



TASAI
THE AFRICAN SEED ACCESS INDEX



Zambia Brief 2017 - The African Seed Access Index

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INTRODUCTION

A competitive seed sector is key to ensuring timely availability of high quality seeds of improved, appropriate varieties at affordable prices to smallholder farmers in Zambia. This country brief summarizes the key findings of The African Seed Access Index (TASAI) study conducted in 2016/17 to appraise the structure and economic performance of Zambia’s seed sector. With a focus on four grain and legume crops important to food security in Zambia — maize, rice, groundnut, and beans — the study evaluates the enabling environment for a vibrant formal seed sector. These four crops account for about 41% of arable land in Zambia (FAOSTAT, 2017). The study covers 20 indicators divided into the following categories: Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers. [Appendix 1](#) summarizes all 20 indicators and compares Zambia to 12 other countries where similar studies were conducted. TASAI seeks to encourage public policymakers and development agencies to create and maintain enabling environments that will accelerate the development of competitive formal seed systems serving smallholder farmers.

Overview

Like most other African countries, the seed industry in Zambia consists of two systems: the informal sector and the formal sector. This country brief focuses almost exclusively on the formal seed sector.

The informal sector broadly refers to the system where farmers produce, obtain, maintain, and distribute seed resources from one growing season to the next (FAO, 1998). Standards in the informal seed sector are not monitored or controlled by government policies and regulations; rather, they are guided by indigenous knowledge and standards, and by social structures. The colloquial nature of transactions means that there is scant performance data on the informal sector.

The formal sector focuses on breeding and evaluating improved varieties, and producing and selling seed of these varieties that are certified by the Seed Control and Certification Institute (SCCI), the government department under the Ministry of Agriculture responsible for regulating seed in Zambia. Zambia’s seed sector is mature, with a robust private sector. Adoption rates for improved maize seed are above 70% (Langyintuo, A.S., W. Mwangi, A.O. Diallo, J. MacRobert, J. Dixon, 2008), and the country is a net exporter of maize seed.

As shown in Table 1, Zambia’s formal seed sector comprises numerous institutions, including government (e.g. Zambia Agriculture Research Institute, ZARI; SCCI, extension service), private sector (mostly local and multinational seed companies and agro-dealers), and development agencies. Founded in 1999, the Zambia Seed Trade Association (ZASTA) is an established institution that represents the interests of seed companies.

Table 1: Role of key players in Zambia’s formal seed sector

ROLE	KEY PLAYERS
Research and breeding	ZARI, seed companies, CGIAR (CIMMYT, CIAT, ICRISAT)
Variety release and regulation	SCCI
Seed production and processing	Local seed companies, multinational corporations
Education, training, extension	Seed companies, ZASTA, agro-dealers
Distribution and sales	Seed companies, agro-dealers

Key acronyms: CIAT - International Centre for Tropical Agriculture; CIMMYT – International Maize and Wheat Improvement Centre; COMESA – Common Market for Eastern and Southern Africa; DTMA – Drought Tolerant Maize for Africa; FISP – Farm Input Support Programme; HHI – Herfindal-Hershman Index; ISTA – International Seed Testing Association; SADC – Southern Africa Development Community; SCCI - Seed Control and Certification Institute; ZARI – Zambia Agriculture Research Institute; ZASTA – Zambia Seed Trade Association



RESEARCH AND DEVELOPMENT

Number of active breeders

For the four priority crops in Zambia – maize, rice, groundnut, and bean – there are 26 active breeders. Of these, 15 breeders are from the private sector, and 11 are from the Zambia Agriculture Research Institute (ZARI). Most of the breeders (17 of 26) focus on maize, while five breeders focus on rice, three on groundnut, and one on beans.

On average, seed companies' rate their satisfaction with the number of active breeders as good (66%). The highest level of satisfaction is for rice (80%). Seed companies' satisfaction with the number of breeders for the other three crops is fair – 64% for maize, 55% for groundnut, and 60% for bean.¹

Varieties released in the last three years

Between 2014 and 2016, a total of 44 varieties were released for the four crops combined; of these, 37 were maize, 3 were rice, 2 were groundnut, and 2 were bean. Not surprisingly, the number of varieties released strongly correlates with the number of active breeders. Figure 1 shows the trend for variety releases (using three-year moving averages) for the four crops. Variety releases for maize outnumber the combined variety releases for rice, groundnut, and beans. There were no releases for rice between 2000 and 2008, and no releases for groundnut between 2009 and 2013.

