INTRODUCTION

A competitive seed sector is key to ensuring timely availability of appropriate, high quality seeds at affordable prices to smallholder farmers in South Africa. This policy brief summarizes the key findings of a major study conducted in 2013 and 2014 by Dr. Van Der Walt and Professor John Derera to appraise the structure and economic performance of South Africa's seed sector. With a focus on four grain crops that are important to food security in South Africa – maize, soybean, sunflower and wheat – the report evaluates the enabling environment for a vibrant, private sector-led seed industry. The report covers 16 indicators that are divided into the following categories: Research and Development, Industry Competitiveness, Service to Smallholder Farmers, Seed, Policy and Regulations, and Institutional Support. To give perspective, the performance of South Africa's seed sector is compared against three other countries, namely Kenya, Uganda, and Zimbabwe, where similar studies have been conducted under a new initiative called The African Seed Access Index (TASAI). TASAI seeks to encourage public policy makers and development agencies to create and maintain enabling environments that will accelerate the development of local, private sector-led seed systems serving smallholder farmers.

OVERVIEW

Unlike most other African countries, the seed industry in South Africa is fairly advanced and primarily serves the needs of commercial farmers. The seed industry has evolved over more than a century into a mature sector with some 107 seed companies that are members the South African National Seed Organization (SANSOR). Table 1 below shows the role of key players in South African formal seed sector.

In 2012-2013 the formal seed trade exported some US$73 million worth of seeds and imported seeds with value of US$89 million, accounting for half of formal seed business in Africa. The seed market for local and export sales of main crops totals R5.562 billion: R4.296 billion for agronomic seed, R892 million for vegetables, and R374 million for forage/pasture crops. Maize dominated the agronomic market with local and export sales of R3.600 billion, of which only R90 million is OPVs, the balance being hybrid conventional and genetically modified Sunflower seed sales were worth R210 million, soybean R127 million, and wheat R115 million. One should take into account that over half the areas planted to wheat and soybean come from farm-saved grain used for planting (SANSOR, 2013). The seed market in MT is: local maize 41,939 MT and export 4,227 MT; soybeans 578 MT and 226 MT; sunflower 2151 MT and 612 MT; and wheat 14 837MT and 226 MT, respectively.

Table 1: Role of key players in South African formal seed sector

ROLE	KEY PLAYERS
Research and breeding	ARC; MNCs; Local seed companies; Universities
Variety registration & regulation	SANSOR
Breeders and foundation seed production	ARC; MNCs; Universities; Local seed companies
Seed production	SME Seed Companies; MNCs; ARC
Education, Training, Extension	Seed companies; NGOs; ARC; Government
Distribution and sales	Private sector seed merchants; Agricultural supply outlets; Cooperatives;

Key Acronyms: AFSTA - Africa Seed Trade Association; **ARC** – Agriculture Research Council; **KZN –** KwaZulu-Natal; **MNC** – Multinational Corporation; **NGO** – Non Governmental Organization; **OSTS** – Official Seed Testing Station; **SANSOR** - South African National Seed Organization; **SME** – Small and Medium Enterprise.

