



Strategy for the Development of Sustainable Seed Supply Systems in Burundi



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Country Snapshot



Figure 1: Country Snapshot - Burundi

Nutrition Profile

- Chronic malnutrition afflicts 57% of children under five years of age, with 25.6% of young children experiencing severe malnutrition (ENSNMB, 2018).
- Burundi is classified as an alarming hunger situation by the 2014 Global Hunger Index (IF- PRI, 2014).
- Common cases of malnutrition in the country include kwashiorkor (protein deficiency) and marasmus (energy deficiency), both of which can stunt development and can be life threatening if not treated. Although women and young children are most at risk for diseases caused by malnutrition, many men are also affected.
- Nearly half of the population is at risk for insufficient zinc intake. Vitamin A deficiency impacts about 25% of children under 5 and 12% of women.

Food insecurity	Acute malnutrition
<ul style="list-style-type: none">• About 15% of population affected by food insecurity• Poverty rate- 78%	<ul style="list-style-type: none">• < 5stunting-55.9%• <5 Wasting-5.1%• Anemia in women of 15-49 years age -26.7 %

Figure 2: Nutritional Profile- Burundi



Crop Profile

The varied agro-ecological conditions in Burundi allow a variety of crops to be grown in the country. Food crops are categorized as roots and tubers (sweet potato, cassava, taro, potatoes); legumes (beans, peas); cereals (maize, rice, wheat, sorghum, finger millet); vegetables and fruits; and oilseeds (oil palm, sunflower, soybean). Major food crops of Burundi are cassava, beans, maize, rice and sorghum (Figure 3).

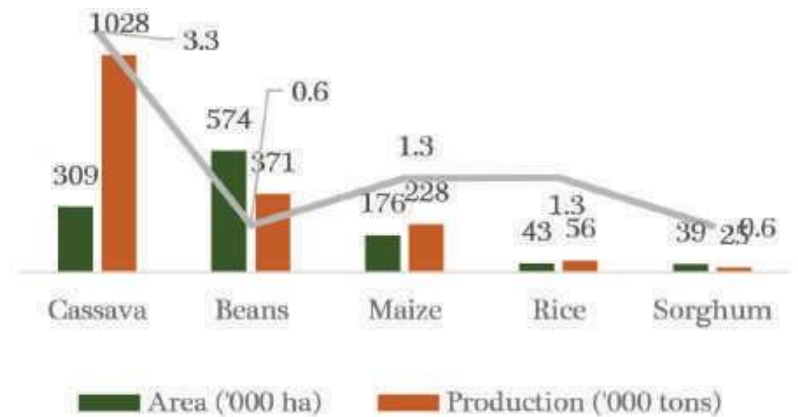


Figure 3: Crop Profile (2017) - Burundi

Cash crops occupy 10% of cultivated land and include coffee, tea, cotton, palm oil, sugarcane and tobacco.

Table 1 and Figure 4 shows the trend in yield of crops cultivated in Burundi. The yield of rice decreased from 3.2 tons/ha (2008) to 1.9 tons/ha (2017) and sorghum yields have decreased from 1.3 tons/ha (2008) to 0.6 tons/ha (2017).

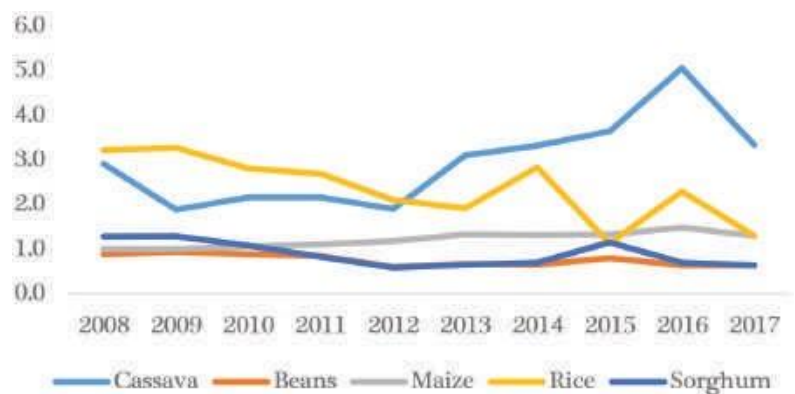


Figure 4: Yield Trends (tons/ha) - Burundi

In 2017, the yields of maize (1.3 tons/ha), and cassava (3.3 tons/ha) were very low compared to global averages for maize (5.74 tons/ha), and cassava (12.8 tons/ha).



