Strategy for the Development of Sustainable Seed Supply Systems in Togo

SEED SYSTEMS GROUP

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Country Snapshot

Population- 8 million

28% Agricultural share to GDP

2.65 m ha Arable land

16% Undernourished population

Age group < 15 - 41%; 15-65 -56%; > 64 - 3%

34% Agricultural employment

Climate Risk index- 106

Global hunger index- 23.9

Figure 1: Country Snapshot - Togo

Nutrition Profile

- 2018 Global Hunger Index reports "serious" levels of hunger in Togo. Limited access to nutritious food is exacerbated by lack of reliable information on agricultural markets. Deficiencies in micronutrients including iron, vitamin A, and iodine are a result of inadequate food consumption
- Seed shortages, poor weather, low productivity, soil degradation, irregular rains, postharvest losses, and cyclical climate shocks such as flooding and droughts have resulted in low yields of crops, which contribute to hunger in the country

Food insecurity	Nutrition	Dietary diversity	Average per capita Fruits & Vegetable intake
• About 32.2% of population affected by food insecurity • Poverty rate-55.1 %	• < 5 stunting-27.6% • <5 wasting- 6.6% • Anaemia in women of 15-49 yearsage -48.9 %	• 72% of energy source derived from cereals, roots and tubers representing low dietary diversity	• 26.1 and 76. 1 g/ day against recommended guidelines 200-250g/day

Figure 2: Nutritional Profile - Togo

Crop Profile

Major food crops cultivated in Togo are cereals (maize, sorghum, millet, and rice), legumes (cowpea, groundnut, and soy- bean) and roots and tuber crops (yams, cassava, and potatoes) (Figure 3).

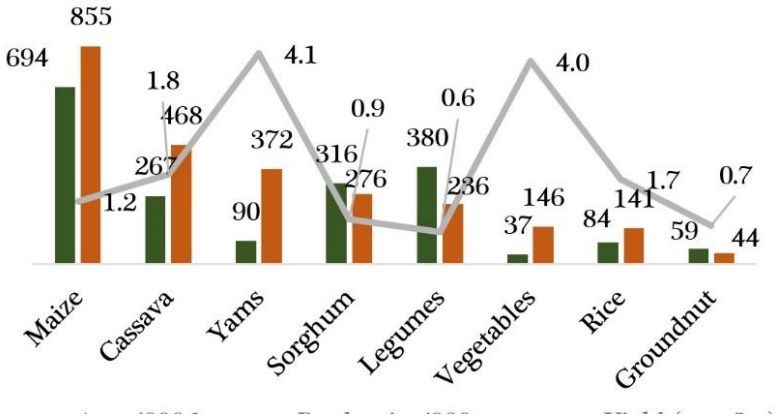

Figure 3: Crop Profile (2017) - Togo

In 2018, maize represented 66% of the total production of cereals with a harvested area representing 61%, making it the most cultivated staple food crop among the cereals (71% of the area under maize cultivation is of the variety IKENNE 9449 SR, released nearly 40 years ago). Although large amounts of soybean are produced in the country, it is mostly used as raw material for processing and does not figure as a staple food crop. Soybean variety TGX1910-14F is widely adopted and production has increased as result of new varieties introduced from Ghana. Vegetables like okra, cabbage, brassicas, tomatoes, and peppers are grown in the coastal and dry savannah regions of the country.

Figure 4 indicates that the yields of key crops in the country are stagnant: maize at 1.2 mt/ ha and rice at 1.7 mt/ha. Similar trends have also been observed for other crops. The government's efforts from 2010- 2015 to revive agricultural production in order to ensure food security for the population resulted in a 6% increase in annual agricultural growth in 2015.

