

Seed Sector Review Nigeria

Crop Briefs

25 October 2019



Purpose

- The compiled crop briefs are an attachment to the seed sector assessment report, which has been developed as part of a seed sector review in Nigeria
- The crop briefs provide a quick insight on seed sector performance through the distinct window of crop groups
- We provide crop briefs for four crop groups, each with two focus crops:
 - Maize: maize OPVs and maize hybrid varieties
 - Roots, tubers and bananas: Irish potato and yam
 - Legumes: cowpea and groundnut
 - Vegetables: tomato and onion
- The crop briefs provide insights into the seed systems, stakeholders involved, and challenges and opportunities for strengthening farmers' access to quality seed; insights emerged that are either crop or crop group specific
- The focus group discussions as part of the seed sector review process have been instrumental to the development of the crop briefs; this information was complemented with information sourced through desk study



Maize

Crop Group

Crop group: Maize - OPVs & hybrid varieties

National vision and relevance of the crop

The Agriculture Promotion Policy (APP, 2016–2020) considers the agricultural sector a key instrument to long-term economic growth. APP prioritizes maize as a focus crop. APP promotes private sector led business; strengthening of commodity value chains; improving market orientation through infrastructure and commodity exchanges; mainstreaming climate change measures; and implementation of nutrition interventions for vulnerable groups. Maize is a major commodity in Nigeria; it is relevant to food security, while at the same time its importance as feed is increasing with the growing animal production sector. Nigeria is an important maize producer at regional level. The gross production value for maize reached US\$1,654 million in 2016 (FAOSTAT, 2019). Productivity as well as profitability are relatively low. The price of seed is relatively low as compared to other African countries.

Stakeholders

- IITA & NARS including universities: variety development, seed system research and EGS supply
- NASC: quality assurance, battling counterfeiting
- Global companies: breeding, seed production & marketing
- National seed companies: seed production & marketing
- Private seed producers: seed production
- NGOs & development projects: seed dissemination
- Agro-dealers & informal seed traders: marketing of quality and informally sourced seed

Predominant seed system

Maize farmers predominantly use farm-saved or informally sourced seed of OPVs. The use of hybrid varieties is limited, despite the relatively low seed price as compared to other countries in Africa of US\$1 per kg (TASAI, 2019). A wide range and growing number of seed companies produce and market certified seed of OPVs. Over the period 2015-2017, 25 new varieties were released; the average age of varieties in the market is 7 years. Due to a history of counterfeiting in the seed industry, especially associated to major government, development programme and NGO interventions, the trust of farmers in seed companies has been reduced. Several industry-wide interventions aim to recover the trust and enhance professionalism in the sector. Seed sector stakeholders foster and promote the maize seed system to evolve from an informal into more intermediary and formal systems. Key to drive such an evolution is that maize grain markets offer farmers more profitable prices for their product. Only then farmers' willingness to invest in more intensive production systems, including the use of quality seed of maize hybrids, can be fostered.

Programmes

- IITA, in collaboration with several NARS and universities supports development and release of maize OPVs and hybrid varieties
- AGRA has a record in supporting maize seed systems and seed companies; it continues to do so through value chain programmes; AGRA supports NASC in the development of a tracking system to counter marketing of fake seed

Crop group: Maize - OPVs & hybrid varieties

Crop and seed projections

Crop data	Metric	2010	2015	2020	2025	2030
Maize crop area	M ha	4.15	6.77	6.69	5.76	5.50
Area OPVs	M ha			6.52	5.47	5.11
Area hybrids	M ha			0.17	0.29	0.40
Production	M mt	7.68	10.56	13.73	17.85	23.20
Production OPVs	M mt			13.04	16.42	20.42
Production hybrids	M mt			0.69	1.43	2.78
Productivity	mt/ha	1.85	1.56			
Productivity OPVs	mt/ha			2.00	3.00	4.00
Productivity hybrids	mt/ha			4.00	5.00	7.00

Seed data OPV maize	Metric	2020	2025	2030
Crop area	M ha	6.52	5.47	5.11
Seed demand	mt	26,088	21,896	20,420
Seed production	%	107%	100%	100%
Seed production	mt	27,811	21,896	20,420
Gap	%	-7%	0%	0%

Seed data hybrid maize	Metric	2020	2025	2030
Crop area	M ha	0.69	1.43	2.78
Seed demand	mt	17,163	35,700	69,614
Seed production	%	9%	5%	4%
Seed production	mt	1,464	1,683	2,609
Gap	%	90%	94%	95%

Assumptions crop data and projections

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Increase in product demand for is 30% every 5 years
- Productivity OPV maize for 2020 is 2.0 mt/ha; for 2025 is 3.0 mt/ha; and for 2030 is 4.0 mt/ha
- Productivity hybrid maize for 2020 is 4.0 mt/ha; for 2025 is 5.0 mt/ha; and for 2030 is 7.0 mt/ha
- Production OPV maize in 2020 as compared to hybrid is 95%; in 2025 is 92%; and in 2030 is 88%

Assumptions seed data and projections

- OPV and hybrid variety seed rate is 0.025 mt/ha
- OPV maize seed replacement rate is once every 5 years
- OPV maize seed production in 2020 = (TASAI indication seed production 2017 + 10%) * 95%
- OPV maize seed production in 2025/2030 = demand
- Hybrid variety maize seed production is 2020 = (TASAI seed production 2017 + 10%) * 5%
- Hybrid variety maize seed production in 2025 = 2020 + 15% increase; in 2030 = 2025 + 25% increase