Table 2: South Africa's formal seed sector compared to other African countries

COUNTRY PROFILE			KENYA	SOUTH AFRICA	UGANDA	ZIMBABWE
Focus crop 1			Maize	Maize	Maize	Maize
Focus crop 2			Sorghum	Soybean	Beans	Cotton
Focus crop 3			Beans	Sunflower	Millet	Soybean
Focus crop 4			Cowpeas	Wheat	Sorghum	Sorghum
Population (Million)			43	51	36	13
Size (KM^2)			569,250	1,214,470	197,100	390,760
Arable land (Million Ha) (% of size)			4.89	14.8	5.3	3.58
2014 Ease of Doing Business rank (Rank out of 189)			136	43	150	171
Stage of Seed Sector development			Growth	Mature	Growth	Decline
A. RESEARCH AND DEVELOPMENT						
1	Number of active breeders	Total	68	53	11	40
		Score	--	43.3	36.3	79.1
2	Varieties released in last 3 years	Total	60	310	19	35
		3 year average	20	103	6.3	11.7
3	Availability of foundation seed	Score	61.3	91.3	42.8	99.3
B. INDUSTRY COMPETITIVENESS						
4	Number of active crop seed companies for focus crops	Total	17	37	14	20
5	Time it takes to import/export seed from neighboring countries (days)	Import seed	26	38	48	12
		Export seed	12	--	18	12
		Score	58.9	68.7	55	68
6	Market share of top 4 companies, Herfindahl-Hirschman Index	Crop 1	6,450	2,489	1,509	2,734
		Crop 2	1,989	3,625	950	10,000
		Crop 3	3,223	2,473	1,350	5,393
		Crop 4	3,240	4,816	1,050	3,027
7	Market share of government parastatal	% mkt share	62.4	0	0	2.5
C. SERVICE TO SMALLHOLDER FARMERS						
8	Concentration of rural agro-dealer network	Score	--	55	49	70.2
9	Availability of seed in small packages	% volume sold	94.4	2.5	29.1	7.8
		Score	--	30.8	50	63.4
D. SEED POLICY AND REGULATIONS						
10	Length of variety release process	Time (months)	37	12	37	22
		Score	32.7	81.0	55.8	92.2
11	Quality of seed policy framework	Score	65.2	82.7	47	65.5
12	Quality of seed law / regulations	Score	60.9	70	44.2	87.3
	Quality of enforcement systems	Score	53.1	70	41.4	83
13	Adequacy of seed inspectors	Total inspectors	60	148	4	68
		Score	63.8	--	43.5	82.3
14	Efforts to stamp out fake seed	Reported cases in 3 yrs	36	17	--	41
		Score	38.5	60	40.6	66.9
E. INSTITUTIONAL SUPPORT						
15	Availability of extension services for smallholder farmers	Ratio to farmers	1:1000	1:3313	1:3140	1:300
		Score	--	35.2	45	63.6
16	Quality of national seed trade association	Score	53.4	91.5	60.6	43.2

KEY

Score	80 to 100	60 to 79.99	40 to 59.99	20 to 39.99	0 to 19.99
Grade	A	B	C	D	F
Color Code					
Interpretation	Excellent	Good	Fair	Poor	Extremely poor
H-4 Index	<1000	1000-1999	2000-2999	3000-3999	>4000

RESEARCH AND DEVELOPMENT

Number of active seed breeders

Unlike other African countries, plant breeding in South Africa is dominated by the private sector. Maize has the highest number of active breeders, 27, of which 26 are in the private sector. Underlining the predominance of maize, the other three crops *combined* had only 26 active breeders (7 for soybean, 10 for sunflower and 9 for wheat), only 2 of which are in the public sector. There are only two public breeders for maize and two for wheat, while there are no public breeders for soybean and sunflower. Three dominant MNCs (Monsanto, Pannar and Dupont-Pioneer) employ 80% of private sector maize breeders, 100% of soybean and 100% of sunflower breeders in the country. Most small and medium-scale companies do not have plant breeders. The ratio of technical assistants to breeders is almost 1:1 for all the crops.

Although plant breeders at public universities are not included in the numbers above, they are nevertheless an important component of the seed sector research overall. There is at least one plant breeder at all public universities with an agriculture faculty, such as the University of KwaZulu-Natal (UKZN), the University of the Free State (UFS), the University of Limpopo, the University of Venda, and the University of Zululand. For example, UFS has 8 plant breeders, and UKZN has 6.

Varieties released in the last 3 years

As indicated by number of varieties released, South Africa has a robust research and development program for all key crops. As shown if Figure 1 below, the average number of varieties that were developed and released for each crop during 2010-2013 (3 year rolling average) is 74 for maize, 12 for sunflower, 9 for soybean, and 9 for wheat.

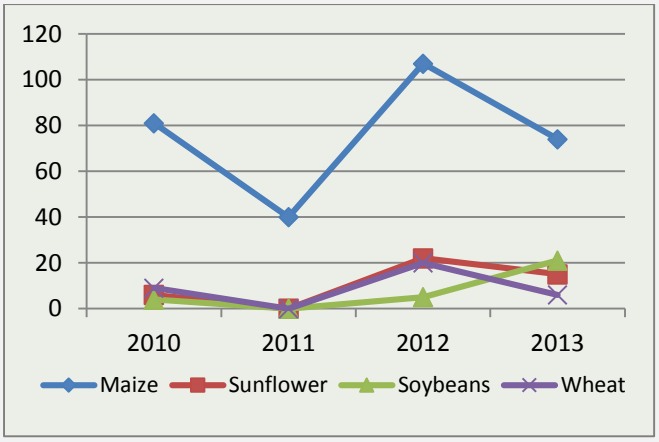

Figure 1: Number of varieties released (3 year moving average)