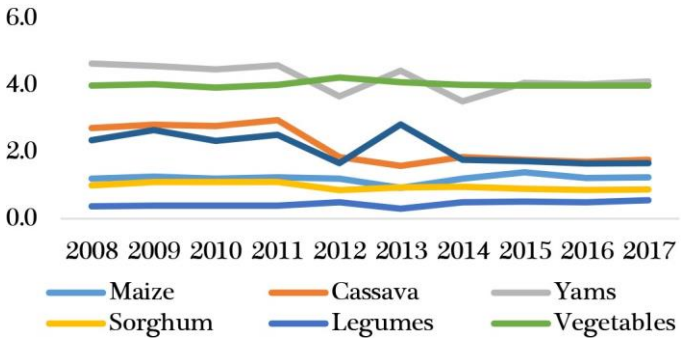

Figure 4: Yield Trends (tons/ha) - Togo

However, the increase in food crop production observed from 2010, with the exception of rice, was mainly due to the increase in areas under cultivation and not an increase in

productivity. Nevertheless, there exists a strong will of public authorities to dynamize seed sector in order to boost agricultural production, taking advantage of the favorable agro-ecological conditions in the country. The effort put forward by the government and other technical and financial support agencies during the period 2010-2015 permitted the seed sector to:

- Adopt a legal and regulatory framework based essentially on ECOWAS/UEMOA seed regulations;
- Organize all seed multipliers into a national network;
- Have official quality control and seed certification service.

Breeding, Variety Development, and Release

Togolese Agricultural Research Institute (ITRA) Lomé is the main public institute focused on varietal testing, release, and basic seed production of maize, soybean, groundnut, sesame, and rice. ITRA operates research centers in each of the country's four agro-ecological zones known as Centers of Excellence for Research in Agriculture (CRA).

Currently, however there are no varietal development programs ongoing at ITRA. Togo's agriculture is characterized by a low rate of adoption of improved seeds (15%), low rate of fertilizers applications (only 33.5% of food crops cultivated area are fertilized), and a low level of mechanization (174 tractors, or about seven tractors per 100,000 farmers). Generally, there is low adoption of improved crop varieties in the country which is one of the main reasons for extremely low crop productivities.

Table 1: The Adoption Level of Improved Varieties for Maize, Rice, and Sorghum in Togo, 2012

Crop	Improved varieties	Adoption rate, %
Maize	Ikenne 9449 SR	71
	Obatanpa	7
	AB11	8
	ACR97TZL	1
	TZEE W POP STR	0 (not estimated)
	Others	13
Rice	IR841	37
	TGR	13
	NERICA	16
	Others	34
Sorghum	Sorvato 1	12
	Sorvato 28	7
	Local varieties	9
	Others	72
Millet	No improved variety used	No available data
Cowpea	Vitoco	No available data
	Vita 5	
	TVX 1850-01E	
Groundnut	RMP 12	No available data
	TS 32-1	
	ICIAR 19 BT	
	ICGV 01276	

Three higher education institutions also conduct agricultural R&D. All three are at the University of Lomé (UL), mostly focused on academic research. 81% of university agricultural scientists have doctorate degree compared to only 16% in ITRA. There are no postgraduate training programs at ITRA, thereby limiting the capacity to upgrade the skills of human resources. There are insufficient financial resources for field and laboratory research and lack of infrastructure to conduct research activities at ITRA.

Togo has limited capacity to develop new varieties. No new varieties have been released in the past three years. The majority of varieties cultivated in the country are 20-30 years old. ITRA employs one rice, one soybean, and two rice breeders, but there is limited capacity to develop new varieties of any crop. ECOWAS approved maize hybrids from IITA, Ghana, and Mali have been imported, validated, and marketed in the country. Rice varieties from Ghana and hybrids from AfricaRice and Advanta are also available for field validation trials and marketing. Groundnut from Senegal and Niger are available, as are soybeans from Nigeria and Ghana. Yellow and white maize hybrids are being imported with help from West Africa Agricultural Productivity Program (WAAP). There are 25 hybrids from IITA available from the ECOWAS approved list, and SeedCo hybrids namely, 'SC 649' and 'SC 719' are being tested by Togosem. Rice hybrids (4 from AfricaRice and 2 from Egypt) are being evaluated.

The Ministry of Agriculture is committed to shifting its maize crop to hybrids and has fast-tracked testing and release of several hybrids developed in Ghana. TGX-1910-14 and TGX-1448-2e, developed in the 2000s, are the preferred soybean varieties.