Crop group: Maize - OPVs & hybrid varieties

Challenges

- Security issues in rural areas jeopardize private sector investment in the production and marketing of quality seed, as well as farmer's willingness to invest.
- Government interventions in the maize grain market distort the functioning of both maize grain and seed markets.
- Past seed interventions have jeopardized genuine seed businesses. There is a need to reduce government, NGO and project interventions in seed business, e.g. no more seed subsidies or distribution schemes. TASAI (2019) reports that 47% of maize seed sales continues to be through institutional markets. There is a need to transform models used through institutional markets to models enabling seed business allowing for farmers' knowing their seed sources and building a customer relationship with them. The institutional markets contribute to carryover seed that further distorts market functioning. Lack of reliable data on seed production and marketing causes a huge knowledge gap in the development of the maize seed sector.
- Private sector capabilities in the production and marketing of quality seed of OPVs and hybrids is limited. Maize seed companies have limited capacity in production, marketing and finance management. The limited professionalism contributes to a limited trust of farmers in seed companies.
- Seed companies have limited awareness and interest in hybrid seed production and marketing. They have limited capabilities in terms of use of new technologies and infrastructure. Private investment and financial services (loan, credit, equity) available for improving commercial maize seed business are limited.
- Variety replacement of OPVs by new and especially hybrid varieties is slow and limited. Access to varieties and EGS from public entities is constrained in its structure, its limited transparency, unclear financial models and planning; as such the weak structure in EGS supply results in inefficiencies.
- Stakeholders consider the current yield jump between hybrids and OPVs not high enough to convince farmers to purchase hybrid seed; companies are reluctant to invest or transition from OPVs to hybrids.
- Improvement of the yield and potential in terms of other traits is limited with the current variety portfolio used by seed companies. The business model of most companies does not favour replacement of OPVs by new varieties or hybrids; hybrid seed is not yet considered a strong business case. Current government policies and interventions related to maize grain pricing do not favour the introduction of new and more productive hybrids.
- Farmers capacity and professionalism in maize production is limited. Farmers' production systems and use of agronomic practices are in line with the use of OPVs; for gaining the potential of hybrid varieties these need to be improved. Moreover, farmers perception on the potential of the business model of hybrid varieties is limited.
- The policy and regulatory environment limits the growth and development of the sector. There is an urgent need for better standards and enforcement of regulations to adequately counter fake seed producers and seed sellers.

Crop group: Maize - OPVs & hybrid varieties

#	Topic/strategy	Options
1.	Policy and regulatory environment	
	The seed enabling environment fosters the production and marketing of quality seed of productive OPVs & hybrids by capable and genuine seed companies	<ul style="list-style-type: none"> • Enhance standardization in maize production and marketing • Increase penalties to be effective and realistic in terms of the value of seed business and business case of violating seed regulations • Roll-out the seed tracker and other systems countering fake seed business • Increase the effectiveness, efficiency and relevance of quality assurance in the maize seed sector • Accelerate the release of productive hybrids and OPVs
2.	Constrained maize seed markets	
	Government, project and NGO interventions in maize seed marketing are transformed into those that foster a direct linkage between seed companies and farmers, thereby increasing competition and promoting genuine seed business models in the maize seed sector	<ul style="list-style-type: none"> • Ensure that the government role in the maize seed sector remains limited to the development of regulations and standards and overseeing quality control • Ensure that government (at all levels) does not engage in the financing and distribution of maize seed • Reduce government interventions in the maize seed market, and thereby enhance the direct relationship between companies and farmers, and increase competition and enhance trustworthiness of the sector • Reduce and limit seed distribution schemes by NGOs and projects, which favour unsustainable business models and reduce trust in the sector • Develop farmer support mechanisms for government, projects and NGOs for direct linkage between companies and farmers

Crop group: Maize - OPVs & hybrid varieties

#	Topic/strategy	Options
3.	<p>Slow and limited replacement of OPVs by new OPVs and hybrid varieties</p> <p>Seed companies are engaged in a more structural manner in the production and marketing of quality seed of new hybrid varieties; they are supported through enhanced linkages that allow for access to varieties and EGS</p>	<ul style="list-style-type: none"> • Increase capacity of research to develop a wide portfolio of superior hybrids available for seed companies • Ensure the availability of more productive and competitive hybrids • Increase the use of licensing in creating exclusivity for seed companies in the production and marketing of maize varieties • Increase the funding for breeder seed production; enhance availability of productive female lines • Promote and increase availability, efficiency and transparency in the supply of EGS/hybrid parental lines to seed producers and companies • Foster engagement of companies in the production of EGS seed • Promote and strengthen the business case of hybrid seed production and marketing among seed companies • Facilitate backstopping by breeders of seed companies in seed production and marketing of new varieties • Create structures that link in a more effective and transparent manner breeders with seed companies • Create a structure that will facilitate company awareness on new varieties

Crop group: Maize - OPVs & hybrid varieties

#	Topic/strategy	Options
4.	Private sector capabilities to produce and market maize hybrid seed	
	The seed companies have the capacity to produce and market quality seed particularly of hybrid varieties	<ul style="list-style-type: none"> • Enhance in a structural manner the capacity of seed producers and companies in terms of production, marketing and financial management • Enhance the capacity of seed company staff in hybrid seed production • Promote investment and availability of affordable financial products and services for seed companies • Investment by public, private and NGO sector in the capacity of seed producers and companies in terms of technology and infrastructure
5.	Farmers' awareness of and professionalism in maize production	
	Farmer production systems are improved in which hybrid seed use becomes attractive, with increased productivity and profitability	<ul style="list-style-type: none"> • Promote the use of good agronomic practices in maize cultivation (without GAP hybrids are not more productive) • Strengthen maize value chain functioning and stakeholder linkages to promote farmer investment in maize production • Develop and share the business case of maize production using hybrid seed • Collect, analyse and interpret, and share the benefits of hybrids among farmers • Seed companies establish demonstrations on hybrid versus OPVs via demo plots and field days • Engage in sensitization on the benefits of adopting hybrids through media outlets e.g. radio jingles, social media etc.



