana (SEEDPAG) is a member of NASTAG and brings together seed growers.<sup>5</sup>

**Table 1: Key players in Ghana’s formal seed sector**

| ROLE                               | KEY PLAYERS   |
|------------------------------------|---|
| Research and breeding              | Crop Research Institute (CRI), Savanna Agricultural Research Institute (SARI), Legacy Crop Improvement Centre (LCIC), private seed companies, CGIAR centers (IITA, CIMMYT, ICRISAT), West Africa Centre for Crop Improvement (WACCI), University of Ghana, University of Cape Coast |
| Variety release and regulation     | Plant Protection and Regulatory Services Directorate (PPRSD), National Variety Release, and Registration Committee  |
| Seed production and processing     | Seed growers, Grains and Legumes Development Board (GLDB), Kpong Irrigation Scheme (KIS)  |
| Education, training, and extension | Seed growers, National Seed Trade Association of Ghana (NASTAG), Ghana Seed Inspection Division (GSID), PPRSD, CRI, SARI, Department of Agricultural Extension Services   |
| Distribution and sales             | Seed companies, agro-dealers  |

<sup>4</sup> <https://nastag.org/>

<sup>5</sup> Ghana’s seed law (Plants and Fertilizers Act, 2010) requires the registration of seed importers, exporters, growers and dealers (Article 31) (Republic of Ghana 2010). In this report, the term “seed companies” refers to registered seed growers which are also eligible to become members of NASTAG. Seed growers may also register as companies for other purposes (e.g., trade), but this is not a requirement for registration to produce seed.



## METHODS

TASAI studies cover 22 indicators divided into 5 categories: **Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support,** and **Service to Smallholder Farmers**<sup>6</sup> (Table 2). In most TASAI studies, the bulk of the performance data reported comes from the year preceding 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 2019; however, whenever 2020 data are available, they are included in the report.

**Table 2: TASAI Indicators**

| INDICATOR  | 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’ attributes/ 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                                    | <del>Yes</del> | +                     |
| E3 Availability of seed in small packages                                  | Yes            | +                     |
| E4 Seed-to-grain price ratio at planting time                              | Yes            | -                     |

<sup>6</sup> The list of indicators and recent TASAI data are available at [https://tasai.org/wp-content/uploads/TASAI-Appendix\\_CURRENT.pdf](https://tasai.org/wp-content/uploads/TASAI-Appendix_CURRENT.pdf)





To assess the progress of Ghana's formal seed sector, the present Country Report draws comparisons with the findings of the 2017 TASAI Ghana study (which draws on performance data primarily from 2016). 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 growers<sup>7</sup>, plant breeders, and representatives of government entities active in the country's seed sector. Of these, seed growers were the study's primary source of information. For several indicators, TASAI supplemented quantitative data with survey data, in which respondents were asked to rate various aspects of the seed sector in Ghana on a scale of 0-100, color-coded as follows: 0-19.99% **extremely poor**, 20-39.99% **poor**, 40-59.99% **fair**, 60-79.99% **good**, and 80-100% **excellent**.

In 2019, the Ghana Seed Inspection Division (GSID)<sup>8</sup> had a list of 284 registered maize seed growers, 163 rice seed growers, 114 soya bean seed growers and 6 cowpea seed growers. This list was obtained from the GSID head office in Accra and was verified at its regional offices. This list was used to identify the seed growers examined for the present

7 In Ghana all seed producing entities are registered as 'seed growers' by the Ghana Seed Inspection Division (GSID). Article 31 of the Plants and Fertilizer Act (Republic of Ghana 2010) spells out registration of seed exporters, importers, growers, and cleaners. For the purposes of this report, we use the terms – seed growers and seed companies – interchangeably. One example where the distinction is important is with NASTAG, whose members are the seed growers that are also companies.





8 GSID is a division under PPRSD

study. The list was cross-checked with the regional<sup>9</sup> lists of seed growers to confirm which seed growers were active in 2019. As a result of the cross-check, 134 seed growers were identified as out-growers (seed growers who produce seed for other, often larger, seed growers), who were excluded from the sample since their production was captured under that of the seed growers they worked with. The study population was further narrowed down to include only those growers who produced seed on a minimum of 10 ha, a cut-off point that was established to ensure that all reasonably large growers were included in the study. Further, the sample was cross-checked against the list of seed companies that are members of NASTAG. The intention was to include all active seed companies that produced or sold any of the study's four focus crops (maize, rice, soya bean and cowpea). These selection criteria resulted in a study population of 94 active seed growers who produced, processed, and sold certified seed of at least one of the four focus crops on at least 10 ha in 2019. Table 3 shows the breakdown of seed grower respondents by crop and activity.

In addition to the seed growers, the study also surveyed five public agricultural research institutions and universities that deal with the four focus crops: the Crops Research Institute (CRI), the Savanna Agricultural Research Institute (SARI), the University of Ghana (Legon), the University of Cape Coast and the West Africa Centre for Crop Improvement (WACCI), in addition to the relevant directorates in the Ministry of Food and Agriculture

9 Ghana is divided into 16 administrative regions which are further subdivided into districts.

**Table 3. Breakdown of respondents by activity and crop (2019)**

| Crop   | Number of growers examined for the present study*<br>(out of 94 respondents) who: |                  |             | Total number of seed growers in Ghana<br>(PPRSD data) |
|--|---|------------------|-------------|---|
|  | Produced seed   | Processed seed** | Sold seed** |   |
|  <b>Maize</b>     | 76  | 77               | 77          | 284   |
|  <b>Rice</b>      | 51  | 50               | 50          | 163   |
|  <b>Soya bean</b> | 43  | 42               | 43          | 114   |
|  <b>Cowpea</b>    | 25  | 25               | 25          | 6***  |

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

\*\* The number of those who processed and sold is higher than those who produced because few growers may sell carry-over stocks from previous year without producing seed in the year of data collection.

\*\*\* The total number of the interviewed cowpea growers is higher than the one registered by PPRSD because some growers may register to produce one crop but end up producing others.

# RESEARCH AND DEVELOPMENT

## NUMBER OF ACTIVE BREEDERS

A well-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.<sup>10</sup> In addition to tracking the number of breeders working on the four focus crops, the present study also measures the level of satisfaction reported by growers (seed companies/individual producers) with the public breeding programs. The latter acts as a proxy for the ability of active breeders in public institutions to produce new varieties.





Ghana has 24 active breeders for the four focus crops – maize, rice, cowpea, and soya bean (Table 4). Of these, 21 breeders work with public institutions. Of these 21 breeders, 13 work at one of Ghana’s two public agricultural research institutions – the Savanna Agricultural Research Institute (SARI) and the Crop Research Institute (CRI), which are part of the Council for Scientific and Industrial Research (CSIR). SARI has the mandate for research and development of the four crops in northern Ghana, while the CRI is responsible for research and development in southern Ghana. The remaining eight

<sup>10</sup> TASAI studies define an “active breeder” as a breeder who is currently engaged in breeding/maintaining a variety or a breeder who had either developed and released at least one variety or was developing a variety of the crop of interest at the time of the TASAI study.

breeders work with one of two universities - the University of Ghana (Legon) or the University of Cape Coast – or the West Africa Centre for Crop Improvement (WACCI). Finally, three breeders are employed by private seed companies, two of which are foreign-owned, while the third company, which is locally owned, produces basic seed only.

The seed growers rate their satisfaction with the adequacy of the ability of active breeders in public institutions to produce new varieties as “good” for maize at 73% and “fair” for the other three crops: 48% for soya bean, 50% for cowpea, and 52% for rice. The high rating for maize corresponds to the relatively high number of breeders for maize compared to the number of breeders producing the other three crops. The lower ratings for rice, cowpea, and soya bean signal a need to strengthen breeding capacity for these crops. Since 2017, when TASAI data was last collected in Ghana, the number of breeders has remained the same for all focus crops except rice, for which the number has declined from six to four. The decline is due to the retirement of breeders. However, between 2017 and 2019, satisfaction ratings have fallen for all four crops. The ratings for cowpea declined most significantly, from 80% (excellent) to 50% (fair) showing dissatisfaction with the adequacy of the number of breeders to produce new varieties. This decline is due to weak breeding programs occasioned by inconsistent funding for research and development. Public research institutions indicated that they received inconsistent funding for research and variety development over the years.

**Table 4: Number and adequacy of active breeders in Ghana**

| Crop  | Number of public breeders | Number of private breeders | Total number of breeders |           | Satisfaction rating (out of 100%) |      |
|---|---------------------------|----------------------------|--------------------------|-----------|-----------------------------------|------|
|   | 2019                      | 2019                       | 2017                     | 2019      | 2017                              | 2019 |
|  Maize     | 7                         | 3                          | 10                       | 10        | 83                                | 73   |
|  Rice      | 4                         | 0                          | 6                        | 4         | 70                                | 52   |
|  Soya bean | 5                         | 0                          | 5                        | 5         | 80                                | 50   |
|  Cowpea    | 5                         | 0                          | 5                        | 5         | 60                                | 48   |
| <b>Total</b>  | <b>21</b>                 | <b>3</b>                   | <b>26</b>                | <b>24</b> |                                   |      |

extremely poor   poor   fair   good   excellent



## VARIETIES RELEASED IN THE LAST THREE YEARS

The number of varieties released 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-enhancement. A total of 105 varieties of the focus crops were released during the period 2002-2019: 49 varieties of maize, 20 rice varieties, 24 cowpea varieties, and 12 varieties of soya bean. The national variety catalogue, lists released varieties and their descriptions (NVRRC 2019).