Seed companies operating in the country include ETS LE PASYAN, Abe Solo-Seeds Company, ON- FITH, STIEA, Togo Semence/Technisem, and Daily Bread of the Youth of Kara. These companies don't have breeding or seed processing centers, however, ETS LE PASYAN and Daily Bread of the Youth of Kara want to conduct hybrid maize trials. Pasyan is testing hybrids and aims to begin producing hybrid seed by 2020. Seed Co is also testing seed of their maize hybrids in several locations of the country.

The most important limiting factors for the success of the crop breeding programs in Togo are the insufficient number of breeders (due to the inability of the government to replace retired breeders), the lack of adapted infrastructure, and an inadequate training and educational system. The lack of financial resources for field and laboratory experiments is also a major constraint.

The scientific level of ITRA's research personnel has increased, although still insufficient. There is currently at least one PhD holder in each of the food crop breeding programs. A total of 11 researchers with PhD or MS are involved in breeding food crops except for fonio and yam. ITRA has established five breeding programs that deal with major food crops:

- Maize breeding program with two breeders (one PhD and one MSc);
- Rice breeding program with one PhD holder;
- Sorghum, millet, and fonio breeding program with one PhD holder breeder and one agronomist;
- Legumes and sesame breeding program with one PhD holder breeder and one agronomist;
- Cassava and other root crop breeding program with one breeder (PhD student) and two biologists (one MSc and one PhD student);
- Yam and taro breeding program with only one MSc student.

Proposed Interventions

- Maize, soybean, and cowpea varieties and hybrids will be introduced and the varieties with competitive yield levels will be released for commercial production
    - *Maize*: Yellow maize hybrids with the yield potential of 7-8 times over current productivity will be sourced from private companies, IITA and Cameroon. 25 ECOWAS registered maize hybrids from IITA will be tested and selected for release
    - Varieties of *Soybean* from Ghana and India (JS Series) and groundnut from Senegal and Niger will be tested
    - *Cowpea* seed demand is high, but seed access is limited. Varieties from Burkina Faso, Ghana and IITA will be introduced and tested
    - *Vegetables* – Hybrids of okra, cabbage, brassicas, tomatoes and peppers will be tested in collaboration with mid-sized global vegetable companies such as East West, Advanta, Technisem, Sakata and the World Vegetable Centre. These crops can be validated with the help of private companies for commercialization
- Enhancement of R&D capacity of four seed companies (ETS LE PASYAN, Abe Solo-Seeds Company, MONFITH and Daily bread of the youth of Kara) on hybrid development and conducting trait validation trials will be done
- Development of newly trained breeders for existing and new crops will be done by awarding fellowships to eight MS and one Ph.D. (Vegetables). Students will be trained with exchange programs with universities in Ghana, Kenya, Uganda, and elsewhere. SSG will train MS maize breeders for Togo to work with breeding programs to introduce, evaluate, and select hybrids. A recent WACCI graduate maize breeder with a doctorate will be supported to lead the maize hybrid import and testing program and eventually develop a breeding nursery. There are WACCI-trained rice and groundnut breeders who also could be integrated into the training plans. MS breeders will also be trained for hybrid development in millet and varietal development for cowpea, soybean. MS vegetable breeders will be trained for hybrid vegetable development

Seed Systems

In Togo, breeder and foundation seed is produced by ITRA, certified seed (Figure 5) is produced by the private sector. It has been suggested that private sector companies should produce foundation seed, but so far none have shown the capability.

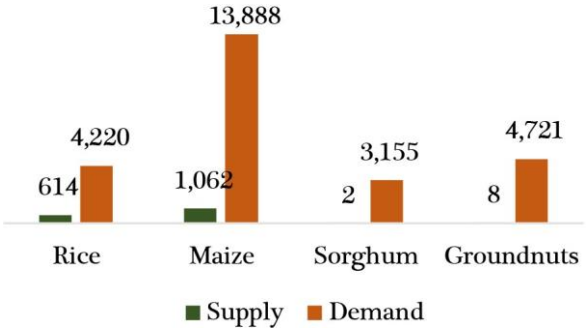

Figure 5: Supply Demand Gap (MT) - Togo

Sotoubua seed farm is an ITRA station dedicated to foundation seed production of maize, rice, soybean, and cowpea. However, the seed produced on this station is of obsolete varieties developed 30-40 years ago, and none of the maize varieties are hybrids.