Irish Potato

RTB Crop Group

Crop group: Roots, tubers and bananas

Focus crop: Irish potato

National vision and relevance of the crop

The Agriculture Promotion Policy (APP, 2016–2020) considers the agricultural sector a key instrument to long-term economic growth. APP prioritizes specific crops; Irish potato is not considered a focus crop. APP promotes private sector led business; strengthening of commodity value chains; improving of market orientation through infrastructure and commodity exchanges; mainstreaming of climate change measures; and implementation of nutrition interventions for vulnerable groups. The potato sector in Nigeria is of major economic importance to Plateau State. With an estimated 300,000 hectares of production, this is one of Africa's largest potato production areas. However, the potato production system and production support systems are poorly developed.

Stakeholders

- NRCRI: crop improvement, seed system research and EGS supply; CIP has no activities for potato breeding and seed systems in Nigeria
- NASC: limited attention for potato quality assurance
- Few private seed companies: EGS production and supply, seed potato production and marketing
- Private seed producers: seed potato production and marketing
- International private companies: on a limited basis import of seed potatoes

Predominant seed system

There are hardly sources of reliable quality seed potatoes, making that farmers are condemned to continuously recycle their own seed, or buy similar seed in informal markets. As a result of seed borne diseases yield potential is significantly reduced over generations. Ware potato producers use poor production practices and crop protection management. Farmers nor extension staff have the required basic knowledge on virus disease management, bacterial wilt management and late blight management. Few seed companies and projects are engaging, at a very small scale, in the importation of quality seed potatoes of varieties that have been released in the country, and are trying to develop import channels. They meet several obstacles in terms of the limited capacity of regulatory and public bodies in the processing of containers of seed potatoes. Public research is engaged in the development of new seed production methods, which have not yet reached an operational stage. At the same time the alternative of seed import is jeopardized despite the major demand among seed companies and projects in the sector.

Programmes

The GiZ SEEDIN programme in Plateau is involved in the set up of groups of ware potato producers, improving their production system and addressing the market system. Major bottleneck for SEEDIN and the producers is the access to quality seed and import of quality seed.

Crop group: Roots, tubers and bananas

Focus crop: Irish potato

Crop and seed projections

Crop data	Metric	2010	2015	2020	2025	2030
Crop area	ha	265,992	328,009	346,344	376,461	376,461
Production	M mt	1.03	1.20	1.39	1.73	2.16
Productivity	mt/ha	3.86	3.67	4.00	4.60	5.75
Seed data	Metric	2010	2015	2020	2025	2030
Crop area	ha	265,992	328,009	346,344	376,461	376,461
Seed demand	mt			288,620	376,461	470,577
Seed production	%			1%	2%	4%
Seed production	mt			2,886	7,529	18,823
Seed gap	%			99%	98%	96%

Assumptions crop data and projections

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Increase of production in 2015-2020 with 15%; in 2020-2025 with 25%; and in 2025-2030 with 25%
- Productivity in 2020 is 4.0 mt/ha
- Increase in average productivity for 2020-2025 of 15%; and for 2025-2030 of 25%

Assumptions seed data and projections

- Irish seed potato seed rate is 2.5 mt/ha
- Replacement for 2020 is once in every 3 years; which means that annual replacement need is 0.83 mt/ha
- Replacement for 2025 is once in every 2.5 years; which means that annual replacement need is 1.00 mt/ha
- Replacement for 2030 is once in every 2 years; which means that annual replacement need is 1.25 mt/ha
- Seed potato production as % of demand in 2020 is 1%; in 2025 is 2%; and in 2025 is 4%

Crop group: Roots, tubers and bananas

Focus crop: Irish potato

Challenges

- Potato is of growing economic importance to Nigeria, especially in Plateau State. The production system and production support are still very poorly developed. Average yields are below 4 mt/ha, which is very low, since producers use 1-2 mt of seed potato to reach this yield.
- The challenge is not only that smallholder farmers lack the required knowledge, the entire sector seems to be isolated from the international public and private bodies of knowledge on efficient potato production. The return on land, labour, water, capital and nutrients is very poor. The important and highly potential natural resources of the Plateau highlands are used inefficiently.
- Factors constraining potato production include poor farmers' awareness on appropriate potato cropping practices, with inadequate knowledge on proper practices of land preparation, disease management, positive seed potato selection, harvest and post-harvest handling, storage and cost-benefit analysis.
- Farmers' demand for quality seed potato is high, and farmers are willing to pay for this input, but seed potato supply is very low; this causes farmers to recycle their own seed continuously, which highly contributes to low productivity
- The number of professional domestic private seed producers is very limited, associated with a generally low level of technical production and business management capacity, as well as investment hurdles like access to capital.
- The number of registered potato varieties is limited and so is the quantity of clean and disease free early generation seed.
- Seed potato import, another pathway for providing farmers access to quality seed potato is complicated and constrained. The development of a domestic seed system is not yet feasible and its competitiveness as compared to the import of seed potatoes is considered to be limited. The development of a properly functioning seed potato supply system from the current dismal situation, requires a longer term investment. It is recommended to simultaneously develop a seed potato system that is based on imports and a domestic production system.
- Currently there is no seed potato quality assurance system, nor is there the required capacity within NASC to implement such a system. Once for-profit seed potato production starts to take off, also quality assurance regulation and routines need to be developed by NASC.
- The government recognizes the importance of this crop, but policy guidance, legislative attention and regulatory control is currently lacking.