Figure 1 illustrates the 3-year moving averages of crop varieties released between 2002 and 2019. Between 2017 and 2019, 17 maize, 7 rice, 7 cowpea, and 3 soya bean varieties were released. All 17 maize varieties were hybrid varieties. However, across the four crops, in some years, no varieties were released. Three factors explain the erratic flow of variety releases. The first centers around the timing of variety releases. Specifically, a high number of varieties were submitted for release in 2017 and 2018. The National Seed Council (NSC), which oversees variety release, detected several errors in the variety release applications. The

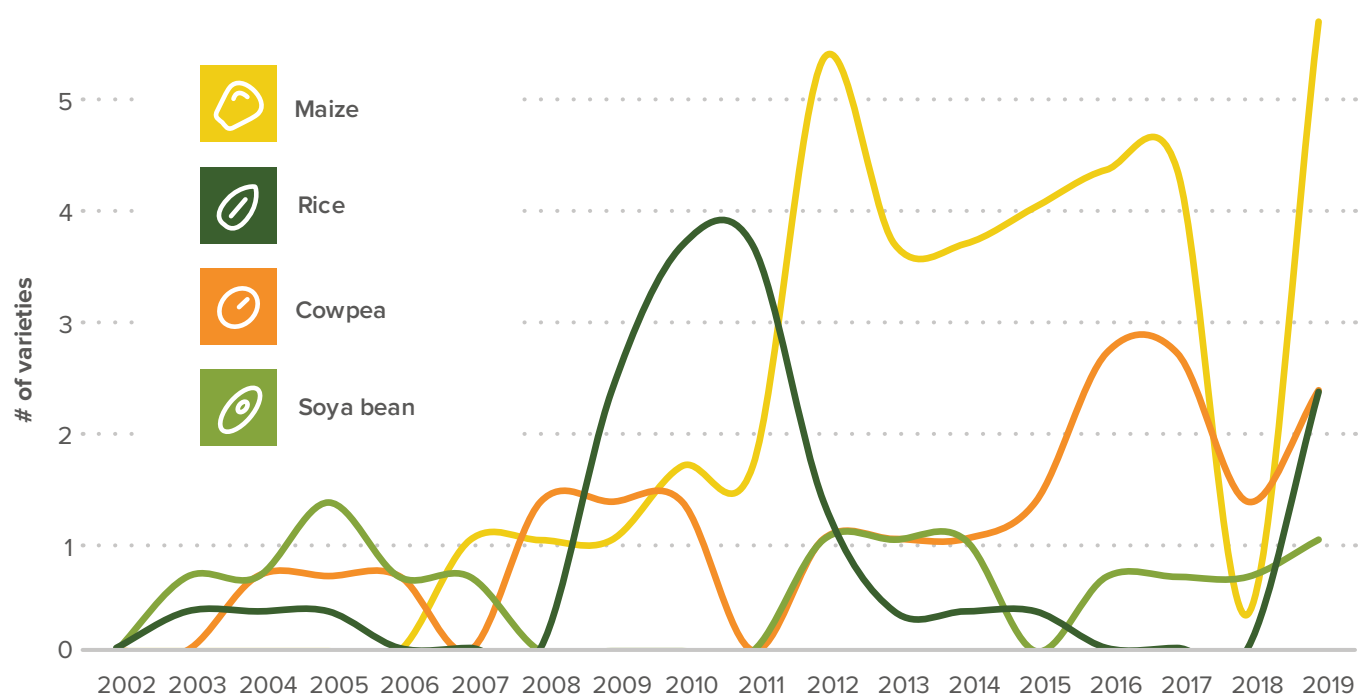
applications were sent back to the respective institutions, which corrected the errors and resubmitted the applications. However, due to financial constraints, the NSC did not respond to the resubmitted applications during this period, creating a backlog of applications that were only reviewed and approved in 2019. This explains why there were no variety releases of the focus crops in 2017 and 2018, while 34 varieties were released in 2019 alone.

The second factor for the erratic figures is that, historically, seed growers' demand for basic seed was relatively low. The low demand was compounded by the high cost of the variety release process, which typically discourages breeders from developing new varieties. However, this changed in 2017, when, as part of the Planting for Food and Jobs<sup>11</sup> (PFJ) program, the government began to invest in the production of basic seed and purchased certified seed from seed growers. With the government guaranteed to buy the certified seed produced by growers, the derived demand for basic seed produced by research institutions has also increased.

The third reason for the erratic variety releases has to do with funding: research institutions have not received consistent funding for research and variety development over the years. Funding often comes from external donors whose programs tend to be short-term. Since variety development takes time, the number of variety releases peaks towards the closure of the programs, often followed by inactivity.

<sup>11</sup> <https://mofa.gov.gh/site/programmes/pfj>

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



## VARIETIES WITH SPECIAL FEATURES

Varieties may have special characteristics, for instance climate-smart, fast-cooking and nutrition-enhanced, or industry-demanded features. Examples of climate-smart features are drought tolerance, early maturity, or extra early maturity. Such varieties are particularly important in the northern parts of Ghana, where rainfall is mono-modal and unreliable. Between 2017 and 2019, a total of 34 varieties with special features were released (Table 5). Note that one variety may have multiple special features. Of the 17 maize varieties released in this period, 5 are drought-tolerant, and 4 are early maturing (90 – 95 days) or extra early maturing (80 – 85 days) varieties that perform well during short growing periods. Two new maize varieties offer nutrition-enhanced features (enhanced with Pro-vitamin A). Finally, five varieties are suitable for industrial preparation (grits) for breweries. Of the seven rice varieties released since 2017, two varieties released were fast cooking. For cowpea, seven varieties released during this period were drought tolerant, and one is a fast-cooking variety. None of the soya bean varieties released during this period had special features.

**Table 5: Number of varieties with special features released**

| Attribute/<br>feature                                 | Description of<br>feature/ attribute               | Number of varieties released<br>2017 - 2019 |      |        |           |           |
|---|--|---|------|--------|-----------|-----------|
|   |  | Maize                                       | Rice | Cowpea | Soya bean | TOTAL     |
| <b>All varieties released</b>                         |  | 17  | 7    | 7      | 3         | <b>34</b> |
| <b>All varieties released with special features</b>   |  | 15  | 2    | 7      | 0         | <b>24</b> |
| <b>Climate smart features</b>                         | All climate-smart features                         | 11  | 0    | 6      | 0         | <b>17</b> |
|   | Drought tolerant                                   | 5   | 0    | 5      | 0         | <b>10</b> |
|   | Early / extra-early maturing                       | 4   | 0    | 0      | 0         | <b>4</b>  |
| <b>Fast-cooking and nutrition-enhanced attributes</b> | All fast-cooking and nutrition-enhanced attributes | 2   | 2    | 1      | 0         | <b>5</b>  |
|   | Fast-cooking                                       | 0   | 1    | 2      | 0         | <b>3</b>  |
|   | Nutrition-enhanced features                        | 1   | 0    | 0      | 0         | <b>1</b>  |
| <b>Industry-demanded features</b>                     | All industry-demanded features                     | 5   | 0    | 0      | 0         | <b>5</b>  |
|   | Grits for the breweries                            | 5   | 0    | 0      | 0         | <b>5</b>  |





## NUMBER OF VARIETIES SOLD IN 2019

An increase in the number of varieties sold in a country often reflects an increased choice of varieties available to farmers. The seed growers surveyed sold a total of 22 maize varieties to farmers in 2019. Based on the number of growers selling a particular variety, the most popular varieties were: Obatanpa (sold by 50% of maize seed growers), Sanzal Sima (37%), Abontem (36%), Omankwa (25%), and Wang-Dataa (22%) (Table 6). Obatanpa was the first quality protein maize (QPM) variety in Ghana (released in 1992). It is known for its nutritional features, and the Ministry of Health promoted it extensively in the years after its release.

Seed growers sold four rice varieties to farmers in 2019. AGRA Rice was the most popular rice variety by far, sold by 98% of rice seed growers. This variety is popular because of its aromatic taste and low-starch content, both desirable qualities for cooking. AGRA rice has cooking traits similar to varieties imported from Asia. The next most popular variety is Jasmine 85, sold by 25% of growers.

The cowpea varieties Wang Kae (sold by 48% of growers), Kirkhouse Benga -1 (sold by 40% of growers), and Padi-tuya (sold by 28% of growers) were the most popular cowpea varieties sold (Table 6). Seed growers produced four soya bean varieties, the most popular of which were Jenguma (sold by 63% of growers), Afayak (sold by 53% of growers), and Favour (sold by 33% of growers).

**Table 6: Name and age of popular varieties sold**

| Crop      | Number of varieties sold in 2019 | Name of popular variety sold | % of growers selling the variety | Age of variety (years) in 2019 | Average Age of Popular Varieties |
|-----------|----------------------------------|------------------------------|----------------------------------|--------------------------------|----------------------------------|
| Maize     | 22                               | Obatanpa                     | 50%                              | 27                             | 12                               |
|           |                                  | Sanzal Sima                  | 37%                              | 7                              |                                  |
|           |                                  | Abontem                      | 36%                              | 9                              |                                  |
|           |                                  | Omankwa                      | 25%                              | 9                              |                                  |
|           |                                  | Wang-Dataa                   | 22%                              | 7                              |                                  |
| Rice      | 4                                | AGRA Rice                    | 98%                              | 6                              | 8                                |
|           |                                  | Gwebaa Rice                  | 25%                              | 10                             |                                  |
| Cowpea    | 7                                | Wang Kae                     | 48%                              | 3                              | 6                                |
|           |                                  | Kirk House Benga-1           | 40%                              | 11                             |                                  |
|           |                                  | Padi Tuya                    | 28%                              | 3                              |                                  |
| Soya bean | 4                                | Jenguma                      | 63%                              | 16                             | 8                                |
|           |                                  | Afayak                       | 53%                              | 7                              |                                  |
|           |                                  | Favour                       | 33%                              | <1                             |                                  |

## VARIETIES DROPPED OR NO LONGER MAINTAINED

A vibrant seed sector is expected to retire old varieties and discontinue varieties that fail to meet farmer needs as newer and better varieties become available. This indicator tracks any variety dropped (i.e., no longer sold) by at least one seed company in the last three years.<sup>12</sup> The TASAI study tracks the dropped varieties, and for each dropped variety, we also capture the reason(s) why it was dropped.