Of the varieties released in the past 3 years, 162 maize varieties and 21 soybean varieties are genetically modified (GM). Maize dominates the national variety list with a total of 546 maize varieties on the official list, of which 308 varieties are protected by plant breeders' rights (PBR). On the soybean variety list, there are 35 non-GMO varieties, 19 with PBR protection, in comparison to 41 GM varieties, 38 with PBR. For sunflowers, there are 88 varieties on the official variety list; 79 are high-oil hybrids, 11 of which have PBR, 2 are high-oil OPVs, both with PBR, 5 are low-oil hybrids, of which 2 have PBR, and 2 are low-oil open pollinated varieties (OPVs), with no PBR. Note however that, due to greater involvement of multinationals, much of the basic breeding is done in home countries with more local assessments for adaptation done in South Africa.

Availability of foundation seed

Seed companies rated their access to foundation seed as excellent for maize and sunflower and good-to-very good for wheat and soybeans. The MNC and most of the large domestic seed companies produce and maintain their own foundation seed and do not depend on the government or public research institutions for foundation seed. Smaller companies get their foundation seed through partnership or contract with more established companies.

INDUSTRY COMPETITIVENESS

Number of active seed companies

There are 72 registered seed companies that are full members of SANSOR. Thirty-seven (37) companies deal in the four focal crops: 17 sell maize seed, 11 soybeans, 9 sunflowers, and 7 wheat. The other 35 companies work with other crops, including a large number (27) producing vegetable seeds, indicating more competition in the vegetable sector than in the field crops cluster. As the industry matures, the number of companies dealing in grain crops is likely to decline through mergers and acquisitions. For now it is fair to say that there is healthy competition in the production and distribution of improved seed in South Africa.

Time it takes to import seed

It takes an average of 25 days (range: 14 - 90) to import seed for all crops from South African Development Community (SADC) countries into South Africa. Compared to other countries in the region, it is easier to obtain an import permit. On average, the import process is rated as very good by the seed industry with an average score of 69%. With good planning the seed can be imported and planted in the same season. The relative ease of the import process is due to the fact that, to date, no GMO varieties are imported from other African countries and therefore importers are not required to comply with biosafety requirements. In contrast, exporting South African seed from to the rest of the world, including SADC countries, requires biosafety clearance in addition to an export permit, phytosanitary, and international seed quality documentation. The export process is consequently much longer.

Market share of top seed companies

The market share data indicate that there is significant concentration in South Africa's seed industry. The top 3 companies (all MNCs) account for at least 85% of the seed business for each of the four focus crops. However, there is an intense competition among these three companies resulting in a strong push for

investment and delivery of high quality products at competitive prices. Small companies only account for 2-15% of the seed market across the focus crops. As a sign of industry maturity, there is significant specialization by seed crop. Large seed companies, especially multinationals, tend to focus on major food crops, with significant economies of scale. Figure 2 shows the relative market share for each crop by different companies. The more evenly sliced the pie, the more competitive the market. Of the four focus crops, maize and sunflower are the most competitive (see Herfindahl-Hirschman Index scores in table 2 for comparison). With only three active seed companies, wheat is the least competitive crop.