Crop group: Roots, tubers and bananas

Focus crop: Irish potato

#	Topic/strategy	Options
1.	Enabling seed potato regulatory framework	
	Legislative attention and regulatory control is enhanced for seed production, marketing and importation	<ul style="list-style-type: none"> • Develop a more favourable government policy to facilitate seed potato import, including a quick release of new varieties • Develop an efficient system for seed potato certification • Review the existing laws/act in relation to the quantity of seed potato import allowed for trials (now 50 kg which is too low) • Build the capacity of government agencies such as NASC, NAQS and NRCRI to enforce regulations • Enforce registration of seed companies and facilitate good collaboration between government regulatory agencies and seed companies
2.	Private sector investment in seed potato business	
	Private companies increasingly invest in seed potato production	<ul style="list-style-type: none"> • Develop and share business cases for seed potato production and marketing • Develop capacity of private seed potato producers • With involvement of financial institutes improve conditions for access of financial services tailored to seed potato business
3.	Enhance professionalism and capacity of seed potato producers	
	Infrastructure and capacity of seed potato producers is enhanced	<ul style="list-style-type: none"> • Develop and share best practices for seed potato production • Develop technical and business capacity of private seed potato producers • Develop and avail quality inputs for seed potato production • Develop simple tools for soil testing and fertilizer recommendations for potato • Establish early warning system for factors such as control of late blight • Promote Diffuses Light Storage for seed potato producers

Crop group: Roots, tubers and bananas

Focus crop: Irish potato

#	Topic/strategy	Options
4.	Continuous variety replacement	
	New varieties continuously flow into the seed potato production and marketing system	<ul style="list-style-type: none"> • Facilitate linkages with international research programmes for new germplasm • Support the national breeding programme for ensuring a continuous flow of new and farmer preferred varieties into the system
5.	Commercial and sustainable early generation seed potato supply	
	Research institutes maintain and produce breeder and foundation seed potato in a commercial and sustainable manner	<ul style="list-style-type: none"> • Build the capacity of research staff to clean and generate early generation seed • Enhance management capacity in EGS including infrastructure and processes in a manner that will result into a commercial and sustainable EGS system • Strengthen the tissue culture laboratory for the production of clean and virus-free plantlets
6.	Professional ware potato producers	
	Farmers increasingly use best practices for potato seed selection	<ul style="list-style-type: none"> • Training of ware potato producers and extension agents on proper agronomic practices, including disease identification and control • Train farmers on positive selection allowing them to keep seed potato for few generations



Yam

RTB Crop Group

Crop group: Roots, tubers and bananas

Focus crop: Yam

National vision and relevance of the crop

The Agriculture Promotion Policy (APP, 2016–2020) considers the agricultural sector a key instrument to long-term economic growth. Yam is not considered a focus crop in APP. APP promotes private sector led business; strengthening of commodity value chains; improving market orientation through infrastructure and commodity exchanges; mainstreaming climate change measures; and implementation of nutrition interventions for vulnerable groups. Nigeria is the top producer of yam, accounting for 70% of the world's total yam production. The gross production value for yam of US\$6.2 billion in 2016 was respectively 35%, 74% and 84% higher than for cassava, rice and maize (FAOSTAT, 2019). Despite the high production level and important economic value, productivity remains limited and yam seed systems gain limited attention.

Stakeholders

- IITA and NRCRI: crop improvement, seed system research and EGS supply
- NASC: development of quality assurance (in initial stage)
- Private seed companies: EGS production and supply, seed yam production and marketing (future scenario)
- Private seed producers: seed yam production and marketing (currently all informal setting)

Predominant seed system

- Currently, yam farmers use their own seed for ware yam production. Occasionally they source seed yam through informal sources; no formal seed system is currently operational.
- YIIFSWA develops a new seed yam system where in a relatively short seed value chain quality seed yam is produced by a new class of seed producers and entrepreneurs. This seed system is currently piloted at a limited scale.
- Given the reproduction factor, it will take time for the new seed system to increase farmers' access to and use of quality seed of new and more productive varieties. This means that the yam seed system will increasingly include commercial components, but that farmers will remain saving and using their own seed, and continue to source seed yam through informal sources.

Programmes

- IITA implements, in collaboration with NRCRI, the YIIFSWA II project, which seeks to develop a functional, commercial seed yam system
- IITA and NRCRI are also involved in a crop improvement programme

Crop group: Roots, tubers and bananas

Focus crop: Yam

Crop and seed projections

Crop data	Metric	2010	2015	2020	2025	2030
Crop area	M ha	2.90	5.40	5.00	5.43	5.43
Production	M mt	37.30	45.70	50.00	62.50	78.13
Productivity	mt/ha	13.00	8.40	10.00	11.50	14.38
Seed data	Metric	2010	2015	2020	2025	2030
Yam area	M ha	2.90	5.40	5.00	5.43	5.43
Seed yam demand	M plants			10,000	10,870	10,870
Seed yam production	%			0%	1%	10%
Seed yam production	M plants			-	109	1,087
Seed yam gap	%			100%	99%	90%

Assumptions crop data and projections

- Data of 2010 and 2015 are from FAOSTAT
- Production = demand, i.e. all that is produced is also sold
- Increase in product demand is 25% in 5 years
- Increase in average productivity due to new seed system from 2020-2025 of 15%; and from 2025-2030 of 25%
- Other data based on YIIFSWA

Assumptions seed data and projections

- Calculations are based on the new yam seed system
- Seed yam plants/ha: 10,000
- Replacement rate: once in 5 years
- Annual replacement need: 2,000 plants/ha per year
- Seed yam production as percentage of demand in 2020: 0%
- Seed yam production as percentage of demand in 2025: 1%
- Seed yam production as percentage of demand in 2030: 10%