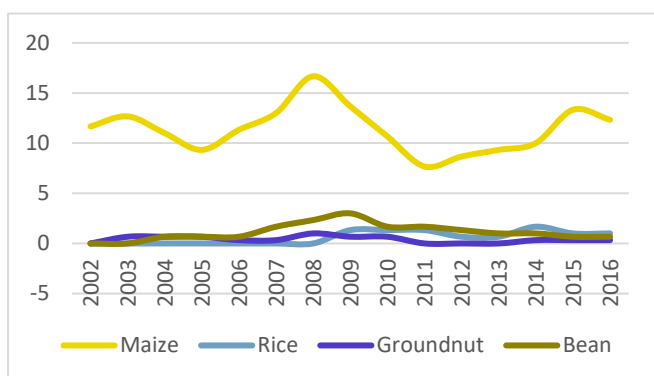


Figure 1: Number of varieties released in Zambia (three-year moving average)

Availability of foundation seed

Many companies produce their own foundation seed. Of the companies that produce maize, 78% produce their

own foundation seed, while 50% of rice-producing companies and 33% of bean companies also produce their own foundation seed. The remaining companies source maize, rice, and bean foundation seed from ZARI, the International Maize and Wheat Improvement Center (CIMMYT), and the International Center for Tropical Agriculture (CIAT). Groundnut-producing companies source their foundation seed primarily from ZARI.

On average, seed companies are more satisfied with the availability of foundation seed for maize (76%) and rice (68%), and less satisfied with the availability of bean (57%) and groundnut (40%) foundation seed. This may be because most of the maize and half of the bean-producing seed companies use their own foundation seed.

Average age of varieties sold

The average age of the varieties sold in 2016 was as follows: 10 years for maize, 4 years for rice, 29 years for groundnut, and 12 years for bean. The youngest varieties for all four crops are one-year old, implying a rapid conversion from variety release to commercialization. The oldest varieties are 24 years for maize, 7 years for rice, 62 years for groundnut, and 18 years for bean. The ongoing sale of old varieties suggests a reluctance to switch to new varieties by some farmers. This is especially true for maize; some of the oldest varieties are more than two decades old, yet there were 192 new varieties released between 2000 and 2016. The case for groundnut is different, as fewer varieties have been released. The oldest variety sold in 2016 was 62 years old, but only seven varieties were released by SCCI between 2000 and 2016.

Varieties with climate-smart features

To be classified as climate-smart, a crop variety must meet at least one of two criteria: early maturity, and/or tolerance to extreme weather conditions such as drought, flooding, or frost. For maize, 19 out of 37 varieties released between 2014 and 2016 were climate-smart, with drought tolerance being the dominant trait. Four of the maize varieties were developed in collaboration with CIMMYT under the Drought Tolerant Maize for Africa (DTMA) project. A total of 22 maize varieties were released under DTMA between 2007 and 2014 (CIMMYT,

¹ All scores reported in this brief are based on industry self-reporting of satisfaction ranging from 0% (completely dissatisfied) to 100% (completely satisfied).



2015). Given the increasing incidence of drought in southern Africa (both past and projected), the high percentage of climate-smart maize varieties reflects responsive breeding. Very few climate-smart varieties for the other three crops were released over this period: one rice variety (of three), one groundnut variety (of two), and one bean variety (of two).

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2016, there were 50 registered seed enterprises in Zambia. Of these, 17 produced and marketed at least one of the four crops. Of the 17, only 10 were engaged in the production of certified seed. The remaining seven produced QDS seed and the rest were seed merchants, i.e., engaged in seed trade but not seed production. Of the 10 companies that produced certified seed for the four focus crops, all produce maize seed, four produce rice seed, four produce groundnut seed, and four produce bean seed. These ten companies form the core of the formal seed sector in Zambia, and all but one were interviewed for this study.