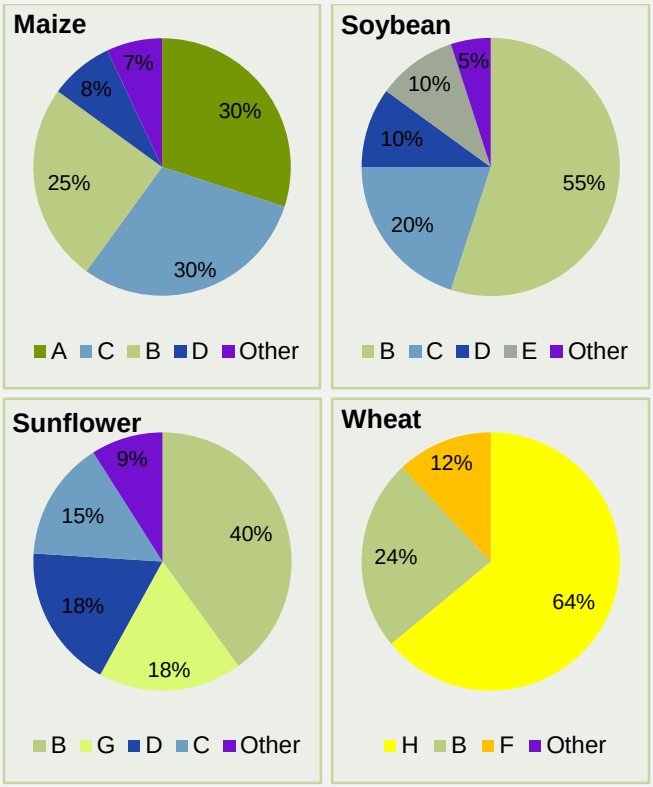

Figure 2: Seed volume market shares for staple crops

Market share of government parastatal

There are no parastatal companies operating a seed business in South Africa. The industry is fully liberalized and no government entities produce seeds.

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

Because of its extensive and efficient road network and transport infrastructure, commercial farmers in South Africa have good access to agricultural inputs including seed. However, the agro-dealer network in rural areas is thin. Except for wheat, which is rated slightly below 50%, the industry survey indicated that seed distribution is generally fair with a satisfaction score of 55%. There is certainly a lot of room for improvement on this measure. Key informants and seed companies estimated that on average, seed is available within an 80km radius for most farmers. The seed is distributed through cooperatives and rural retail shops within the communities. Sales representatives from seed companies also assist farmers and cooperatives to transport seed especially when large quantities are purchased. To encourage adoption of improved seed by smallholder farmers, a better distribution system is needed in rural areas.

Availability of seed in small packages

Because commercial farmers constitute a very large share of the seed market, most seed in South Africa is sold in bulk orders. About 70% of the maize seed is sold by kernel count. For maize the common package size is 60,000 or 80,000 kernels while for sunflower the common size is 180,000 kernels. Only 10% of maize seed is sold in packages that are 2kg or less and another 10% is sold in 5kg bags. Of the other three focus crops – soybean, sunflower and wheat - it is nearly impossible to get seed in packages that are less than 25kg. Most seed companies do not process small packs of seed especially for crops that are generally classified as non-smallholder crops in South Africa. Availability of seed in small packs was rated as extremely poor for soybean (25%), poor for sunflower (22%) and extremely poor for wheat (2%). It is however rated good for maize seed (74%). The bulk of maize seed that is packed in small packs is open pollinated varieties, which are distributed in KwaZulu-Natal and Eastern Cape. While the lack of small seed packs could be overcome by breaking the bulk at retail level, repackaging seed is illegal.

SEED POLICY AND REGULATIONS

Length of variety release process

It takes on average 12 months to release varieties of the four focal crops and may take up to 36 months to release a pasture variety. Seed companies rate their satisfaction with the variety release process is excellent at 81%. Satisfaction levels for each of the focus crops are as follows: Maize 79%, Soybeans, 81%, sunflower 79% and wheat 82%. SANSOR is the contracted licensing agent in charge of the variety release process (in close collaboration with ARC), an initiative arising from the need to minimize the delay between registering a new variety and getting the seed to farmers. It is noteworthy that royalties collected peaked in 2007-08 when an amount of R4.25 million (US$525 000) was collected after having steadily grown since inception of licensing, then declining to the 2013 amount of R1.7 million (US$170 000) as result of fewer competitive varieties being released.

Quality of seed policy framework

Seed industry stakeholders in South Africa rate the quality of the seed policy framework as excellent with a satisfaction score of 83%. The high numbers shows that stakeholders are satisfied with both the contents and implementation of the Plant Acts, the policies that govern the seed industry.

Quality of seed regulation and enforcement

South Africa's seed sector is regulated through four acts, namely the Plant Improvement Act no. 53 of 1976 (as amended), the Plant Breeders' Rights Act no. 15 of 1976 (as amended), the Agricultural Pests Act no. 36

of 1983 (as amended), and the GMO Act no. 15 of 1997 (as amended). There are various secondary Acts that impact on seeds and varieties such as the Fertilizers, Farm Feeds, Agricultural Remedies, and Stock Remedies no. 36 of 1947 (as amended). At 70% satisfaction, the quality of the regulatory enforcement was rated as very good. Most of the acts that regulate the South African seed industry are in a state of amendments, some completed, some in process and some forthcoming.