Crop group: Roots, tubers and bananas

Focus crop: Yam

Challenges

- By value, yam is one of Nigeria's major commodities.
- The growth and development of yam as food crop is, however, constrained by a series of factors.
- Production systems are not sustainable in terms of soil fertility management, natural resources and land use; they push boundaries in the transformation of forest land into temporary yam production plots.
- Farmers' access to and use of quality seed yam of improved and more productive varieties is limited, as is the use of agronomic practices that are required for enhancing its sustainability.
- Commercial seed systems are limited in their capacity to disseminate new and improved varieties.
- Within the current policy framework for agricultural development, yam and yam seed systems gain limited attention.
- Through the pioneering work of the YIIFSWA project, a new yam seed system is piloted at an experimental scale.
- A major challenge is to bring this system to scale including aspects of varietal development, commercial and sustainable production and supply of seed yam EGS, commercial production of seed yam through a new group of seed yam producers and entrepreneurs engaged in marketing quality seed yam.
- These challenges are coupled with a need to raise awareness among ware yam producers and enhance their capacity in production, and if available, increase their use of quality seed yam, combined with good agronomic practices.
- For this to be successful, it is required that within the larger policy framework for agricultural development, ware yam production systems and yam seed systems gain attention and support, combined with promoting innovation and entrepreneurship within the culture of yam.

Crop group: Roots, tubers and bananas

Focus crop: Yam

#	Topic/strategy	Options
1.	Policy support	
	Agricultural development policies give attention to the specific needs for yam production and yam seed systems	<ul style="list-style-type: none">• Recognize yam as a focus crop within FMARD policies and strategies• Develop and implement policies that take an integrated approach to yam seed system development, which includes research and development, EGS production and supply, seed production and marketing, and seed quality assurance• Develop a set of incentives required to support the new yam seed system to reach scale
2.	Culture of yam	
	Traditions and culture associated with yam production and seed use allow and support innovation and an entrepreneurial approach for yam seed systems	<ul style="list-style-type: none">• Design and conduct behaviour change campaigns on yam seed use using various forms of mass media, and supporting stakeholder and community dialogues
3.	Yam varieties	
	Improved and farmer-preferred yam varieties are increasingly available and used	<ul style="list-style-type: none">• Promote the use of existing farmer-preferred varieties and conduct research to improve them• Link research with yam seed entrepreneurs in the development of variety profiles• Develop promotion strategies to increase the uptake of improved yam varieties
4.	Yam EGS	
	Early generation seed yam is increasingly available for seed yam producers	<ul style="list-style-type: none">• Promote investment of private sector/seed companies in new technologies for yam EGS production and supply• Enhance the technical and business capacity of the private sector in yam EGS production and supply

Crop group: Roots, tubers and bananas

Focus crop: Yam

#	Topic/Strategy	Options
5.	Seed yam producers & entrepreneurs	
	A new and growing class of technically capable and commercial yam seed producers/entrepreneurs produce and market quality seed yam of improved varieties	<ul style="list-style-type: none">• Develop a convincing business case and create awareness of the business opportunity of seed yam entrepreneurship• Develop and facilitate networks of yam seed entrepreneurs for technical and business capacity development, access to EGS, access to finance, variety and seed promotion and marketing• Enhance the technical and business capacity of the private sector in yam seed production, post harvest management, storage and marketing• Develop and implement financial products and services for yam seed entrepreneurship including loans for infrastructural investments• Promote seed business as career opportunity in universities
6.	Farmer awareness	
	Farmers increasingly use quality seed yam of improved varieties	<ul style="list-style-type: none">• Conduct multi-locational field demos and farmers field days• Trigger the business case for yam producers motivating their investment, use of seed yam and sustainable production systems• Enhance the capabilities of field level extension and commercial agents on yam seed, production and business aspects
7.	Sustainable yam production systems	
	Yam production systems are increasingly transformed into sedentary and sustainable production systems, resulting in a reduction of forest clearance and reduced use of unsustainable practices	<ul style="list-style-type: none">• Develop sustainable yam production systems including soil fertility management• Create awareness and build capacity among farmers on good agronomic practices and other aspects contributing to sustainable production systems



**Cowpea &
Groundnut**
Legume Crop Group

Crop group: Legumes

Focus crops: Cowpea and groundnut

National vision and relevance of the crops

The Federal Government of Nigeria launched the Agricultural Transformation Agenda (ATA) to attract private sector investment in agriculture, add value to local agricultural produce, and develop rural infrastructure. The ATA set out to create over 3.5 million jobs along the value chains of the priority agricultural commodities. Soybean features heavily in this agenda due to its importance as a component of livestock feed. The ATA has the ambition to return Nigeria to its position as the world's leading exporter of groundnuts. Cowpea is Nigeria's major legume crop covering 3.6 million ha in 2015; groundnut is also important covering 2.8 million ha in 2015. Over the past years, the soybean area doubled reaching 605 thousand ha in 2016, reflecting the growing livestock sector in the country.

Stakeholders

- IITA: crop improvement and EGS supply of cowpea/soybean & ICRISAT for groundnut
- IAR/ABU: crop improvement
- Companies: >20 companies produce & market cowpea seed
- Community based seed producers: organized groups of farmers produce quality seed of legumes, either for informal markets or formal markets (company out-grower schemes)
- NASC: seed quality assurance
- Government: support to legume value chains at federal and state level

Predominant seed system

Farmers primarily use farm-saved seed and source seed from informal/local markets. Because of the crop reproduction system and low multiplication factor, cowpea and groundnut are less attractive to seed companies. Few groups of organized farmers produce quality legume seed; quantities are much lower than in neighbouring countries such as Burkina Faso and Niger. For soybean, farmers irregularly source certified seed from seed companies. Institutional buyers, through soybean value chain programmes, take a fair share of the seed market. Seed companies source soybean and cowpea varieties from research organizations, especially IITA. Due to the crop biology and seed multiplication rate, EGS production is not profitable and public investment in its production is required. Seed companies work with seed producers for the production of certified seed. Even though a gradually growing commercial sector develops for legumes, the predominant seed system remains informal.