Total seed sales for the local market in 2015 were 33,018 tons (maize), 295 tons (rice), 621 tons (groundnut), and 719 tons (bean). Seed production in Zambia is overwhelmingly dominated by maize, with very little focus on the other three crops.

Market share of top seed companies

Market concentration is calculated in two ways. First, by calculating the sales of the top four companies as a percentage of total industry output for each commodity. Using this method, the overall volume weighted market share for the top four companies (for all four crops) was 82%. Using data for the top four companies, the market share by crop was 81% for maize and 100% for the other three crops. The latter is due to the fact that only four companies produce bean and groundnut seed, and only four of the five companies producing rice reported sales data for 2016. Figure 2 illustrates the market shares.

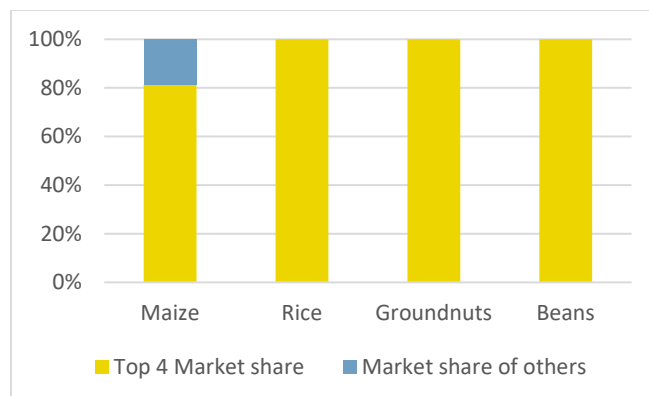


Figure 2: Total market share (%) of top four companies

Market concentration was also analyzed using the Herfindal-Hershman Index (HHI). The HHI measures market concentration by squaring the market share of each firm competing in a market and then summing the resulting numbers. HHI can range from close to zero (perfect competition) to 10,000 (monopoly). HHI was calculated for each of the four crops. The HHI for maize is good (1,952), but it is poor for beans (3,530), and extremely poor for rice (4,898) and groundnut (4,765). The market shares of the top four companies and the HHI results both indicate that the seed market for three crops – rice, beans, and groundnut – is dominated by a few players, with poor levels of competition. More competition for these crops could improve choice, affordability, and seed quality for smallholder farmers in Zambia.

Market share of government parastatal

In Zambia, the government is not involved in the production and/or marketing of certified seed for any of the four focus crops. From 1981 through the mid-1990s, Zambia Seed Company Ltd (Zamseed) was a government parastatal responsible for the production and marketing of all types of seed, except for cotton and tobacco. In the mid-1990s, Zamseed was fully privatized, though the new private company has maintained its original name.

Length of import/export process for seed

Seven of the nine seed companies interviewed engage in both export and import of seed. One company is only involved in seed import with no exports. Zambia's main seed testing laboratory is accredited by the International Seed Testing Association (ISTA) and issues International Seed Analysis Certificates. In 2015, about 20,000 tons of seed was exported using ISTA certificates, while more was exported using national seed certificates. Maize is the most common seed export. The main export destinations are Botswana, the Democratic Republic of Congo, Kenya,



Malawi, Mozambique, Rwanda, South Africa, Swaziland, Tanzania, and Zimbabwe. In 2015, seed companies imported less than 5,000 tons of seed (mainly vegetable, sweet potatoes and parental lines of maize). Much of the seed imports are mainly from South Africa, Netherlands, Sweden, Zimbabwe, Malawi and Australia.

The length of the import process is measured as the number of days from the time an import permit is applied for to the time the seed is cleared at the border. Seed companies reported that the import process ranges from 2-21 days, with an average of 11 days. The situation is similar with the export process, which ranges 2-25 days, with an average of 12 days. Relative to other countries surveyed by TASAI, these numbers are impressive and seem to indicate an efficient seed trading process.

Seed companies rated their satisfaction with the import process as fair (55%) and with the export process as good (60%). Companies highlighted the following areas for improvement: increased clarity on the import/export certification process; extending the validity period of the phytosanitary certificate; and clear distinctions between maize grain and maize seed during times of export bans in neighbouring countries.