Table 1: Crop production in Burundi and their respective yield between 2013 and 2019

Crops	Cropping year 2013-2014			Cropping year 2018-2019		
	Cropped area (ha)	Production (in tons)	Yield (kg/ha)	Area cropped (ha)	Production (in tons)	Yield (in kg/ ha)
Maize	97,242	127,829	1,315	270,755	270,813	1,000
Sorghum	32,254	22,354	693	15,809	8,851	560
Rice	23,730	67,377	2,839	53,497	209,245	3,911
Finger Millet	5,254	3,084	587	18,375	10,158	553
Wheat	9,766	5,628	576	7,651	1,894	248
Bush bean	248,944	154,357	620	361,076	312,216	865
Climbing bean	131,318	97,404	742	338,317	325,510	962
Cowpeas	3,120	3,238	1,038	2,358	1,962	832
Peas	6,478	12,389	1,912	6,271	8,967	1,430
Cajanus Cajan	8,396	7,486	892	5,959	3,059	513
Banana	126,215	1,013,955	8,034	102,309	1,179,759	11,531
Cassava (bitter)	256,040	1,848,970	7,221	237,689	1,543,054	6,492
Cassava (sweet)	48,506	393,382	8,110	83,865	571,692	6,817
Sweet potato	66,029	664,217	10,059	93,578	1,023,458	10,937
Potato	24,442	181,209	7,414	53,689	376,441	7,012
Groundnut	16,708	9,296	556	14,072	12,436	884
Soybean	4,438	3,648	822	12,868	14,584	1,133
Sunflower	2,088	2,056	985	1,667	2,019	1,211

For crop varieties, farmers rely on locally produced seeds for various crops and roots and tuber cuttings taken from previous harvests. They have low performance potential and are degenerated in some cases e.g. use of seeds from previous harvests in maize cultivation yields 800 kg/ha, while that of certified seeds (composite varieties) yields 3 to 4 tons/ha, and hybrids yield 7 tons/ha (ADIS- CO, 2014).

The main causal factors of low productivity, according to the Ministry of Agriculture, Environment and Animal Husbandry (MINEGARIE), are the following:

- Inadequate purchasing power of farmers to access quality seeds
- Competitive price of traditional seeds compared to certified seeds
- Inefficient seed production value chain leads to reduced availability of certified seeds
- Insufficient information for farmers on the importance of quality seeds
- Poor information on the availability and demand of quality seeds
- Low availability of high performing varieties that meet farmer preferences



Agriculture is mostly rain-fed and subsistence-oriented. Farmers rely on traditional production technologies due in part to limited access to agricultural input and output market infrastructures. Family farms produce mainly for household consumption using family labor and few external inputs. The cropping calendar follows the rainfall patterns, with two main seasons: an eight-month long rainy season (October-May) alternating with a four-month long dry season (June-September).

A mixed cropping system has gained importance in the last few decades. Farmers prefer to grow a wide range of crops, often producing meager quantities of various crops to minimize the risk of yield variability while maximizing output diversity. Farmers seek to secure household autonomy due to the unreliability of the food market, dynamic diet preferences, and unpredictable risk (Cochet, 2001).

Most farm plots are intercropped except for plots bearing rice in the marshlands and cassava on highly degraded lands, which are usually mono-cropped. Farmers plant up to five crops on a single plot in order to cope with risks while minimizing yield variability.