Programmes

- BMGF through TLIII crop development and seed system programme with IITA and ICRISAT; incl. cowpea and groundnut
- USAID through FtF invests in soybean and cowpea seed systems
- USAID and BMGF are investing and exploring ways to strengthen the commercial supply of legume EGS through PPPs; IITA is taking the lead

Crop group: Legumes

Focus crop: Cowpea

Crop data and projections

Crop data	Metric	2010	2015	2020	2025	2030
Crop area	M ha	2.86	3.64	3.40	3.32	3.53
Production	M mt	3.37	2.31	3.40	3.98	5.29
Productivity	mt/ha	1.18	0.63	1.00	1.20	1.50

Assumptions

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Estimated crop area in 2020 is 3.4 M ha
- Increase in demand for 2020-2025 is 17%; and for 2025-2030 is 33%
- Estimated productivity in 2020 is 1.0 mt/ha
- Increase in average productivity for 2020-2025 of 20%; and for 2025-2030 of 25%

Seed data and projections

Seed data	Metric	2020	2025	2030
Crop area	M ha	3.40	3.32	3.53
Seed demand	k mt	9.71	26.52	47.03
Seed production	%	20%	25%	30%
Seed production	k mt	1.94	6.63	14.11
Gap	%	80%	75%	70%

Assumptions

- Seed rate for 2020 is 20 kg/ha; and for 2025 and 2030 is 40 kg/ha
- Seed replacement rate is once per 7 years in 2020; once per 5 years in 2025; and once per 3 years in 2030
- This results in an annual seed replacement need of 2.9 kg/ha for 2020; 8.0 kg/ha for 2025; and 13.3 kg/ha for 2030
- Seed production as percentage of demand in 2020 is 20%; in 2025 is 25%; and in 2030 is 30%

Crop group: Legumes

Focus crop: Groundnut

Crop data and projections

Crop data	Metric	2010	2015	2020	2025	2030
Crop area	M ha	2.79	2.80	2.69	2.63	2.55
Production	M mt	3.80	3.47	3.50	4.45	5.60
Productivity	mt/ha	1.36	1.24	1.30	1.69	2.20

Assumptions

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Note that groundnut is not a priority crop for the Nigerian government
- Estimated production in 2020 is 3.50 M mt, which is almost similar to groundnut production in 2015
- Increase in production/demand for 2020-2025 is 27%; and for 2025-2030 is 26%. This adds to a total production increase of 60% over 2020-2030.
- Estimated productivity in 2020 is 1.30 mt/ha; which is a bit higher than 2015, but lower than 2010
- Increase in average productivity for 2020-2025 of 30%; and for 2025-2030 of 30% also. One of the reasons is the current introduction of new high yielding varieties.

Seed data and projections

Seed data	Metric	2020	2025	2030
Crop area	M ha	2.69	2.63	2.55
Seed demand	k mt	34	53	89
Seed production	k mt	2.0	5.3	22.3
Seed production	%	6%	10%	25%
Gap	%	94%	90%	75%

Assumptions

- Seed rate for 2020 is 50 kg/ha, for 2025 is 60 kg/ha and for 2030 is 70 kg/ha; this is shelled groundnut
- Replacement rate for quality seed is once per 4 years in 2020; once per 3 years in 2025; and once per 2 years in 2030
- This results in an annual seed replacement need of 12.5 kg/ha for 2020; 20 kg/ha for 2025 and 35 kg/ha for 2030
- Note that currently 80% of the seed is bought from informal markets, which is not considered quality seed. Next to seed companies, also community-based seed production schemes provide quality seed to farmers.
- Quality seed production as percentage of demand in 2020 is 6%; in 2025 is 10%; and in 2030 is 25%
- Strategies to increase quality seed production include the promotion of community-based seed production schemes; this is currently discussed with the government.

Crop group: Legumes

Focus crops: Cowpea and groundnut

Challenges

- Farmers have limited awareness on legume varieties and appropriate cultivation practices including preventive measures for diseases. This results in a low productivity and production. Farmers have a limited knowledge on varieties for their agro-ecological conditions. Inadequate extension services impact legume crop production.
- Quality seed of improved varieties of legume crops is hardly available to farmers; if available, the seed price is considered too high. The latter is particularly relevant to groundnut, for which seed production is very expensive; farmers even consider farm-saved seed of this crop expensive. Farmers continue to use farm-saved or locally sourced seed of legume crops, which results in a slow process of adoption of new varieties, or variety replacement. Demand for varieties with resistance to pests and diseases is high, but the seed sector is slow in getting quality seed of the new varieties to farmers. This results in low productivity increases as compared to cereals.
- Seed production and processing are constrained through the lack of good storage facilities, proper bags/sacks and proper post-harvest management, which results in insect attacks. Loss of seed viability of soybean and cowpea, and bulkiness of groundnut further hamper the development of commercial and formal seed systems.
- Markets for legume grains are unstable in relation to price, demand and supply; moreover, they are highly fragmented. This results in a limited interest of the private sector to invest in legume crops. This, together with the self-pollinating nature of the crops and low reproduction factor results in seed companies producing and marketing quality seed of improved legume varieties only to a limited degree. Seed companies basically treat these crops as complementary to their cereal crop portfolio.