SEED POLICY AND REGULATIONS

Length of variety release process

The length of the variety release process is the duration of time from when the application for a variety release is submitted to when the variety is released by the relevant authority. The National Variety Release Committee has the sole mandate for crop variety release in Zambia. Prior to the release of a crop variety, the variety is evaluated for *distinctness, uniformity, and stability* (DUS) and *value for cultivation and use* (VCU) over two cropping cycles.

Seven companies released a variety in 2015. All but one companies reported an average duration of 24 months for the variety release process. (The one exception was a company that had experienced a 36-month-long wait for the release of a new maize variety.) This uniformity in responses shows a standardized and predictable process for variety release that is typical of a mature seed sector. Overall, seed companies are very satisfied with the process of variety release, rating it as excellent (84%). By crop, companies' satisfaction is excellent for rice (85%), groundnut (90%), and bean (88%). Companies rated their

satisfaction with the variety release process for maize as good (79%).

Status of seed policy framework

Zambia's national seed policy was passed in 1999. Before then the seed industry was guided by various laws and regulations established after Zambia's independence in 1964. The current seed law is the Plant Variety and Seeds Act (CAP 236), which came into effect in 1995. The formal seed sector was liberalized in the mid-1990s as part of the structural adjustment program ending the monopoly of government parastatals in the production and marketing of seed.

Zambia is a member of both the Southern Africa Development Community (SADC) and the Common Market for Eastern and Southern Africa (COMESA). Zambia's seed regulations have been amended to conform to the COMESA harmonized seed regulations, the goal of which is to facilitate the movement of certified seed within the region. Draft regulations were submitted to the Ministry of Justice for approval in 2016, which is expected to approve the regulations in 2017. In anticipation of the approval, several private seed companies have already listed varieties in the SADC and COMESA seed catalogue.

In 2016, Zambia applied for membership to the Organisation for Economic Cooperation and Development (OECD) Seed Schemes for maize and sorghum.

Quality of seed regulations and enforcement

Seed companies have a favourable opinion of the quality of the seed law and regulations in Zambia, rating it as good (77%). Companies are less satisfied with their enforcement, though this is still rated as good (68%). According to the seed companies interviewed, enforcement agencies are not well-equipped (in terms of manpower and equipment) to effectively enforce the current seed law and regulations.

Adequacy of seed inspectors

Zambia has 118 licensed seed inspectors. Of these, 83 are private and 35 are under SCCI, which has been licensing private seed inspectors since 1995. Unlike in other African countries where seed inspectors are all government employees, in Zambia seed personnel from the private and public sectors can be licensed to perform seed quality control services, such as seed inspection, sampling, and analysis. At the minimum, licensed seed inspectors must



have a diploma in agriculture and must pass the Seed Inspectors Training Course provided by SCCI. Seed companies rate the adequacy of inspectors as good (67%), indicating that they are generally available and sufficiently skilled to carry out seed inspections.

Efforts to stamp out fake seed

Seed companies indicated that they had received a total of 22 reported cases of fake seed sales in the 2015/2016 season. This figure is likely to be an underestimate as not all cases of fake seed are reported officially. Seed companies rated the government's effort to stamp out fake seeds as fair (57%), indicating that more could be done by government to address this problem. Companies identified the main sources of fake seed as agro-dealers, marketing agents, and informal cross-border imports.

SCCI has been working with private companies and other actors to implement various approaches to stamp out fake seed. These include regular seed market inspections, awareness-raising via community radio, publications, and farmers' workshops, and introducing unique security features on seed packages. However, according to SCCI, these efforts have had limited success due to a lack of resources.

Use of smart subsidies

Since 2002, the Zambian government has been implementing the agricultural input subsidy program called Farmer Input Support Programme (FISP), which aims to increase farmers' crop production. At its inception, the government procured agricultural inputs (seed and fertilizer) and distributed them to farmers across the country. During the 2015/16 season, part of the subsidy program was implemented electronically using e-vouchers, with the intention of improving its efficiency. Inputs are distributed to farmers through agro-dealers. At the point of purchase, a farmer pays about 20% of the cost of the inputs, and the government covers the rest.