During the 2010–2019 period, seed growers dropped 12 maize varieties, 8 cowpea varieties, 7 rice varieties, and 7 soya bean varieties. Since these varieties are still produced by some growers, they continue to be maintained by the research institutions. Seed growers have dropped varieties for several reasons. The first reason is that varieties were not climate-smart, e.g., the Obatanpa maize variety, when growers are increasingly interested in early-maturing and drought-tolerant varieties. The second reason is a drop in

demand by farmers for maize varieties Obatanpa, and Sanzal Sima, rice varieties Gwebaa Rice and Digang, cowpea variety Songotra, and soya bean variety Jenguma. The third reason is a shortage of basic seed, which has caused growers to drop the variety. This was the case for maize varieties Mamaba, and Abeleehi, the rice variety GR-18, and the cowpea variety Padi Tuya. The fourth reason is a high susceptibility to insect pest infestation, which applied to cowpea varieties Songotra and Bengpla. Lastly, some varieties, specifically soya bean varieties Jenguma, Anidaso, Quarshie, and Salintuya, were dropped because they were difficult to thresh and often shattered at maturity.

Over the same period, the research institutions reported that they discontinued the maintenance of seven varieties - three maize, two cowpea, and two soya bean varieties. Breeders no longer maintain these varieties because there is a low demand for the varieties. The breeders do not know all the reasons why seed growers no longer demand certain varieties, which suggests a disconnect between the seed growers and the breeders. The two soya bean varieties were discontinued because they shatter at maturity, i.e., the pods break and drop the seeds before they are harvested.

<sup>12</sup> It is important to note that this does not mean the variety is no longer on the market, as other companies may still sell it.

## AVERAGE AGE OF VARIETIES SOLD

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

Table 7 shows the ages of the most popular varieties (and average age by crop) that were sold to farmers in 2019. The age of the variety is calculated based on the year when the variety was released for commercialization. The popularity of the variety is determined by the number of seed growers producing and/or selling that variety.

**Table 7. Average age of varieties sold (all vs. popular)**

| Crop      | Number of varieties sold in 2019 | Average of all varieties sold | Average Age of Popular Varieties |
|-----------|----------------------------------|-------------------------------|----------------------------------|
| Maize     | 22                               | 6                             | 12                               |
| Rice      | 4                                | 6                             | 8                                |
| Cowpea    | 7                                | 10                            | 6                                |
| Soya bean | 4                                | 13                            | 8                                |

## SOURCES AND AVAILABILITY OF FOUNDATION (BASIC) SEED

Seed growers use basic seed to produce certified seed for sale to farmers. In many African countries, limited access to basic seed from public research institutions often limits the ability of seed companies to scale up production. The general process to obtain the desired quantities of basic seed starts with the grower applying to the research institution that produces or supplies the particular basic seed, specifying the crop, variety, and quantity needed. The research institution invoices the grower for the basic seed, and upon payment, the grower receives the seed.

**Sources of basic seed:** Table 8 shows the public and private sources of basic seed for the focus crops in 2019. The main public sources were the Crops Research Institute (CRI), the Savannah Agricultural Research Institute (SARI), and the Grains and Legumes Development Board (GLDB). In addition, three private companies also produced basic seed. However, of the three, only one sold basic seed to other growers. The other two companies retained the basic seed for their certified seed production programs. For each organization, the table lists the number of transactions, by crop, between the source organization and seed growers. (Note that the same seed grower may have obtained basic seed for a particular crop from multiple sources.) The data shows that the most popular sources of basic seed were GLDB for maize (40% of all transactions) and SARI for the other three crops – rice (71% of all transactions), cowpea (56% of all transactions), and soya bean (92% of all transactions). The other significant sources were CRI, the Legacy Crop Improvement Center (LCIC), and the University of Ghana (Legon). Only one seed grower reported sourcing maize basic seed from the International Institute for Tropical Agriculture (IITA), which is one of the research centers of the Consultative Group on International Agricultural Research (CGIAR). However, the research institutions in Ghana work with several CGIAR centers including CIMMYT, ICRISAT and CIAT at various stages of the variety development process.

**Table 8. Sources and volume of basic seed (as % of total)**

| Source of basic seed        | Maize                  |             | Rice                   |             | Cowpea                 |             | Soya bean              |             |
|-----------------------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|------------------------|-------------|
|                             | Number of transactions | % of total  | Number of transactions | % of total  | Number of transactions | % of total  | Number of transactions | % of total  |
| CRI                         | 21                     | 17          | 9                      | 15          | 3                      | 12          | 1                      | 2           |
| GLDB                        | 50                     | 40          | 3                      | 5           | 7                      | 28          | 1                      | 2           |
| IITA                        | 3                      | 2           | 0                      | 0           | 0                      | 0           | 0                      | 0           |
| LCIC                        | 5                      | 4           | 0                      | 0           | 0                      | 0           | 1                      | 2           |
| SARI                        | 32                     | 26          | 42                     | 71          | 14                     | 56          | 43                     | 91          |
| Own                         | 4                      | 3           | 0                      | 0           | 0                      | 0           | 0                      | 0           |
| Other seed companies        | 9                      | 7           | 4                      | 7           | 1                      | 4           | 1                      | 2           |
| University of Ghana (Legon) | 0                      | 0           | 1                      | 2           | 0                      | 0           | 0                      | 0           |
| <b>Totals</b>               | <b>124</b>             | <b>100%</b> | <b>59</b>              | <b>100%</b> | <b>25</b>              | <b>100%</b> | <b>47</b>              | <b>100%</b> |



**Seed growers’ assessment of the availability of basic seed:**

Survey respondents were asked to assess three aspects of the availability of basic seed: the quality of seed received, the timeliness of delivery, and whether they had received the requested quantities. In addition, they provided a satisfaction rating on the overall availability of basic seed in the country. As shown in Table 9, overall, seed growers rated the availability of basic seed as “excellent” for all four crops – 87% for soya bean, 86% for maize, 85% for cowpea, and 84% for rice. The quality of basic seed for all crops was rated “excellent” (83%-85%). The quantity of seed received was also rated as “excellent”, ranging from 88 to 94%, indicating that most growers received the quantities requested. Finally, the timeliness of delivery was rated as “excellent” across the four crops, ranging from 86% to 92%. The high ratings indicate that, across the four crops, seed growers in Ghana are satisfied with the three aspects and the overall availability of basic seed. A clear indication of progress is that the overall satisfaction rating is “excellent” across all crops. This rating is a marked improvement since 2016, when the overall satisfaction ratings were 70% for maize, 68% for cowpea and soya bean, and 62% for rice (Figure 2).

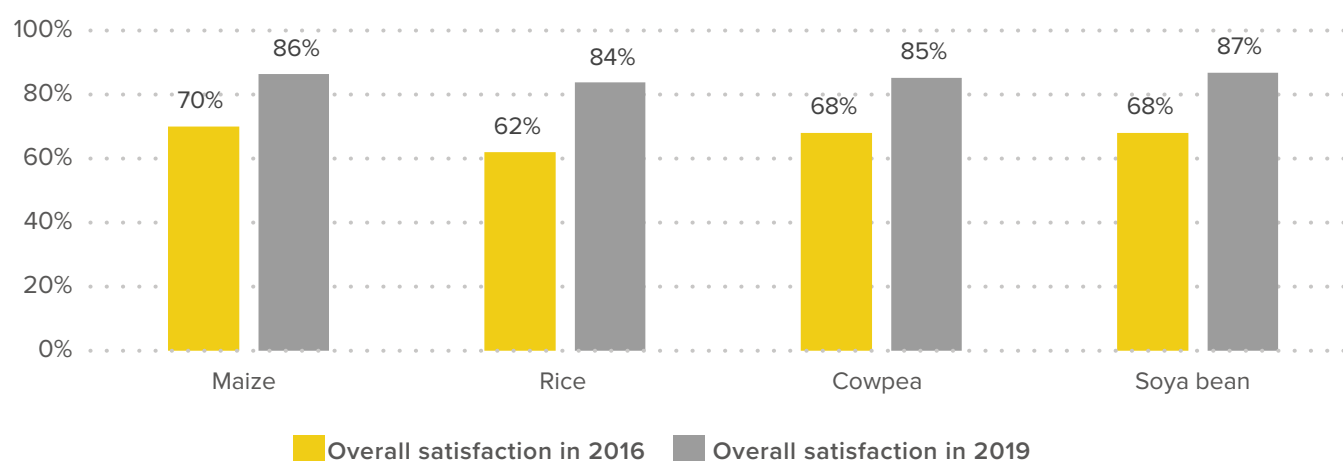
**Availability of basic seed by organization:**

Seed growers were asked to rate each source organization along with the aspects of quality, quantity, timeliness of delivery, and overall availability of basic seed. The seed growers surveyed generally scored the four variables as “excellent” (above 80%) across the four crops for all organizations (Tables 10 and 11). The main reason for the high scores of the public institutions CRI, GLDB, and SARI is that the government supports them under the PFJ program to produce and provide all early-generation seed. However, in some instances, seed growers were not satisfied with quantities of seed they received. For example, the IITA received a low score (67%) for maize, because one of the three companies that sourced maize basic seed from the IITA did not receive the quantity requested and scored the organization lower. The LCIC received a rating of 80% for quantity of maize seed received, because one of the five seed growers that sourced maize basic seed from the LCIC did not receive the quantity requested. Its ratings for seed quality and timeliness of delivery were higher, at 84% and 100%, respectively. In addition, the availability of cowpea seed from SARI was rated relatively low (79%) because of delays in the availability of breeder seed needed to produce basic seed: SARI sources breeder seed from the IITA in Nigeria, which only supplies the seed after a licensing agreement has been signed, and this may delay the process.