Crop group: Legumes

Focus crops: Cowpea and groundnut

#	Topic/strategy	Options
1.	Limited capacity in seed production and processing	
	Seed production, processing and storage infrastructure is enhanced	<ul style="list-style-type: none">• Establish modern centralized storage facilities• Develop localized storage facilities for community-based seed production• Sustain decentralized availability of foundation seed, as a quality input to seed production• Promote mechanized post-harvest processing systems that will reduce problems post-harvest; hiring schemes for community based seed production may be developed
2.	Unstable markets & limited interest of the private sector	
	Legume markets are stabilized and the private sector is involved	<ul style="list-style-type: none">• As a policy intervention the government may buy back grain when there is surplus, to keep farmers engaged in the business – no market for grain is no market for seed• Diversify cowpea uses to increase the market for the product and the seed (go beyond solely domestic use)• Develop strong grain aggregation centres to reduce market fragmentation
3.	Lack of improved varieties	
	A wide portfolio of high yielding legume varieties resistant to pests and diseases has been developed and is available to farmers	<ul style="list-style-type: none">• Keep investing in the development of high yielding pest and disease resistant varieties• Create awareness of farmers on new varieties through on-farm demonstration trials• Make new legume varieties available to farmers through community-based seed production schemes

Crop group: Legumes

Focus crops: Cowpea and groundnut

#	Topic/strategy	Options
4.	Limited availability of early generation seed	
	Sufficient EGS is available to legume seed producers and seed companies	<ul style="list-style-type: none">• Develop public-private partnerships for the production of EGS of new improved legume varieties• Develop capacity of seed companies to produce quality EGS• Develop a business model for a sustainable EGS enterprise• Involve professional seed producers in EGS of legume crops• Develop a system for EGS demand forecasting
5.	Farmers not aware of varieties and appropriate practices for legume production	
	Legume productivity is increased through farmers' use of new improved varieties and appropriate cultivation practices	<ul style="list-style-type: none">• Develop communication materials to inform farmers on new varieties and their suitability to different agro-ecological conditions• Demonstrate new varieties widely to increase farmer awareness• Provide farmer extension on appropriate agronomic practices, including planting technologies and preventive measures for pests and diseases



**Tomato &
Onion**
Vegetable Crop Group

Crop group: Vegetables

Focus crops: Tomato and onion

National vision and relevance of the crops

The Agriculture Promotion Policy (APP, 2016–2020) prioritizes improving productivity and export markets for several crops including fruits and vegetables. Emphasis is on issues like the reduction of post-harvest losses. APP aims to support closing the gap by partnering closely with private investors across companies and farmer groups to develop end-to-end value chain solutions. The production area for vegetables was relatively stable over the last decade. The key crops in terms of volume produced are tomatoes, okra and onion. Most tomatoes (43%), peppers (36%) and onions (50%) are produced in Kaduna and Kano States. The yield of most vegetable crops in Nigeria is at or below the average of Western Africa. Vegetables are generally sold through traditional informal markets. Vegetables are considered a standard element of meals, however, the diversity, both in terms of types of vegetables consumed and degree of processing is limited. Tomato accounts for almost one fifth of vegetable consumption.

Stakeholders

- NIHORT: horticultural research and variety release
- Private companies: import of quality seed, which is marketed through agro-dealers and other channels
- Vegetable seed is a side activity of most companies
- NASC: working on standards for crops such as onion to support processing and export
- East-West Seed company: global vegetable seed company with local presence; also involved in variety demonstration and farmer training
- Limited extension capacity on horticulture

Predominant seed system

Farmers' use mainly commercial seed obtained through both agro-dealers and informal seed traders. Seed companies source their seed from international companies; they do not engage in seed production of global vegetables such as tomato, onion and hot pepper. The varieties currently used are mainly OPVs. Seed prices are low, and the varieties in the market are relatively old and do not have specific resistances or other quality traits. The current vegetable seed system is a combination of both formal and informal seed systems.

Programmes

- Seeds4Change (NABC) supports the development of the vegetable sector in Kano by the provision of high quality inputs, including hybrid vegetable seeds, combined with training on improved cultivation practices
- The SDG Partnership implemented by East-West Seed and partners aims to enhance vegetable production in Kano and Kaduna states
- Horticultural activities do take place in several states as part of nutrition programmes
- In few cases, production of tomato paste supports the development of farmer aggregation schemes, however, many of us such schemes are not yet sustainable

Crop group: Vegetables

Focus crop: Tomato

Crop and seed projections

Indicator	Metric	2010	2015	2020	2025	2030
Production	m mt	1.80	4.23	5.07	6.09	7.31
Productivity OPV	mt/ha			3.00	3.50	4.00
Productivity hybrid	mt/ha			12.00	20.00	35.00
Area	m ha	0.27	0.56	1.06	0.72	0.41
Area OPV	%			80%	70%	55%
Area hybrid	%			20%	30%	45%
Area OPV	m ha			0.85	0.50	0.22
Area hybrid	m ha			0.21	0.22	0.18
Seed demand						
OPV seed demand	Kg			126,870	75,672	33,587
Hybrid seed demand	Kg			31,718	32,431	27,480

Assumptions crop and seed data and projections

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Increase in production/demand is 20% every 5 years
- Seed rate for OPVs is 300 g/ha
- Seed replacement for OPVs is every 2 years
- Annual seed replacement need for OPVs is 150 g/ha
- Seed rate for hybrid varieties is 150 g/ha

Crop group: Vegetables

Focus crop: Onion

Crop and seed projections

Crop data	Metric	2010	2015	2020	2025	2030
Crop area	M ha	0.18	0.43	0.43	0.38	0.40
Production	M mt	1.35	1.00	1.00	1.50	2.00
Productivity	mt/ha	7.48	2.30	2.35	4.00	5.00

Seed data	Metric	2020	2025	2030
Crop area	M ha	0.43	0.38	0.40
Seed demand	mt	128	281	599
Seed production	mt	20	50	75
Seed production	%	16%	18%	13%
Gap	%	84%	82%	87%

Assumptions crop data and projections

- Data from FAOSTAT for 2010 and 2015
- Production = demand; i.e. all that is produced is also sold
- Estimated production in 2020 is 1 million mt
- Increase in demand for 2020-2025 with 50%; and for 2025-2030 with 33%
- Estimated productivity in 2020 is 2.35 mt/ha
- Considering that the yield potential for OPVs is 15 mt/ha and for hybrids is 30 mt/ha, increase in average productivity for 2020-2025 to 4.00 mt/ha; and for 2025-2030 to 5.00 mt/ha