In 2016, the government spent US\$ 23 million on the subsidy program for seed and fertilizer. The target was for 30% of the total certified seed to be sold as subsidy. Seed companies reported that on average 38% of their maize sales, 80% of bean sales, and 50% of groundnut sales were through the subsidy program. For seed companies, the main challenge is that payments from government are often delayed. In 2016, the program adopted an e-voucher system (called FISP e-voucher); however, seed

companies still faced challenges when trying to redeem the voucher cards.

INSTITUTIONAL SUPPORT

Availability of extension services

Zambia has approximately 2,633 agricultural extension officers, 65% of whom are male and 35% are female. Seed companies employ 127 of these extension officers. Government extension services are provided through a well-structured system from the Camp, Blocks, Districts, Provincial to National levels. However, the effectiveness of the system is hampered by inadequate financial and human resources. Seed companies rate their satisfaction with extension services as fair (55%). Zambia has about 1.47 million farming households, thus the ratio of government extension worker-to-farm household is about 1:560.

Quality of national seed trade association

ZASTA is a national seed association that represents the interests of its 19 members. ZASTA plays a key role in liaising between private seed companies and the government in the implementation of FISP.

Figure 3 illustrates seed companies' level of satisfaction with ZASTA's performance in six service areas. The companies rate their satisfaction with the overall quality of ZASTA as good (69%). ZASTA's highest rating is in democracy and governance (85%), while the lowest rating is in its ability to mobilize resources (58%). In all other areas – effectiveness in advocacy, activity on important seed sector issues, managerial ability, and providing value to members - ZASTA's members rate the association as good, with responses ranging from 64% and 69%.

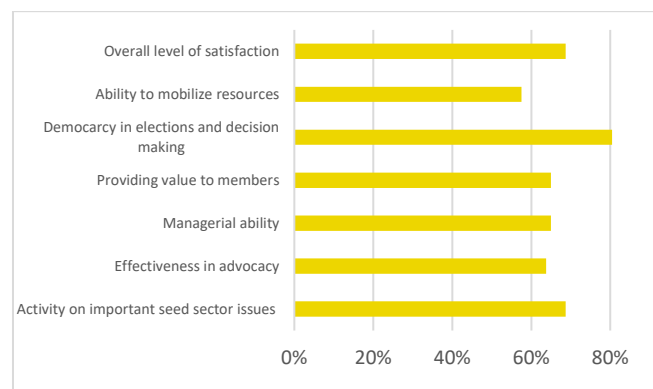


Figure 3: Members' satisfaction with ZASTA



Concentration of rural agro-dealer network

According to the Agribusiness and Marketing Department of the Ministry of Agriculture, there are 450 agro-dealers in Zambia. This translates to an agro-dealer-to-farm household ratio of 1:3,276, which is worse than other countries surveyed by TASA, e.g., Kenya, Malawi, or Zimbabwe. This implies that smallholder farmers in Zambia have to travel longer distances to access agricultural inputs from agro-dealers. Further, since the e-voucher system is implemented through agro-dealers, the agro-dealer network is vital to improved seed access by smallholder farmers. Seed companies rate their satisfaction with the agro-dealer network as fair (57%), signaling that it meets their basic requirements but there is room of improvement.

Availability of seed in small packages

Much of the seed in Zambia is sold in 5 or 10 kg packages. In the 2015/16 season, 19% of seed was sold in small packages (2 kg or less). Breaking the numbers down by crop, we find that 19% of maize seed and 4% of bean seed were sold in small packages. In contrast, 100% of rice seed and 62% of maize seed were sold in larger package sizes between 2 and 10 kg. Further, for maize, 19% of seed was sold in packages larger than 10 kg. On average, seed companies rate their satisfaction with the volumes of seed sold in small packages as good (72%). By crop, the companies' satisfaction of package sizes is excellent for bean (80%) and good for maize (74%), rice (65%), and groundnut (65%). Figure 4 shows a breakdown of the percentage of seed sold in the different package sizes for each crop.