**Table 9: Seed growers’ assessment of availability of basic seed (2019)**

| Aspect of availability                   | Maize (n=124) | Rice (n=59) | Cowpea (n=25) | Soya bean (n=47) |
|--|---------------|-------------|---------------|------------------|
| Received the quantity requested (% yes)  | 92            | 93          | 88            | 94               |
| Timeliness of delivery (% yes)           | 91            | 86          | 92            | 91               |
| Quality of basic seed (out of 100%)      | 84            | 83          | 83            | 85               |
| Availability of basic seed (out of 100%) | 86            | 84          | 85            | 87               |

**Figure 2: Overall satisfaction rating of availability of basic seed in 2016 and 2019**



**Table 10: Rating of quality, quantity, and timeliness of basic seed, by source organization (2019)**

| Crops            |                | CRI | GLDB | IITA | LCIC | SARI | Own | Other seed companies |
|------------------|----------------|-----|------|------|------|------|-----|----------------------|
| Maize (n=124)    | Quality *      | 89  | 82   | 93   | 84   | 79   | 97  | 88                   |
|                  | Quantity **    | 81  | 100  | 67   | 80   | 91   | 75  | 100                  |
|                  | Timeliness *** | 86  | 88   | 100  | 100  | 94   | 100 | 100                  |
| Rice (n=59)      | Quality *      | 82  | 80   | n/a  | n/a  | 84   | n/a | 80                   |
|                  | Quantity **    | 100 | 100  | n/a  | n/a  | 93   | 80  | n/a                  |
|                  | Timeliness *** | 100 | 100  | n/a  | n/a  | 83   | 80  | n/a                  |
| Cowpea (n=25)    | Quality *      | 87  | 87   | n/a  | n/a  | 80   | n/a | n/a                  |
|                  | Quantity **    | 100 | 100  | n/a  | n/a  | 79   | n/a | n/a                  |
|                  | Timeliness *** | 93  | 93   | n/a  | n/a  | 81   | n/a | n/a                  |
| Soya bean (n=47) | Quality *      | n/a | n/a  | n/a  | n/a  | 85   | n/a | n/a                  |
|                  | Quantity **    | n/a | n/a  | n/a  | n/a  | 93   | n/a | n/a                  |
|                  | Timeliness *** | n/a | n/a  | n/a  | n/a  | 93   | n/a | n/a                  |

\*Quality of basic seed (opinion).

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

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

**Table 11: Overall assessment of availability of basic seed, by source organization (2019)**

| Organization         | Availability of basic seed (overall opinion in %) |             |               |                  |
|----------------------|---|-------------|---------------|------------------|
|                      | Maize (n=124)                                     | Rice (n=59) | Cowpea (n=25) | Soya bean (n=47) |
| CRI                  | 85  | 94          | 93            | n/a              |
| GLDB                 | 86  | 80          | 93            | n/a              |
| IITA                 | 93  | n/a         | n/a           | n/a              |
| LCIC                 | 98  | n/a         | n/a           | n/a              |
| SARI                 | 83  | 82          | 81            | 87               |
| Own                  | 100   | n/a         | n/a           | n/a              |
| Other seed companies | 91  | 82          | n/a           | n/a              |

extremely poor   poor   fair   good   excellent



# INDUSTRY COMPETITIVENESS

## NUMBER OF ACTIVE SEED GROWERS

Competition breeds excellence: the presence of more active seed companies increases competition and creates incentives for companies/individual producers 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 growers that produced and marketed seed of one or more of the focus crops.

As outlined under Section 1.1 (Methodology), TASAI interviewed 94 registered seed growers. Table 12 shows the breakdown of number of active seed companies in 2019. According to the list produced by the PPRSD and NASTAG, there were 31 active seed companies for the four crops in 2019. Note that the total number of seed companies in Table 12 exceeds 31, as a single company may grow more than one of the four focus crops.

**Table 12: Active seed companies**

| Crop      | No. of seed companies in 2016 | No. of seed companies in 2019 |
|-----------|-------------------------------|-------------------------------|
| Maize     | 17                            | 29                            |
| Rice      | 7                             | 19                            |
| Cowpea    | 9                             | 13                            |
| Soya bean | 5                             | 15                            |

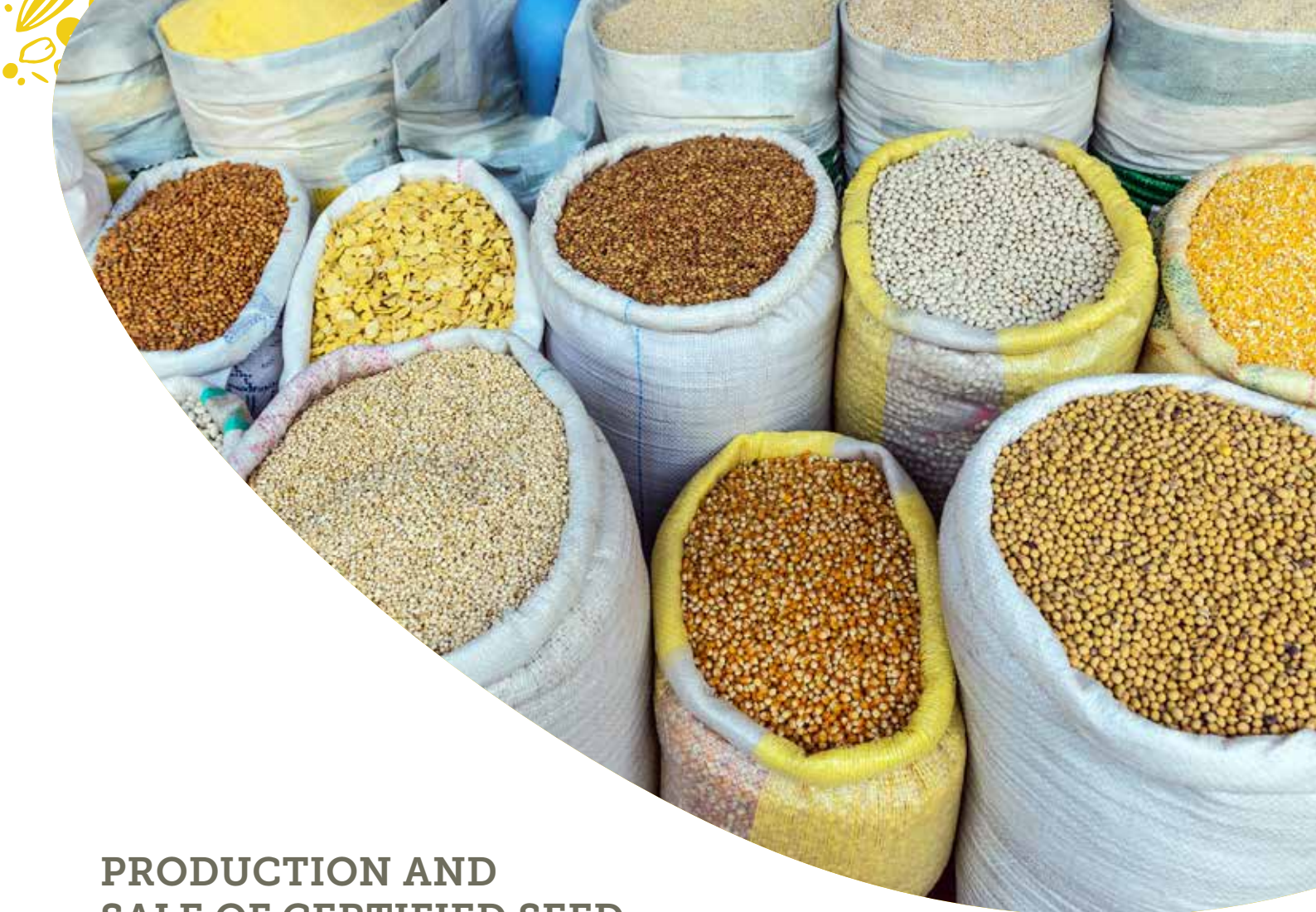
## GENDER IN MANAGEMENT OF SEED COMPANIES

TASAI also tracks the number of women in management and ownership positions in seed companies. The 31 seed growers reported a total of 92 management positions, including positions such as managing director, assistant managing director, farm manager, finance manager, production/operations manager, and marketing manager. Table 13 provides the findings across the 31 seed companies surveyed in 2019. The figures range from 3% to 23%, showing that at present, women's participation as owners or managers of seed businesses in Ghana is low.

**Table 13: Gender in management of seed companies (2019)**

| Gender indicator  | Number | %  |
|---|--------|----|
| Women in management positions (n=92)                            | 21     | 23 |
| Companies where management consist of at least 50% women (n=31) | 4      | 13 |
| Companies with female top manager (n=31)                        | 1      | 3  |
| Companies with female owner (n=31)                              | 1      | 3  |





## 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 MT) of certified seed sold in the data collection year, as reported by active seed growers. Table 14 lists the aggregated quantities of seed production reported by the 94 respondents. The quantities produced were 4,527 MT of maize, 4,937 MT of rice, 255 MT of cowpea, and 1,141 MT of soya bean. The table also includes the estimated production volumes reported by the PPRSD. For maize, rice and soya bean, the data recorded by TASAI are notably lower than the government's data, while the opposite is true for cowpea.<sup>13</sup>

Table 14 also provides figures on the total volume of seed sold by the 94 seed growers in 2019: 5,550 MT of maize, 4,445 MT of rice, 218 MT of cowpea, and 967 MT of soya bean. The 5,550 MT of maize sold includes 2,200 MT of hybrid maize imported and sold by a total of 14 companies.

<sup>13</sup> Due to differences in sampling frame, timing of data collection, and estimation approaches, TASAI estimates on total seed production and sales differ from government estimates reported by PPRSD. TASAI estimates are based on a summation of self-reported ex-post (after season) production and sales figures from surveyed producers. PPRSD estimates are primarily based on ex-ante (before season) registrations from seed producers, gathered before planting and during field inspections. In both cases, the self-reported data from seed producers are not independently verified.