Table 2: Crop combination on farm plots of Burundi

Proportion of plot (%)	Season A	Season B	Season C
Monoculture	32.1	39.5	59.8
Crop Mixture	67.9	60.5	40.2
2 crops	26.2	29.3	28.5
3 crops	23	18.8	8.9
4 crops	14.2	9.5	2.4
5 crops	4.5	2.9	0.4
Total	100	100	100

This practice protects farmers against risks of crop failures caused by adverse climatic conditions, pests and diseases while guaranteeing access to more diversified food.

Despite the intent of the National Fertilizer Subsidy Programme (PNSEB) to provide farmers access to fertilizers at low prices, the rate of fertilizer use is very low. On average, only 5.4 kg of fertilizers are applied per hectare of arable land (World Bank, 2016). Farmers rely mostly on organic fertilizers produced on their land: approximately 57% farmers used manure in 2019. Major barriers to increased fertilizer adoption is low purchasing power of the farming population and limited farmer awareness.



Table 3: Utilization of fertilizers among farm household of Burundi, Kg/ha (2018-2019).

Cropping Seasons	NPK	Urea	DAP	KCl	Lime	Manure	Others
Season A	6.5	18.8	48.2	1.5	1.7	70.3	1.9
Season B	7.6	8.6	49.5	2.0	0.9	68.2	1.3
Season C	1.7	4.0	17.3	1.3	0.2	32.4	0.1
Average	5.27	10.47	38.33	1.6	0.93	56.97	1.10

The National Agricultural Strategy 2018-2030 and related Action Plan initiated the following objectives:

- Diversify the sources of economic growth and initiate trade liberalization and privatization by improving the quality and competitiveness of production of agricultural commodities- Competitive price of traditional seeds compared to certified seeds
- Ensure better control of water management and sustainable use of natural resources
- Ensure better availability of inputs for both agricultural and livestock sectors
- Seek and develop necessary means to solve land disputes
- Strengthen agricultural research and development toward better productivity
- Foster regional specialization of crops and livestock production according to the comparative advantages
- Ensure better processing and marketing of agricultural commodities in order to grasp the advantages of regional integration prospects
- Mobilize funding and increase coordination of actions

The Private Seed Sector Development (PSSD) project is an important element of seed sector development in Burundi. PSSD launched in December 2018 with funding from the Netherlands and implementation by the International Fertilizer Development Center (IFDC). The overall goal of PSSD is to assure the availability and use of high-quality seed by establishing a commercially viable and self-governing seed sector supported by client-oriented seed services. The PSSD focuses on a number of objectives: scale-up emerging commercial seed producers; professionalize national seed traders; unlock Dutch and other international private sector expertise; and the large-scale promotion of quality seeds.

Breeding, Variety Development and Release

The Institut des Sciences Agronomiques du Burundi (ISABU) was founded in 1962 to take over research activities initiated by the Institut National pour l'Etude Agronomique du Congo-Belge, Rwanda-Burundi (INEAC). A number of rice varieties under the acronym FACAGRO were released through 2000. ISABU has taken up the breeding activities with different breeding programs such as wheat in 2014, beans in 2017, sweet potato in 2018 and maize in 2018.



Breeding activities on different crops are also being carried out by the Faculty of Agronomy and International Rice Research Institute (IRRI). In 2009, IRRI started the IRRI-FACAGRO project, which pivoted to a large-scale rice breeding program by the International Rice Research Institute in East and South Africa (IRRI-ESA) in 2013.

Table 4: Location of the ISABU research centers and seed production

Research Centers	Ecological zones	Area (ha)	Potential crops
1. Gisozi	Mugamba	15	Irish potato, maize, wheat
2. Nyakararo	Mugamba	25	Irish potato, maize, wheat
3. Munanira	Kirimiro	8	Irish potato, maize, wheat
4. Mwokora	Mugamba	35	Irish potato, maize, wheat
5. Mahwa	Bututsi	30	Irish potato, maize, wheat
6. Imbo centre	Imbo	40	Rice, Maize, Sorghum, Cassava, Sweet potato
7. Mparambo	Imbo	8	Rice, Maize, Sorghum, Cassava, Beans, Sweet potato, Soybean, Ground nut
8. Murongwe	Kirimiro	15	Maize, Sorghum, Cassava, Beans Sweet potato, Soybean, Ground nut
9. Ndebe	Kirimiro	3	Rice
10. Gasaka	Bugesera	2	Rice
11. Bukemba	Low lands	50	Rice, Maize, Sorghum, Cassava, Sweet potato, Beans, Soybean, Ground nut

ISABU is organized into three departments: one for research and two for technical support to research. The research department is comprised of more than six research programs, including one for crop production which is tasked with variety improvement and seed production. The qualification of ISABU scientific personnel involved in varietal improvement and seed production are indicated in Table 5.