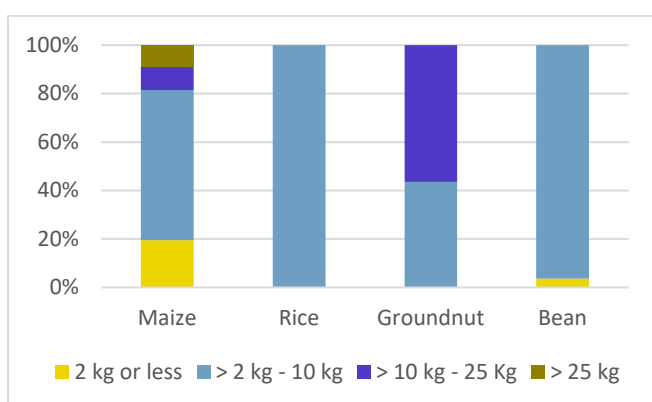


Figure 4. Percentage of seed sold in different package sizes

Seed-to-grain price ratio

Assuming stable prices at planting time, seed-to-grain price ratios can reflect the attractiveness of a variety or affordability of improved seed relative to farmer-recycled grain. The seed-to-grain price ratio for the four crops shows significant variation. At the time of planning, the seed-to-grain ratio is highest for hybrid maize (13.4:1) and OPV maize (10.0:1). In contrast, for rice, groundnut, and bean, the seed-to-grain price ratio is much lower at 1.4:1, 1.3:1, 2.2:1, and 2.3:1, respectively. The high ratios for maize seed are due to the high cost of production. From a seed company's perspective, the low seed-to-grain price ratios for rice, groundnut, and bean reflect competition from farmer-recycled seed.

OPPORTUNITIES AND CHALLENGES

Zambia's seed industry has several opportunities for further growth. As a net exporter of seed, there is potential to access new regional markets, especially under the COMESA and SADC trade agreements. These agreements are particularly beneficial for Zambian seed companies as most are already active in the region. The introduction of the FISP e-voucher program is expected to improve the efficiency and transparency of the subsidy program. In the area of breeding and variety development, there is room for developing more new varieties, as most of the varieties in the market today are quite old. With more new varieties on the market, seed companies can provide more – and in most cases, better – options for farmers.

Despite the achievements to date, significant challenges remain in Zambia's formal seed sector. For three of the top four crops (rice, groundnut, and bean), a total of only seven varieties were released between 2014 and 2016, while there was a heavy focus on maize for all indicators of research and development. There is thus a need to diversify breeding efforts, especially with the increasing recognition that sufficient caloric intake does not necessarily equate to sufficient nutrients.

Seed companies also report concern about the lack of clarity in the seed export process: some importing countries treat seed as grain, which negatively affects the seed trade in times of grain export bans. Further, if left unchecked, the threat of fake seed could cause negatively affect an otherwise vibrant seed sector. The time to counter the threat is now, while the problem is relatively small.

Seed companies also highlight the need to improve efficiency in the handling of the FISP program, especially regarding the speed of payments from government. Lastly, since Zambia is a net exporter of maize seed, the government should prioritize the domestication of the harmonized SADC and COMESA seed regulations.

CONCLUSION

Zambia's seed sector is relatively advanced. Most of the active seed companies in the country export seed across the SADC and COMESA regions. The policy environment promotes private sector growth through private inspection services and efficient variety releases. In addition, the national breeding programs work closely with local private seed companies to ensure the timely availability of foundation seed. To promote nutritional security, there is a need for increased investment in breeding varieties for rice, groundnut, and beans. TASAI research has shown that the seed companies are satisfied with most of the public services.

Nevertheless, to sustain the impressive performance of the sector, there is a need to address several policy-related gaps. These include instituting innovative ways to address fake seed; fast-tracking the nationwide imple-

mentation of FISP e-voucher; ensuring that export regulations are consistent and predictable; and fast-tracking the passing of the revised seed regulations. With an active seed association, seed companies have the appropriate platform to respond to these challenges.

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APPENDIX 1.

For a comparison of TASAI Indicators across 13 countries, please visit: <http://tasai.org/wp-content/uploads/TASAI-Appendix-CURRENT.pdf>





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