**Table 14: Estimated seed production and sales (2019)**

| Crop      | Seed production in MT by all seed growers (estimate; PPRSD data) |                       | Seed production in MT by 94 surveyed seed growers (TASAI data) | Seed sales in MT (TASAI data) |
|-----------|--|-----------------------|--|-------------------------------|
|           | Number of growers (PPRSD)  | Seed production in MT |  |                               |
| Maize     | 284  | 10,831                | 4,527  | 5,550                         |
| Rice      | 163  | 8,354                 | 4,937  | 4,445                         |
| Cowpea    | 6  | 176                   | 255  | 218                           |
| Soya bean | 114  | 5,252                 | 1,141  | 967                           |



## MARKET CONCENTRATION

Competition among seed producers tends to benefit 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>14</sup>

In 2019, the market share of the top four seed growers accounted for 67% of the cowpea seed market, 64% of the soya bean seed market, 59% of the rice seed market, and 45% of the maize seed market (Table 15). In contrast, in 2016, the top four seed growers dominated the seed market, with market shares of 87% for cowpea, 78% for soya bean, 77% for rice, and 72% for maize. Applying the HHI yielded the following scores: 883 for maize, 1,264 for rice, 1,824 for cowpea, and 1,094 for soya bean (Table 15). In the case of HHI, the lower the score, the more competitive the market. Combined with the “top four” market share data, the HHI scores indicate that the markets for all four crops are either competitive or very competitive, with no single grower dominating the market. Instead, there are many small(er) seed growers, each accounting for a small(er) market share. This is marked improvement from 2016, when market concentration ranged from low to high. Although the sample in 2017 (17 seed companies) was smaller than the 2019 sample, there has been marked improvement in the competitiveness of the seed industry in Ghana. This improvement results from the proliferation of seed growers wishing to benefit from the market opportunities created by the PFJ program.





## MARKET SHARE OF GOVERNMENT PARASTATAL

In some countries, public entities are still active players in the marketing and sale of certified seed. Public seed companies can play a critical role in supplying varieties that farmers desire, which private seed companies may consider to be less profitable. They also tend to support multiple national objectives such as university training and research, in addition to seed production. However, such state-owned companies often benefit from preferential treatment, less stringent enforcement of regulations, access to competitor information, and indirect production subsidies. Collectively, these privileges can result in unfair competition against purely private seed companies. In Ghana, two government entities, the Kpong Irrigation Scheme and the Kwame Nkrumah University of Science and Technology, produced and sold seed in 2019.

The Kpong Irrigation Scheme (KIS) is owned by the Ghana Irrigation Development Authority (GIDA), which operates under the Ministry of Food and Agriculture (MOFA). The scheme covers an area of 4,052 ha, of which 2,000 ha are allocated to farmers. KIS started producing rice seed in 2017, and in 2019 it produced and sold 250 MT of rice seed, accounting for 6% of the rice seed market. The seed is supplied to farmers who are members of the scheme and the Planting for Food and Jobs program. However, according to the PPRSD, the seed supplied by KIS was not certified.

The Kwame Nkrumah University of Science and Technology (KNUST) produced and sold 9.4 MT of the Omankwa maize variety. Since the production took place on less than 10 ha, this institution was not included in the survey; however, it is clear from its sales volumes that KNUST is not a major player on the market.

**Table 15: Market concentration (HHI and CR4)**

| Crop  | HHI (2016) | HHI (2019) | Market share of top four (%) |
|---|------------|------------|------------------------------|
|  Maize     | 1,620      | 883        | 45                           |
|  Rice      | 2,287      | 1,264      | 59                           |
|  Cowpea    | 2,798      | 1,824      | 67                           |
|  Soya bean | 3,072      | 1,094      | 64                           |

<sup>14</sup> 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.

## SEED SALES TO DIFFERENT CATEGORIES OF BUYERS

The TASAI study tracked five different categories of seed buyers in 2019: agro-dealers under the PFJ program (agro-dealers PFJ), agro-dealers operating outside of the PFJ (agro-dealers not PFJ), farmers who bought seed directly from seed growers, NGOs, and other buyers. The most dominant buyers are agro-dealers (PFJ), accounting for 68-90% of seed sales by crop (Figure 3). The agro-dealers (PFJ) category is followed by agro-dealers (not PFJ), farmers, NGOs, and other buyers, none of which account for over 10% of seed sales, except for direct sales of cowpea seed sales to farmers, reported at 15%. Seed imports are also accommodated in the PFJ program. An example is that the maize sales to the PFJ program included 2,170 MT of seed imports, 98% of the 2,200 MT of hybrid maize imports mentioned earlier.

## SEED IMPORT AND EXPORT PROCESSES

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 the sum of the number of days needed to obtain import documentation (import permit, phyto-sanitary certificates, and an International Orange Certificate<sup>15</sup>, if applicable) and the number of days to

<sup>15</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.

clear seed at the border. It excludes transportation time. In 2019, the PPRSD granted permits to 16 companies to import certified seed of the four focus crops. All imports were maize seed, primarily hybrid maize, to complement local production for the PFJ program. The source countries were Nigeria, Thailand, Zimbabwe, South Africa, Brazil, Hungary, France, India, Bolivia, USA, Mexico, and Croatia. The main border entry points were Aflao, Tema, and Accra, through Kotoka International Airport. The total volume of imports was 2,224 MT.

The importing companies reported an average length of 15 days to import the seed – on average, 5 days to obtain import documents and 10 days to clear the seed at the border. This is a marked improvement from the average duration of 90 days reported in 2016. Reflecting this improvement, companies' satisfaction with the import process has increased dramatically, from 20% to 80% (Table 16). The main reason for the improvement is that in the past three years, the government has made obtaining the requisite documentation significantly easier. There were no recorded exports for the four crops in 2019.

Table 16: Seed import process

| Indicators                                     | 2016 | 2019      |
|--|------|-----------|
| Average length of import process (in days)     | 90   | 15        |
| Satisfaction with import process (out of 100%) | 20%  | 80%       |
| Interpretation of satisfaction                 | Poor | Excellent |

Figure 3: Seed sales by category of buyers (2019)





# SEED POLICY AND REGULATIONS

## LENGTH OF VARIETY RELEASE PROCESS

Plant variety release is the process by which new varieties undergo various tests for yield, Value for Cultivation and Use (VCU), and Distinctness, Uniformity, and Stability (DUS). Varieties that perform satisfactorily in these tests are approved for release by the National Variety Release and Registration Committee (NVRRC). 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. The length of the variety release process is calculated from the date the variety is submitted to the variety release committee to the date when the variety is approved for release. The calculation does not include the time the breeder spends developing the variety.

In Ghana, the NVRRC handles the variety release and registration process. Members of the NVRRC include representatives of directorates of MOFA, the Head of the GSID, a plant breeder from each of the two research institutions (SARI and the CRI), one representative from the GLDB, two representatives from the private sector, and one from a university.

The variety release process starts with the sponsoring institution and breeder informing the Chairman of the NVRRC of their intention to release a crop variety. In collaboration with the sponsoring institution, the breeder applies to the NVRRC to set a date for the crop's first field inspection at the vegetative stage. A second inspection is conducted at the maturity stage. If the variety is accepted, the NVRRC recommends it to the National Seed Council (NSC) for approval. If the NSC accepts the results and verifies that the correct process was followed, the committee submits the variety to MOFA to be gazetted. Thereafter, it is entered into the National Variety Catalogue.

All but one of the 34 varieties released in 2019 were owned by public agricultural research institutions. The one exception was a maize variety owned by a private seed company. Based on responses by public breeders, the average length of the variety release process was 9.2 months (Table 17). This is relatively short, which, in part, is because the NVRRC inspects the crops over one season, as opposed to the two seasons common in other countries. The length of the variety release process has been reduced significantly since 2016, when seed companies reported that it took an average of 42 months to release a variety. The 2017 TASAI study found that there were delays during on-site trials, delayed committee meetings and delays in setting the date for presentation of the findings (Mabaya et al., 2019a), none of which were reported in the current study.

When asked to rate the variety release process, the five breeders surveyed in 2019 gave it an average rating of "good" at 64%. Importantly, this marks an increase from the "fair" rating at 43% recorded for 2016. However, it is important to note that the ratings are based on the opinions of two breeders who released varieties and that their opinions on the variety release process for the four crops varied widely, with scores ranging between 40 and 70%.

**Table 17: Average length and rating of variety release process**

| Indicators  | 2016 | 2019 |
|---|------|------|
| Average length of variety release process (in months)   | 42   | 9.2  |
| Satisfaction with variety release process (out of 100%) | 43%  | 64%  |
| Interpretation of satisfaction                          | Fair | Good |

## COST OF VARIETY RELEASE PROCESS

In well-functioning seed systems, the costs of releasing a variety should not be so high as to disincentivize variety releases altogether. The NVRRC has not set any costs for variety release. This is the responsibility of the NSC. The 2019 TASAI study surveyed one private breeder and four public breeding institutions and found that the costs of the variety release process varied significantly across crops and breeders. The private breeder incurred US\$ 10,000 for the VCU test. The breeder did not indicate if the cost of DUS or other expenses. In contrast, the costs reported by public breeders averaged US\$ 41,668. By crop, the average cost of variety release was US\$ 53,050 for maize, US\$ 46,500 for rice, US\$36,000 for soya bean, and US\$ 29,233 for cowpea. The costs cover DUS and VCU tests, as well as transport and allowances for the committee members who travel by air or road across the country. In some cases, the committee inspects the crop in more than one field site.

Both the breeders and the Directorate of Crop Services (DCS) acknowledge that the costs of the variety release process are high. Indeed, TASAI findings from other countries support this conclusion: the cost of releasing a variety averaged US\$ 3,000 in Kenya in 2018 (Waithaka et al., 2019a), US\$ 4,000 in Mali in 2018 (Waithaka et al., 2019b), and up to US\$ 27,000 in Nigeria in 2018 (Waithaka et al., 2019c).