Adequacy of seed inspectors

Seed inspection is mostly conducted by in-house or by contracted authorized seed inspectors certified by SANSOR. As such As such seed companies are free to increase or decrease the number of seed inspectors based on need. However, some small and medium sized companies do not have their own in-house seed inspectors. In such cases the availability of a seed inspectors is generally rated as poor. This is an area that needs improvement. Currently SANSOR does not have seed inspectors on staff, although its experienced seed certification and technical managers, who originally came from government inspection services, regularly monitor seed during site visits with contracted private seed inspectors. During the 2012/13 growing season, 1 700 seed production fields of 35 species were registered for certification of which 301 were pre-basic, 500 for basic and 906 for certified seed. This covered 40,430 hectares and 3 374 certificated were issued for 50,900 metric tons of seed.

Efforts to stamp out fake seed

Fake seed is not a problem in South Africa. In 2012-13 there were 6 cases reported of fraudulent labeling and dishonesty with agricultural imports at border posts, 3 of which were investigated. This is down from 11 cases in 2011-2012 and 35 cases in 2008-2009. It is difficult to tell if any of these cases could be classified as fake seed. Respondents were generally satisfied with efforts to get rid of fake seed on the market. The highly formalized structure of the seed distribution system leaves little room for fake seed entry.

INSTITUTIONAL SUPPORT

Availability of extension services

In South Africa, approximately 2155 government extension officers serve about 7,139,397 agricultural households. The concentration of extension officers and the quality of services offered varies widely by province. When it comes to extension services offered by private companies, the data indicate very few extension services available for the four focal crops, as opposed to vegetable seeds, for which more services are offered. Overall, satisfaction with the adequacy of extension support for smallholder farmers is at 35% (32% for private extension and 38% for government supported extension).

Quality of national seed trade association

South Africa has an organized and effective national seed trade association – the South African National Seed Organization (SANSOR). SANSOR is a registered not-for-profit association. The association has a total membership of 118 of which 72 are full members (seed companies), 21 are associate members (service providers), 7 affiliate members, 9 international company members, 2 third party distributors, and 7 honorary members. SANSOR was rated excellent for all aspects such as activeness (92%), effectiveness in advocacy (92%), management ability (93%), democracy in election and decision-making (90%) and capacity to mobilize resources (90%). The overall rating of SANSOR is excellent at 92%, a score that is much higher than any of the other national seed traders associations.

SANSOR is the designated authority for conducting official seed certification on behalf of the Ministry of Agriculture, Forestry and Fisheries. It employs some 210 contracted seed inspectors and samplers for seed certification and is a regular participant in meetings or congresses of the International Seed Federation (ISF), International Seed Testing Association (ISTA), American Official Seed Certifying Authorities (AOSCA), African Seed Trade Association (AFSTA), Organization for Economic Collaboration Development (OECD), and other international organizations. Its organizational structure comprises three divisions: agronomy, horticulture, and pasture/forage. Its various specialist committees assist with SANSOR functions, which include seed testing, plant breeders' rights, phytosanitary issues, arbitration and licensing of public seed varieties.

CONCLUSION

The South African seed industry has had a long and successful evolution from its embryonic inception in the 1890s to a strong and well-established private sector-led industry. Part of the key to its success has been the close interaction between private sector managers and government representatives. Its competitive environment ensures maintenance of seed quality, private seed testing laboratories expertise, and efficient management of seed certification schemes. The national seed traders association (SANSOR) is highly effective in representing the interests of its members. However, due to a highly commercialized agricultural sector, the seed sector has evolved to primarily serve the needs of large-scale commercial farmers. The industry performs poorly on measures that are specific to seed access for smallholder farmers such as availability of seed in small packages, presence of a rural-agro-dealer network, and the availability of extension services. There is still great scope for improving access to seed for smallholder farmers in rural areas.

REFERENCES

Derera, John and Wynand Van Der Walt. (2014). The African Seed Access Index Country Report on South Africa.

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