Table 2: Tonnage of Certified Seed Production in Togo, 2009-2018

Year	Quantity of certified seeds (tons)						
	Maize	Rice	Sorghum	Soybean	Cowpea	Groundnut	Total
2009	353.764	176.371	3.614	0	0	0	533.75
2010	632.67	128.9	4.6	3.5	0	0	769.67
2011	713.793	369.486	5.4	44.82	0.3	0	1133.80
2012	898.68	289.353	1.1	71.1	0.15	0	1260.38
2013	1430.654	447.946	0.8	96.6	0		1976.00
2014	1674.169	750.938	10.7	155.85	1.65	1.5	2594.81
2015	1151.604	397.814	6.1	309.245	1.7	1.7	1868.16
2016	763.83	289.62	13.3	373.7	1	5.1	1446.55
2017	756.8	261.545	4	401.81	7	21.3	1452.46
2018	1061.908	613.759	1.7	716.45	0.5	7.95	2402.27

In Togo, there have always been informal introductions of small quantities of certified seeds of food crop varieties from neighboring countries which do not fall within the framework of seed trade between countries. However, significant importations of certified seeds of crops such as maize and soybean have been registered in 2019, as indicated in Table 3.

Table 3: Quantity of Certified Seeds Imported, 2019

Group	Crop	Imported quantity (MT)	Total
Cereals	Maize	27.6	**41.7**
	Rice	3	
	Fonio	11	
Legumes	Cowpea	0.1	**84.5**
	Soybean	64	
	Groundnut	9.7	
	Sesame	10.6	

At the national level, farmers with less than one-hectare account for 92% of the agricultural population. This indicates the predominance of smallholder farmers in Togo's agriculture.

Farmers have four options to access improved seeds:

- Their own production: 29% of farmers use seed derived from their own production of improved seeds. This is probably due to the lack of financial resources for annual renewal of this type of seed as recommended and by ignorance of the effects of such seeds on the varietal performance, which results in lower yields and therefore agricultural production especially for a cross-pollinated crop such as maize;
- Local market: 23% of farmers purchased their seeds in the local market;
- Modern sources: 43% obtained their improved seed supplies from extension service (16%), specialized stores (18%), NGOs / Projects (5%), or seed multipliers (4%); while
- Other farmers: 4% of farmers acquired improved seeds from other farmers

Farmer-led organizations are important seed producers in Togo. These include ESOP Semences, the National Network of Certified Seed Producers-Togo, and cooperative societies such as COOP-CA Otissan, SCOOPS of the Two Sunny Hills, SCOOPS Good Seed, SCOOPS Super Seed, SCOOPS Dakalfan, and SCOOPS Lando. Improved varieties of maize, rice, sorghum, soybeans, cowpeas, and groundnuts are the most prevalent in terms of production and marketing. Togo Semence is the main supplier of vegetable seeds, and represents Technisem in Togo. Additionally, a network of young seed producers and agricultural professionals has been set up within the Coordination Committee of Farmers Organizations and Agricultural Producers.

Private seed actors are perceived in four categories, including:

- Emerging seed companies or companies: These are ESOP-Seeds, Ets LE PAYSAN, Abé Solo-Seeds, and Daily Bread of the Youth of Kara, cooperative societies or individual companies producing and marketing seed of improved field crop varieties. These companies rely on farmers-multipliers;
- Vegetable seed supply companies: These are mostly companies importing and marketing plant protection products that also have on their shelves vegetable seeds specimens such as tomato, green chili, lettuce, carrots, cabbage, etc.;
- Multiplier farmers: The activity of producing certified seeds of food species is practiced by individual producers and organized into groups or associations. For most of these multipliers, seed activity is still secondary to other agricultural activities. Specialization in seed production is still rare;
- Individual distributors: The distribution of certified seeds is provided by individual growers-multipliers, agricultural input sales establishments, and private individuals.

The government of Togo is highly committed to developing its private seed sector, and recently donated three mobile seed processing units with 2.5 tons/hr capacity to local seed companies (ETS LE PASYAN, COOP-CA-PS-OTISAN, and Daily Bread of the Youth of Kara (founded by women entrepreneurs) as a means of increasing supply of improved seed.