## STATUS AND IMPLEMENTATION OF THE 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 Ghana, seed policy is outlined by the National Seed Policy of the Republic of Ghana, which took effect on 1 August 2013 (Republic of Ghana 2013). The policy is operational and has not yet been reviewed. Two laws govern the seed industry in Ghana. The first is the Plants and Fertilizer Act, 2010 (ACT 803), which is the main legal statute passed by parliament and assented to by the President on 6 September 2010 (Republic of Ghana 2010). Act 803 is currently operational and has not been amended.

Act 803 has three technical parts, focused on Plant Protection (Part One), Seeds (Part Two), and Fertilizer Control (Part Three). The law also established two main implementing bodies – PPRSD and the NSC. The PPRSD is a directorate in MOFA overseeing the import and export of plant materials, seed inspection and surveillance, quality control and certification. The PPRSD implements this mandate through two of its divisions – the GSID and the Plant Quarantine Division. The two divisions are the key institutions charged with implementing Part One and Part Two of the Plants and Fertilizer Act, 2010 (Act 803) and the other seed industry policy instruments. The DCS is also responsible for coordinating the activities of the NVRRC.

The PPRSD (GSID) is also in charge of preparing annual seed sector reports, which it submits to the Policy Planning, Monitoring, and Evaluation Directorate (PPMED) of MOFA. The PPMED compiles all sectoral reports to assess the Ministry’s progress towards its goals and targets. The PPMED also consolidates the plans of the different directorates into an annual plan and budget for the Ministry.

The NSC oversees the overall coordination and development of the country’s seed industry (Republic of Ghana 2013). Its functions include the formulation of policies pertaining to all activities along the seed value chain, updating the national variety list, and developing linkages between agencies in the production and marketing of the different seed classes. Its functions also include monitoring the country’s seed supply and prescribing procedures for the accreditation of individuals/entities. By law, the NSC is required to meet four times a year. However, in 2019 it met only twice due to limited funding.

Act 803 is implemented through the Legislative Instrument (L.I. 2363) on Seeds (Certification and Standards) Regulations. The L.I. 2363 is harmonized with the ECOWAS Regulations (ECOWAS 2008), and was gazetted on 20 November 2018 and came into force on 18 December 2018. This L.I. provides the standards and specifications necessary to enforce Part Two of the Plants and Fertilizer Act, 2010 (Act 803) and it is currently operational.

The second law is the Plant Variety Protection Act, 2020. This law provides a legal framework to protect the rights of plant breeders. It was passed in November 2020 but is yet to be published and so it is not yet operational.

## 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.

The GSID leads the implementation of the seed law and regulations in the country. It is responsible for registering seed growers, dealers, cleaners<sup>16</sup>, importers and exporters, managing all import and export services including documentation, seed inspection and certification, and monitoring seed production. The law requires that all seed be processed and labeled before it is marketed to farmers.

**Implementation of ECOWAS seed regulations:** The study assessed four key areas of implementation required under the ECOWAS regulations: i) the setting up of a national seed committee, ii) the issuing of a decree for seed import and export, iii) the updating of the National Variety Catalogue, and iv) the creation of a seed support fund. Of these four, the first three have been implemented. The NSC, which is Ghana’s national seed committee, has been established. The Plant Quarantine Division of the PPRSD ensures that procedures for the import and export of plants and plant materials specified under Part One of the Plants and Fertilizer Act, 2010 (Act 803) are strictly followed. The variety catalogue was up to date as of 2019, and the variety release procedures have been harmonized with ECOWAS requirements. The fourth element, the seed sector fund, has been set up in Ghana but is not yet operational. In addition to the above, standards governing seed certification as well as field and laboratory inspection have been harmonized with ECOWAS standards.

Seed growers rated the government’s enforcement of Ghana’s seed regulations as “good” (72%). This rating is a notable improvement from the rating of “fair” (56%) recorded in 2017. The main reasons for the improvement are the passing and implementation of the Seeds Certification and Standards Regulations, 2018 (L.I. 2363) and the implementation of the Planting for Food and Jobs program, which has increased the government’s level of engagement with the private sector.

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<sup>16</sup> Seed cleaners are mentioned in the Act, but they are not defined. However, by seed cleaning, the law refers to seed processing.



## 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. In addition, seed companies report their level of satisfaction with government efforts to eliminate counterfeit seed.

Seed companies surveyed reported receiving a total of 33 reports of cases of counterfeit seed in 2019. This figure is likely to be an underestimate, as most fake seed sales are not reported. Moreover, the government does not keep a tally of cases of counterfeit seed. Both the seed growers and the government contend that the main sources of fake seed are seed dealers and seed growers. MOFA uses multiple measures to address the challenge of counterfeit seed in the country. The five measures mentioned most frequently by seed growers were: i) monitoring by GSID seed inspectors; ii) the use of seed packages with labels and certification tags; iii) the requirement for seed growers to show evidence



of procurement of basic seed; iv) the registration of seed growers and dealers; and v) awareness creation as part of the PFJ program. The five measures are rated highly by seed growers, signaling that they are effective in responding to the challenge of fake seed. Of the five measures, three were rated "excellent": the requirement of evidence of procurement of basic seed (88%), the registration of seed growers and seed dealers (83%), and the use of seed packages with labels and certification tags (83%). The other two measures, awareness creation and monitoring by GSID seed inspectors were rated "good" at 73% and 69% respectively (Table 18).

**Table 18: Rating of government measures to address counterfeit seed (2019)**

| Government measure                             | Seed growers' rating of effectiveness | Interpretation |
|--|---------------------------------------|----------------|
| Evidence of procurement of basic seed          | 88%                                   | Excellent      |
| Registration of seed growers/dealers           | 83%                                   | Excellent      |
| Use of packages with labels/certification tags | 83%                                   | Excellent      |
| Awareness creation by government (PFJ)         | 73%                                   | Good           |
| Monitoring by GSID seed inspectors             | 69%                                   | Good           |

When asked to rate the government's efforts to combat fake seed overall, seed growers gave an average rating of 74% ("good") (Table 18). This is a significant improvement from the rating of 32% ("poor") in 2016. This improvement is due to measures outlined in Table 19, most of which had not yet been implemented at the time of the 2017 study.

**Table 19: Cases of counterfeit seeds and rating of government efforts to address issue**

| Indicators   | 2016         | 2019 |
|--|--------------|------|
| Number of cases of fake seed (seed growers)  | not reported | 33   |
| Seed industry satisfaction with government effort to address fake seed (out of 100%) | 32%          | 74%  |
| Interpretation of satisfaction   | Poor         | Good |



## USE OF GOVERNMENT SUBSIDIES

Seed subsidies are intended as a short or medium-term measure to encourage farmers to adopt improved crop varieties. The design and execution of subsidy programs, in terms of the scale, targeting, distribution arrangements, and payment systems, may contribute to the development of the seed market in positive ways, but may also be disruptive to market forces.

Ghana’s program, Planting for Food and Jobs (PFJ) was started by MOFA in 2017 as the government’s flagship program to “promote food security and immediate availability of selected food crops on the market and also provide jobs” (MOFA, 2019). The input subsidy program was intended to support smallholder farmers, with the government paying part of the cost of improved seed and fertilizer.<sup>17</sup>

The seed subsidy component under the PFJ program targets maize, rice, soya bean, sorghum, groundnut, and cowpea (MOFA 2019). MOFA invites applications from interested seed companies through newspaper advertisements. Successful growers receive a contract to grow seed, which they sell to designated agro-dealers, who in turn sell to eligible farmers at subsidized prices. The eligible farmers are registered by municipal and district agriculture departments. The government determines the seed prices based on factors including production costs, open market prices, and the average prices quoted in seed supply tenders. The government subsidizes 75% of the price of seed (88% for hybrid maize). The government pays seed growers directly, who in turn pay the agro-dealers.

In 2019, a total of 1,183,313 farmers (883,046 men and 300,267 women) benefited from the supply of seed procured under the PFJ. As shown in section 4 (Figure 3), the subsidy program was a major buyer of seeds across the four focus crops: maize – 90%, rice – 83%, cowpea – 68%, and soya bean – 86%. The program is monitored throughout the year by the District Departments of Agriculture, the Regional Departments of Agriculture, and MOFA.

TASAI asked seed growers to rate their satisfaction with the implementation of the PFJ program with respect to the openness and transparency and the predictability of the seed procurement process. Both aspects were rated “good”, at 67% and 60%, respectively. Seed growers were significantly less satisfied with the efficiency of the payment process, citing payment delays as their main complaint and rating the process only “fair” at 43% (Table 20). Though the PFJ program was supposed to end in 2020, the government has already advertised tenders for the supply of seed for 2021. These findings were reported in a recent study of the program (Tanko, Ismaila, and Sadiq 2019), which recommended expanding the program to more beneficiaries.

**Table 20: Seed growers’ rating of PFJ (2019)**

| Opinion indicator (satisfaction rating)                   | Rating (out of 100%) | Interpretation |
|---|----------------------|----------------|
| Openness and transparency of the seed procurement process | 67%                  | Good           |
| Predictability of the seed procurement process            | 60%                  | Good           |
| Efficiency of payment process                             | 43%                  | Fair           |

<sup>17</sup> <https://mofa.gov.gh/site/programmes/pfj/68-pfj/pfj-publications/332-planting-for-food-and-jobs-pfj-is-the-way-to-good-harvest-walk-it>





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

Ghana has two seed associations - the National Seed Trade Association of Ghana (NASTAG) and the Seed Producers Association of Ghana (SEEDPAG). NASTAG is an umbrella association of all seed companies and other seed entities in the country, while the SEEDPAG is an association of 306 seed growers in Ghana. All seed companies, though registered by the GSID as seed growers, are members of NASTAG. SEEDPAG is also a member of NASTAG. Since the scope of the TASAI study includes seed companies, this section focuses on NASTAG.