Table 5: ISABU scientific personnel engaged in crop improvement (number per crop)

Crop	PhD	MSc.	BSc.	A2	A3
Beans	1	2	2	6	0
Macadamia	0	0	1	2	0
Soybean-groundnut	0	0	1	1	0
Maize	0	1	1	3	0
Rice	0	1	2	4	0
Sorghum	0	1	0	0	0
Wheat	0	0	1	2	0
Cassava	0	0	2	1	0
Potato	1	1	2	5	0
Sweet potato	0	2	1	2	1
Banana, fruits & vegetables	1	2	0	5	0
Coffee	0	1	2	5	0
Cotton & Stevia	2	0	0	0	0
Palm oil	0	0	1	0	0
Tea	0	0	0	1	0
Plant genetic resources	0	0	1	3	0

ISABU has five laboratories located in different zones:

- The *Agricultural Chemistry Laboratory (LCA)* performs analysis of soil, food products, plants, water, livestock feed, chemical fertilizers and peat. It analyses samples on behalf of ISABU research teams and also for external clients (MINAGRIE, universities, private companies, NGOs). LCA has recently acquired new equipment such as a gas chromatograph, an enzyme sugar analyzer, an extractor and filtration unit for fiber content determination, and a Kjeldahl analyzer with distillation unit. The upgraded equipment will help initiate detection and quantification of pesticides, environmental analysis and food product quality control.
- The *Plant Pathology Laboratory* focuses on identifying plant pathogens of fungal and bacterial origins by microbiological analysis, the detection of potato viruses by the 111 DAS-ELISA test, the detection of potato vascular bacteria (*Ralstonia solanacearum*) by the NCM-ELISA test, detection of cassava viruses (Mosaic and Brown Stem) and others by molecular analysis (PCR and RT-PCR).



- The **Entomology Laboratory** focuses on the identification of crop pests and pests in stored foodstuffs. These identifications constitute the basis of biological and integrated control methods. With the acquisition of a modern insectarium equipped for the collection and conservation of insects, ISABU is developing a reference collection which will build capacity in trainees from other countries of the sub-region.
- The **Plant Biotechnology Laboratory** of Gisozi carries out micro-propagation activities of vegetatively propagated crops (in vitro) such as potatoes and sweet potatoes as well as the maintenance of germplasm. The laboratory also has the capacity to work on cassava, banana and taro (*Colocasia*). The laboratory plans to develop activities on the in vitro culture of ornamental and agro-forestry plants, viral sanitation, the introduction of in vitro mutations and improvement of cultures.
- The **Seed Quality Control Laboratory** inspects seed quality marketed through various channels. The inspections are staggered according to the phases of the plants: before, during and after flowering or heading and during the harvest. Stores and seed lots are regularly inspected to maintain the quality of seeds acquired in the field through integrated management of seed stocks. Seed lots from approved fields are sampled and analyzed in the laboratory
- **Germplasm conservation room** contains deepfreezes for storage of germplasm, with back-ups stored in Switzerland for security purposes.