Three private seed companies currently operate in Togo, producing seed of open-pollinated varieties of maize and improved varieties of soybean, and selling the seed directly to farmers and via agro-dealers, which are widely distributed in the country. There are several farmer/producer groups that sell seed to government and farmers. All of these are interested in producing and selling hybrid maize but need training and support.

Three emerging seed companies have been identified and supported recently with the donation of seed processing, treatment, and packaging units of 2.5 MT/hour capacity. In addition, a laboratory for seed quality analysis is being constructed and will be equipped with the latest facilities for quality control.

Major vegetable seed companies operating in the country — Bejo, East-West Seeds, Limagrain, Pop Variety Seeds, Sakata, and Technisem — have sales operations in Togo, with only East-West Seed and Technisem having testing locations. Farmer-led organizations, such as ESOP Semences, are important seed providers in the country. Some members of the National Network of Certified Seed Producers of Togo, and several cooperative societies, have the potential to become seed companies. Seed producer Assamati Holou produces seed of maize, rice, and soybean through 13 cooperatives on 20 hectares. Kombate produces 30-40 MT of maize seed and has 20 shops selling seed in 1 kg bags within a radius of 50 km of the farm.

Table 4: Number of Registered Agro-dealers Supplying Inputs in Togo

Name of the company	Specificity	Number of chops				
		Maritime Region	Plateau Region	Central Region	Kara Region	Savanna Region
ELISEE COTRANE	Fertilizers	19	23	40	41	29
STD	Fertilizers	4	5	12	22	11
FREDOS VANOS	Fertilizers	11	8	2	8	2
QUALITAS	Fertilizers	10	6	8	10	11
BONI SARL	Fertilizers		1	3	3	3
BIOCHEM	Fertilizers	1	2	3	2	
SPROCA	Fertilizers + Pesticides	2	3	1		2
MONFITH Sarl U	Fertilizers + Pesticides	2	1	1	1	1
STIEA Sarl	Fertilizers + Pesticides	2	1	1	1	1
ARYSTA LIFE SCIENCE TOGO-SAU	Fertilizers + Pesticides	1	1	1	1	1

Policy Advocacy

The Seeds and Plants Department (DSP) is composed of

- Twelve seed inspectors spread over the country (2 in the Maritime region, 4 in the Plateau region, 2 in the Central region, 2 in the Kara region and 2 in the Savannah region). These inspectors provide field inspection through visits to seed production plots. After field monitoring, seed samples are collected and sent for analyses in the laboratory, based in Sotouboua
- One head of the laboratory
- Two seed analysts assisting the head of the laboratory in the analyses

- The director of the department

Production of foundation seed is currently under the exclusive responsibility of the Togolese Institute for Agricultural Research (ITRA). It is mainly carried out on the station of Sotouboua in the central region for maize, rice, soybean, and cowpea; on the station of Abouda, in the region of Kara, for groundnut and sorghum; and on the station of Ogaro, in the Savanna Region, for sorghum. The foundation seed production station at Sotouboua occupies more than 400 hectares but less than 9% of the land is currently used.

Foundation seeds produced by ITRA are available to certified seed multipliers as well as private seed companies. However, most of the emerging private companies tend to source foundation seed from neighboring countries because they do not trust the quality of ITRA's seed.

Proposed Interventions

- Provide seed grant funding to six private seed companies such as ETS LE PASYAN, COOP- CAPS- OTISAN, and Daily Bread of the Youth of Kara to:
    - º Increase the capacity of quality seed production: aim to increase the quality seed production of existing varieties/hybrids and newly introduced ones by 39% of the current quality seed production
    - º Build capacity to produce hybrids seeds
    - º Support expansion of the seed distribution network: expand their reach to farmers
    - º Strengthen business entrepreneurship skills of 80 personnel through professional training courses over a period of five years
- Strengthening the basic/foundation seed production capacity at Sotouboua of ITRA
- Build public-private partnership (PPP) between ITRA and private entities to establish a strong foundation for sustainable production of basic/foundation seed of key crops
- Strengthen seed processing infrastructure: install additional capacity of 2 tons/day in the country at private sector premises
- Agro-dealer development