NASTAG was registered in February 2016 and officially launched in August 2017, with 32 members. The first Annual General Meeting (AGM) was held a day before the Association was launched, and the 32 members were recognized as founding members. Elections are held every two years. The last elections were held in 2019. The executive positions are President, Vice President, General Secretary, Treasurer, Northern Sector Representative, Middle Sector Representative, and Southern Sector Representative.

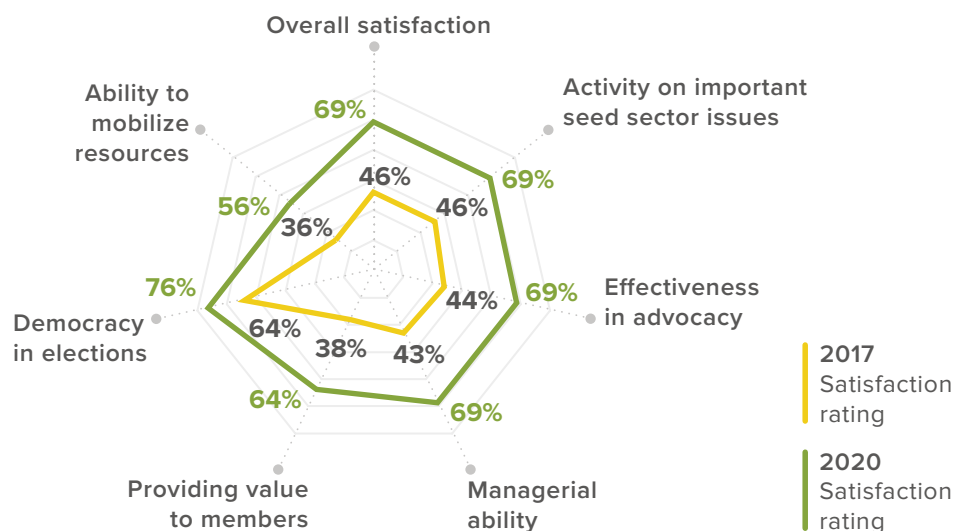
By May 2020, NASTAG had 54 members. According to its constitution (NASTAG 2017), NASTAG has two types of members: (i) ordinary members, with voting rights, which include seed companies<sup>18</sup> and seed associations like SEEDPAG; and (ii) associate members, without voting rights, who which include agricultural research institutions like the CRI, NGOs involved along the seed value chain such as Croplife Ghana, government institutions and agro-input dealers. The NASTAG secretariat is made up of four staff members and is governed by a seven-member executive board.

The seed companies interviewed included 30 NASTAG members, who were asked to rate the association's performance against six performance indicators, presented in Figure 4. Seed companies rated the overall performance of NASTAG as "good" (69%). Democracy in elections received the highest rating of "good" (76%). The average scores on provision of value to members, managerial ability, effectiveness in advocacy and activities on important seed sector issues were rated "good" and ranged between 64% and 69%. Ability to mobilize resources received the lowest rating of "fair" (55%).

Figure 4 compares the performance ratings NASTAG received in 2017 and 2020. The initial ratings were likely influenced by the fact that in 2017 NASTAG had just been established and had no track record, and the comparison to 2020 shows significant improvement in all areas. In the past three years, the organization has set up its secretariat and hired its staff, and the secretariat has increased the association's visibility, improved its standing with the government, and provided

<sup>18</sup> NASTAG refers to their members as companies.

**Figure 4: Members' assessment of NASTAG's performance (2017 and 2020)**





various services to the members. NASTAG’s achievements over the last few years include: awareness-raising among farmers at the district level of the importance of certified seed, sustained dialogue with government on seed industry matters, and the publication of the Directory of Seed Companies and Producers in Ghana (NASTAG 2019). The publication, produced in collaboration with the NSC, PPRSD and DCS, includes the Catalogue of Plants and Species (NVRRC 2019).

The TASAI study also asked NASTAG members to identify priority issues that the seed trade association should focus on:

- *Support members to access seed markets:* Seeking access to seed markets was the most frequently reported priority, especially as the PFJ was expected to end in 2020. NASTAG should support the marketing efforts of its members by publicizing newly released varieties, promoting exports, and instituting a system for demand forecasting.
- *Support the local production of certified seed:* NASTAG should train its members in quality seed production. The training may be done directly by the association or through a third party.
- *Advocate for better implementation of PFJ:* Much as PFJ has provided a market for the growers’ seed, members felt that NASTAG should advocate for an increase in the seed quota under the PFJ program, lobby for faster payments for seed procured under the program and facilitate dialogue on the seed pricing arrangements under the program.
- *Work with government to combat counterfeit seed:* This should in part involve identification of agro-dealers who trade in counterfeit inputs.
- *Facilitate the acquisition of seed processing equipment:* NASTAG should help members acquire seed processing equipment to overcome capacity shortages, since the government-owned seed conditioning and storage facilities at Winneba, Ho, Kumasi, Tamale, Bolgatanga, and Wa are in various degrees of disrepair.

## ADEQUACY OF SEED INSPECTORS

Seed inspection services ensure that certified commercial seed meets the regulatory quality standards. To provide adequate inspection services requires sufficient numbers of well-resourced inspectors. TASAI studies track the number of inspectors and other information pertinent to their effectiveness, such as the availability of resources and the use of (new) digital tools. Seed inspection is the responsibility of the Ghana Seed Inspection Division (GSID), which employed 45 public seed inspectors (36 men and 9 women) in 2019. The number has increased from 32 in 2017, an increase of 40%. Respondents rated the adequacy of public inspection services’ as “good” (75%). This rating is a marked improvement from a rating of “fair” (49%) in 2016 (Table 21). The increase in the rating reflects the increase

in the number of seed inspectors and the fact that, because of the PFJ program, seed growers engage more extensively with seed inspectors. The PPRSD confirmed that, though the number of inspectors is adequate, their ability to do their job is hindered by a lack of sufficient resources.

**Table 21: Number and rating of seed inspectors**

| Indicators  | 2016 | 2019 |
|---|------|------|
| Number of GSID seed inspectors                                | 32   | 45   |
| Seed industry satisfaction with GSID inspectors (out of 100%) | 49%  | 75%  |
| <b>Interpretation of satisfaction</b>                         | Fair | Good |

GSID inspectors use several IT innovations and tools to assist with seed inspection. For instance, GPS trackers are used during seed field inspection to determine the location of seed fields and measure field sizes.







# 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 Ghana, public extension officers are employed by the Ministry of Food and Agriculture and are coordinated under the Directorate of Agricultural Extension Services (DAES). As part of the PFJ program, 2,700 agricultural extension agents were recruited and trained. Table 22 shows the number of public and private extension officers, and the ratio of extension officers to agricultural households in the country. According to the 2018/19 Agricultural Census, Ghana has 2,585,531 agricultural households. For comparison, 2016 figures are also given. The data show a 73% increase in the three-year period, which is mostly due to the recent recruitment under the PFJ program. The ratio of extension officers to agricultural households improved from 1:1,500 in 2016 to 1:594 in 2019. This ratio is lower than in many African countries, but is higher than the 1:560 in Zambia (Mabaya et al., 2019b), 1:127 in Zimbabwe (Mabaya et al., 2019c), and 1:124 in Rwanda (Waithaka et al., 2019d). Along with the increase in the number of extension service officers, the average satisfaction rating has also increased by 9 points: in the 2016 TASAI survey, satisfaction with extension officers was “fair” (52%), while in 2019, it was “good” (61%).

**Table 22: Number and rating of agricultural extension officers**

| Indicators   | 2016    | 2019                               |
|--|---------|------------------------------------|
| Number of public extension officers employed by the government   | 2,484   | 4,286<br>(3,622 men and 664 women) |
| Number of private extension officers employed by seed companies  | 27      | 60<br>(53 men and 7 women)         |
| Total number of extension officers                               | 2,511   | 4,346                              |
| Ratio of extension officers to agricultural households           | 1:1,500 | 1:594                              |
| Seed industry satisfaction with extension officers (out of 100%) | 52%     | 61%                                |

extremely poor   poor   fair   good   excellent



## CONCENTRATION OF THE AGRO-DEALER NETWORK

Agro-dealers play a key role in Africa's seed distribution systems, connecting seed growers to individual farmers, especially in hard-to-reach rural areas. They are often the main point of sale for certified seed. A higher concentration of agro-dealers means that smallholder farmers have greater access to improved seed. This indicator tracks the number of agro-dealers and, where possible, this is disaggregated between registered and non-registered agro-dealers.

According to the PPRSD, in 2019 Ghana had 3,543 agro-dealers, a slight increase from the 3,153 agro-dealers reported in 2016. According to the 2017/18 Ghana Census of Agriculture, Ghana has 2,585,531 agricultural households, translating to a ratio of one agro-dealer to every 730 agricultural households in 2019. The corresponding ratio in 2016 was 1:794.

Agro-dealers are licensed by the PPRSD and the Environmental Protection Agency (EPA). Agro-dealers must possess a business license in order to apply to the PPRSD for an operating permit. The license is conferred by the Registrar General; licensed agro-dealers are required to have a retail location that meets the PPRSD's requirements and submit to regular inspections by the PPRSD. As part of the registration process, agro-dealers are trained by the PPRSD and the EPA on the safe handling of agro-chemicals.

Each seed grower reported working with an average of eight agro-dealers. The relationship between seed growers and agro-dealers is also strengthened by the PFJ program, as most seed is distributed through agro-dealers.

Despite the slight increase in the number of agro-dealers since 2016, the seed industry's satisfaction with the agro-dealer network has not changed significantly. The rating was "good" in both years at 64% in 2016 and 63% in 2019 (Table 23).