Assumptions seed data and projections

- Seed rate is 3.0 kg/ha
- Quality seed replacement rate is once per 10 years in 2020; once per 4 years in 2025; and once per 2 years in 2030
- Annual quality seed replacement need is 0.3 kg/ha in 2020; 0.75 kg/ha in 2025; and 1.5 kg/ha in 2030
- Estimated quality seed production potential, mainly import, in 2020 is 20 mt; in 2025 is 50 mt; and in 2030 is 75 mt

Crop group: Vegetables

Focus crops: Tomato and onion

Challenges

- Current agronomic practices, marketing systems and value chain functioning illustrate that the horticultural sector and vegetable production are not well developed
- Farmer awareness on quality seed and good agricultural practices is limited, which results in low productivity and seasonal production, and low profitability for farmers
- In this setting, farmers have limited awareness on the use of quality seed and improved varieties for tomato and onion. They purchase seed regularly, but most varieties are OPVs, and seed is farm-saved seed or seed from informal sources.
- Private sector investment and distribution networks in the field of vegetable seed are limited. Vegetables are a side business for seed companies. They obtain seed from international companies, which results in a vulnerable business model, in which they are dependent on the provision of large quantities of seed of single varieties that are repackaged and put into the market.
- Due to the low seed prices, varieties with specific traits for resistance and quality traits are not available. Farmer's willingness to pay for improved varieties, though available through international companies is also limited. Release of new varieties is costly and complex, and the seed market is too small for global and local seed companies to make this investment for a large portfolio of varieties. The common local seed repackaging practices are also associated with a risk for fake seed to enter the market.
- Government research and extension has limited attention for horticulture; private sector and few projects are currently taking up this responsibility to a limited extent.
- Limited attention to horticulture results in a poor seed enabling environment with limited law enforcement, fake seed in the market, cumbersome and complex procedures in variety release and obstacles in the import of seed.

Crop group: Vegetables

Focus crop: Tomato

#	Topic/strategy	Options
1.	Current practices, marketing systems and value chain functioning	
	Improved profitability for farmers	<ul style="list-style-type: none"> • Provide farmers with the technical know-how to create interests and justify investment in the purchase of inputs including quality seed • Enhance tomato value chain functioning to increase profitability of tomato production
2.	Farmer awareness on tomato varieties	
	Farmers are aware of tomato varieties	<ul style="list-style-type: none"> • Increase profitability of tomato, to encourage farmers to invest in the relatively expensive tomato seed, and to reduce farm-saved seed practices for this crop • Increase farmers' awareness on the advantages of hybrid seed and discourage farmers use of hybrids for the production of farmer-saved seed
3.	Seed company business model	
	Sustainable business model of seed companies in marketing vegetable seed	<ul style="list-style-type: none"> • Strengthen relationships between local and international tomato seed suppliers • Strengthen marketing for tomato seeds
4.	Accessibility varieties with specific traits	
	Varieties with specific traits are accessible and affordable	<ul style="list-style-type: none"> • Ensure that farmers and local seed companies get access to varieties with disease resistance, and new quality traits like longer shelf life • Raise farmer awareness on the advantages of varieties with new traits

Crop group: Vegetables

Focus crop: Tomato

#	Topic/strategy	Options
5.	Attention to horticulture in research and extension	
	Government research and extension give attention to horticulture	<ul style="list-style-type: none">• Increase technical and infrastructural capability of public research in horticulture• Increase technical and infrastructural capacity for variety release, increasing efficiency of the process• Increase technical capacity in horticulture of government extension agents
6.	Seed enabling environment	
	Seed enabling environment addresses horticulture (law enforcement, variety release, seed import)	<ul style="list-style-type: none">• Facilitate inclusion of specific needs of the vegetable seeds sector in seed policies and regulations to enhance the sector's growth• Ensure enforcement of seed laws to battle fake seed• Increase penalties for fake seed sales to levels that discourage engagement in fake seed business• Install a zero duty on seed similar to other agricultural inputs, allowing to reduce the vegetable seed prices• Improve transparency and efficiency in seed importation to reduce delays, and ensuring timely availability of vegetable seed to farmers

Crop group: Vegetables

Focus crop: Onion

#	Topic/strategy	Options
1.	Farmer awareness	
	Farmer awareness on quality seed & good agricultural practices	<ul style="list-style-type: none"> • Sensitization on the use of quality seed by government agencies, seed companies and NGOs, by electronic and printed media • Organization of training workshops, seminars, etc. for farmers and farmer groups • Setting up of demonstration plots by seed companies and research institutes
2.	Fake seed	
	Presence of fake seed	<ul style="list-style-type: none"> • Education on how to identify fake seed, both for farmers and agro-dealers • Scale innovative technologies to implement seed regulations (e.g. scratch code technology implemented by NASC) • Employment of self regulation strategies by seed companies
3.	Horticultural extension	
	Inadequate farmer extension services	<ul style="list-style-type: none"> • Increase the extension worker to number of farmers ratio • Ensure regular training of extension workers • Encourage the private sector to become engaged in extension

Crop group: Vegetables

Focus crop: Onion

#	Topic/strategy	Options
4.	Demand for vegetable quality seed	
	Limited demand for vegetable quality seed	<ul style="list-style-type: none">• Inform and advertise through media• Establish demonstration plots• Provide farmers with small free seed testing samples• Train farmers on the technicalities of vegetable production• Establish irrigation facilities
5.	Private sector investment and distribution networks	
	Limited private sector investment; and distribution network	<ul style="list-style-type: none">• Implement Plant Variety Protection to aid plant breeding and seed production in-country• Ensure availability and affordability of quality seed by creating local employment through out-grower schemes• Invest more in private extension services

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