- Provide matching grants to 600 agro-dealers in Togo to open new outlets, refurbish or relocate shops, procure inventory supplies, and build cost effective storage units
- Capacity building of the agro-dealers on aspects related to storage, quality control and safe handling of products, and how to better manage micro enterprises through courses on bookkeeping, cash management, inventory management, quality standards, customer relations and compliance. All the 600 agro-dealers will be trained on these modules over a period of five years
- Strengthening of agro-dealer network and association building

- Extension and knowledge dissemination
  - Enabling wider adoption of improved varieties through grants to NGOs for demos, small packs, etc
  - Promotion and introduction of ICT enabled infrastructure through various stakeholders to accelerate adoption of quality seeds
- Seed policy and advocacy
  - Continued dialogue with public sector stakeholders for sensitization on national seed laws implementation and outreach methods to stakeholders, seed standards and regulations refinement and oversight of the seed delivery by national and international players and harmonization of regional policy.
  - Professional trainings will be provided to more than 80 seed inspectors on proper seed quality assessment and seed certification aspects.

Facilitate an increase in quality seed production for the key crops to 4,374 tons covering an area of 13% under quality seeds (Figure 6) at the end of five-year period, and 10,186 tons, covering 34% of the area at the end of 10 years.

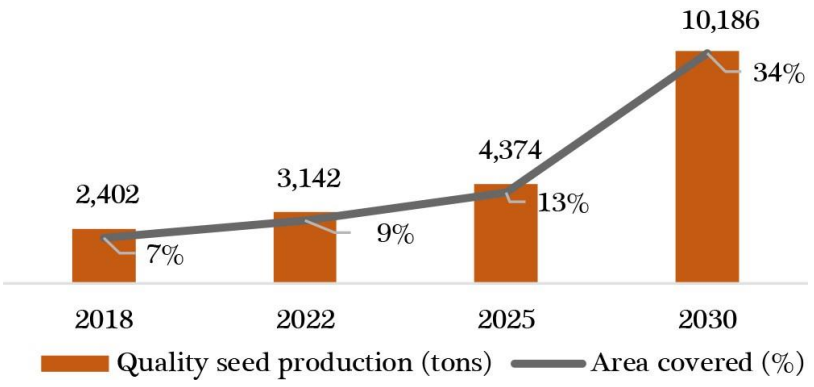

Figure 6: Projected Seed Quantity (MT) - Togo

Budget

Table 5: Togo Budget

Components	Amount (USD million)					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Component 1: Crop Variety Improvement						
NARS varietal Trials	0.19	0.19	0.13	0.00	0.00	0.50
Early generation seed production	0.05	0.08	0.00	0.00	0.00	0.12
MSc fellowships	0.11	0.11	0.07	0.00	0.00	0.28
PhD fellowships	0.15	0.00	0.00	0.00	0.00	0.15
Component 2: Seed Enterprise Development						
Grants for start-up seed companies	0.15	0.15	0.15	0.15	0.00	0.60
Multiplication support for vegetative crops	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid seed production training	0.15	0.20	0.10	0.00	0.00	0.45
Professional trainings	0.05	0.06	0.05	0.00	0.00	0.15
Component 3: Agro-dealer Development						
Grants to agro-dealer development agencies	0.30	0.30	0.30	0.00	0.00	0.90
Capacity Development (Book keeping, information dissemination, inventory management etc.)	0.01	0.02	0.02	0.00	0.00	0.04
Component 4: Seed extension						
Grants to NGOs for demos, small packs, etc.	0.42	0.32	0.00	0.00	0.00	0.74
ICT infrastructure and training support	0.25	0.00	0.00	0.00	0.00	0.25
Professional trainings	0.05	0.06	0.05	0.00	0.00	0.15
Component 5: Seed Policy and Advocacy						
Seed Policy and Advocacy (grantee and stakeholder meetings)	0.05	0.08	0.00	0.00	0.00	0.13
Professional trainings	0.02	0.03	0.02	0.00	0.00	0.06
Total	**1.92**	**1.57**	**0.87**	**0.15**	**0.00**	**4.51**