**Table 23: Number and rating of agro-dealers (2016 and 2019)**

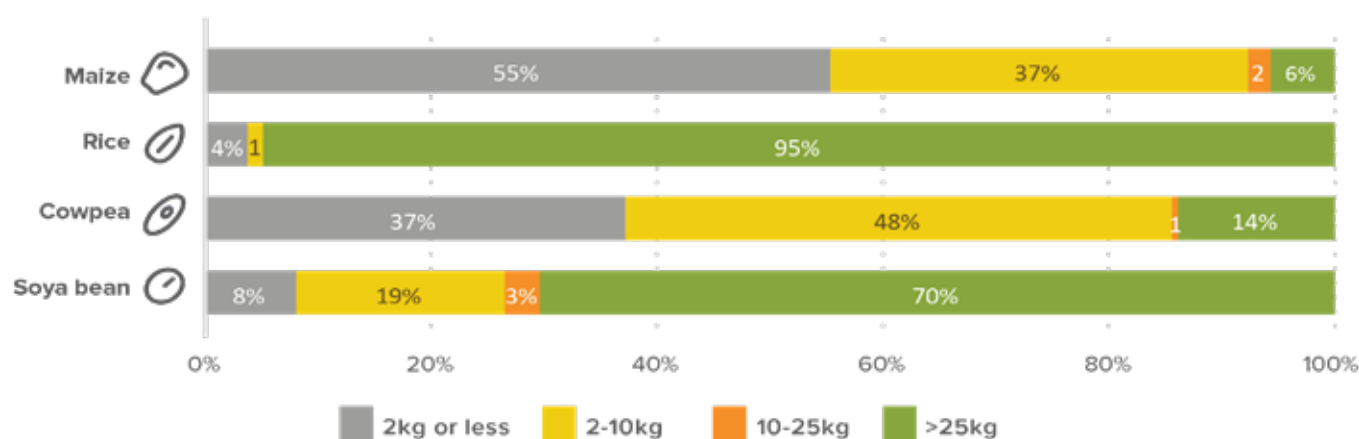
| Indicator   | 2016  | 2019  |
|---|-------|-------|
| Number of agro-dealers  | 3,153 | 3,543 |
| Seed industry satisfaction with agro-dealer network (out of 100%) | 64%   | 63%   |
| Interpretation of satisfaction                                    | Good  | Good  |

## 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 certified seed. TASAI tracks the percentage of seed sold in different package sizes, i.e., 2 kg or less, 2-10 kg, 10-25 kg, and above 25 kg.

According to the GSID, in 2019, seed was packaged and sold in package sizes ranging from 1-50 kg. Currently, the GSID issues polybags in the sizes 1 kg, 9 kg, 25 kg, and 45 kg to registered seed growers who are unable to procure their own packages. Just over half (55%) of all maize seed (by volume) was sold in 1 kg polybags. The small packages are affordable to smallholder farmers and minimize seed wastage. In contrast to maize, 95% of rice seed and 70% of soya bean seed was sold in packages weighing over 25 kg (40 kg and 50 kg, respectively) (Figure 5). Rice and soya bean are commercial crops mainly cultivated by medium and large-scale farmers, who prefer large seed package sizes.

**Figure 5: Percentage of seed sold in different package sizes (2019)**












## 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 ratio of the retail price of seed (at agro-dealer level) vis-à-vis the market price of grain at the time of planting.

The seed-to-grain price ratios at planting time in 2019 were as follows: 12.9:1 for hybrid maize, 3.0:1 for OPV maize, 1.0:1 for rice, 1.8:1 for cowpea, and 1.9:1 for soya bean. Note, however, that retail prices of seed are affected by government subsidies under the PFJ program. The ratios indicate that the price of seed for rice, cowpea, and soya bean is quite low, close to the price of grain. Both OPV and hybrid maize are relatively expensive, but the ratios are comparable to other countries. The high ratio of 12.9:1 for hybrid maize can be justified by the high costs associated with the production and processing of hybrid maize varieties. In addition, most of these varieties are imported into the country, which further increases their cost. A comparison of the same ratios for 2016 is provided in Table 24. The seed-to-grain ratios for OPV maize, rice, cowpea and soya bean are lower in 2019 than in 2016. The lower ratios indicate increased affordability of OPV maize, rice, cowpea and soya bean in the period from 2016 to 2019. Much of this change can be attributed to the PFJ program. For hybrid maize, the increase in the seed-to-grain ratio implies decreasing affordability, possibly due to demand for seed growing faster than the supply.

Table 24: Seed-to-grain price ratios

| Crop   | Prices in 2019 (GHC/kg)                 |                     | Seed-to-grain price ratio |      |
|--|---|---------------------|---------------------------|------|
|  | Average retail seed price, with subsidy | Average grain price | 2019                      | 2016 |
|  Maize (hybrid) | 18.00                                   | 1.41                | 12.9                      | 6.1  |
|  Maize (OPV)    | 4.20                                    | 1.41                | 3.0                       | 4.3  |
|  Rice           | 3.80                                    | 3.96                | 1.0                       | 1.7  |
|  Cowpea         | 7.00                                    | 4.0                 | 1.8                       | 2.0  |
|  Soya bean      | 4.60                                    | 2.46                | 1.9                       | 4.4  |



# CONCLUSION

Ghana's formal seed sector is in the early growth stage of development (Ariga et al., 2019). The early growth stage is characterized by established breeding programs and evolving seed policy environments. Seed companies and growers produce and sell a limited range of staple crops. While governments and NGOs are still significant players in the sector, there is a growing agro-dealer' network that supports the distribution of seeds to smallholder farmers. As the percentage of farmers using improved seed is low (11% for maize and 14% for rice) (Republic of Ghana, 2015), there is ample opportunity for the sector to grow. While the 2020 TASAI Ghana study has revealed some areas for improvement, it highlights many positive aspects of the seed industry, most of which are the result of recent improvements and programs initiated by the government.

Under the **research and development** category, our study found that the number of active breeders has changed little since the 2017 TASAI study, which is reflected by the satisfaction ratings of "good" for maize and only "fair" for the other focus crops. This signifies that breeding programs for the four focus crops need to be strengthened. On the positive side, the number of varieties released has increased since 2018 due to seed growers' heightened demand for basic seed, in response to the PFJ program. Seed growers' satisfaction with the availability of basic seed has increased between 2016 and 2019 for the four crops. In addition, seed growers are highly satisfied with the quality, quantity, and timeliness of delivery of basic seed ordered from public research institutions. Further, the variety release process's average duration has significantly reduced. Lastly, the average time it takes to import seed is among the lowest in the ECOWAS region. However, the erratic funding of research and variety development are constraining this progress.

In the **industry competitiveness** category, the seed industry in Ghana is competitive, as indicated by market shares of the top four companies and the HHI. This is an improvement from 2017, when the market for rice, soya bean and cowpea was dominated by a few players. This is another direct benefit of the PFJ program. Seed import processes have improved significantly from 2017 because of simplified documentation processes. On the downside, the participation of women in the ownership and/or management of seed growers (companies) is quite low. The barriers to women's participation in the running of seed businesses need to be explored.

The **seed policy** environment in Ghana is supportive of private sector growth. The TASAI study has found that the country has much of the requisite policy, legal, and regulatory instruments in place and that these are functioning. This success of implementation is reflected in seed growers' satisfaction ratings for the enforcement of regulatory instruments and the adequacy of seed inspectors, which improved from "fair" in 2017 to "good" in 2019. The latter has been driven by a reduction in the time needed to release a variety and an increase in the number of seed inspectors since 2017. The satisfaction rating for government efforts to address fake seed improved from "poor" in 2016 to "good" in 2019. This is due to government efforts to address the issue. The PFJ program has boosted the seed sector in Ghana by providing a reliable channel for marketing certified seed. Seed growers rated the transparency and predictability of the subsidy program as "good". However, satisfaction with efficiency of the payment process was low, indicating a need for the government to improve the processes. This enabling environment can be improved further through the reduction of the high costs incurred in the variety release processes.

The **institutional support** for Ghana's seed sector is strong. The performance of the NASTAG has improved over time. Seed growers' overall satisfaction with NASTAG's performance has grown from "fair" in 2017 to "good" in 2020. All areas have shown marked improvement, moving from "fair" in 2017 to "good" in 2020, except "ability to mobilize resources", which improved from "poor" to "fair". These improvements reflect NASTAG's efforts to increase the association's visibility and its improved standing with the government. An area that stands out is the publication of the 2019 Directory of Seed Companies and Producers in Ghana, which includes the National Catalogue of Plant Species and Varieties in Ghana. This was done in collaboration with the seed regulatory agencies. Seed growers' level of satisfaction with the concentration of agro-dealers has remained "good" since 2016, reflecting a healthy collaboration between seed growers and agro-dealers, who are the main distribution conduit for PFJ seed.

**Service to smallholder farmers** in Ghana has been supported by an increase in the number of extension officers. This increase has been facilitated by the PFJ program and has led to a rise in seed growers' satisfaction rating from "fair" in 2016 to "good" in 2019. Further, the seed for crops grown by smallholder farmers are available in small packages which are affordable.

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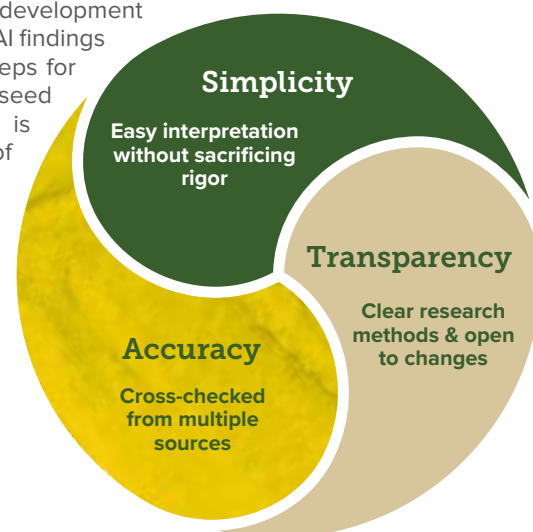


## PILLARS OF COMPETITIVE SEED SECTORS

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

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

## TASAI PRINCIPLES





For a comparison of TASAI Indicators  
across different countries, please visit:  
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