Faculty of Agronomy, University of Burundi (FACAGRO/FABI), currently known as the Faculty of Agronomy and Bio-Engineering (FACGRO) has its origins in the Agronomic Institute of Rwanda-Burundi established in 1958 in Rwanda. This institute was part of the Faculty of Agronomy of the Official University of the Belgian Congo and Rwanda-Burundi. After the independence of the Congo, the Agronomic Institute of Rwanda-Burundi was set up as an autonomous institution and transferred to Usumbura in September 1960. The faculty conducts research aimed at responding to farmers' needs:

- Availability and dissemination of crop and animal material adapted to agro-ecological conditions
- Development or adaptation of farming techniques and practices
- Socio-economic studies to better understand the constraints of farmers

The faculty, which conducted a crossing program on Burundi mid-altitude rice that developed some new varieties under the acronym FACAGRO, is composed of five departments: Rural Socio-Economy; Animal Health and Production; Sciences and Plant Productions; Food Science and Technology; and Environmental Sciences and Technologies.

The Department of Sciences and Plant Productions is mostly involved in crop improvement in collaboration with other departments at FACAGRO



Table 6: FACAGRO scientific personnel engaged in crop improvement

Staff category	Number of staff	Specialization
PhD	4	2 in Plant Pathology
		1 in Plant Physiology
		1 in Plant Breeding
MSc/under doctoral School	4	1 in Plant Pathology and Weeds
		1 in Molecular Biology of Bacteria and Plant Production
		1 in Plant Genetics and Breeding
		1 in Crop Improvement
BSc.	1	Agronomist
Technician	2	Agricultural technicians

FACAGRO, is conducting breeding on rice and wheat. In addition, the faculty is actively collaborating with IRRI. The faculty has recently initiated programs on seed production (maize, potatoes and sweet potatoes). All activities are intended to be supported technically, in the near future, by new and up-to-date lab equipment, which is on order.

Proposed Interventions

- Hybrids/varieties of maize, beans and cassava will be sourced from regional research programs for testing. SSG proposes to support the testing and release of 20-25 varieties and/or hybrids of selected crops over the next five years. Hybrids with competitive yield levels will be released for commercial production. Some of the key sources of yield gain potential for these crops include:
 - Maize hybrids from CIMMYT
 - Beans hybrids from NARS, Rwanda
 - Cassava from IITA
- Hybrids/varieties of maize, beans and cassava will be sourced from regional research programs for testing. SSG proposes to support the testing and release of 20-25 varieties and/or hybrids of selected crops over the next five years. Hybrids with competitive yield levels will be released for commercial production. Some of the key sources of yield gain potential for these crops include:



Seed system

Seven seed systems have been observed in the seed sector of Burundi (ISSD, 2012):

- *Family seed system* is characterized by traditional seed production and preservation practices, with bartering and marketing on local markets. This system is the basis for a large share of the agricultural production in Burundi. It is used for household subsistence and to generate income, with the exception of coffee, tea and exotic vegetables.
- *Community seed system* is made up of farmers' organizations which are supported by NGOs through emergency projects. These farmers' organizations produce seeds which are distributed or sold at a special rate among members, while the surplus is sold locally or sold to NGOs for distribution. This system mainly uses improved varieties on food and cash crops.
- *Private seed producers* include progressive farmers who specialize in the seed production and sale of seeds of food and cash crops for locally improved and imported varieties. This system combines both individual private entrepreneurs and the public services that support and work with them, in order to increase the availability of certified seeds.
- *Free distribution chain* associated with humanitarian programs. In this system, the seed comes from informal sources and is distributed for emergency use with focus on improved local varieties of food and cash crops for the different seed quality.
- *Rapid vegetative multiplication* by tissue culture in vitro. This system is focused mainly on bananas, potatoes and taro. Rapid multiplication is carried out by private or public laboratories and include the production and acclimatization of seedlings which are then distributed to farmers or sold to farmers or specialized multipliers.
- *Formal seed system* is based on a public-private partnership. Seeds of different categories are produced and distributed to farmers through public structures (national seed services). This system is based on project funding. It includes the production of improved varieties and the production of certified seeds.
- The final seed system targets *perennial cash crops* such as coffee and tea. The research is carried out for planting material and then distributed to producers.



Table 7 depicts data from ONCCS on certified seeds for eight crops for the last four years (2016-2019). These data include all the seed categories produced in Burundi. The general trend shows certified seed production increasing in Burundi. Figure 5 shows the supply-demand gap for certified seeds in

Burundi.

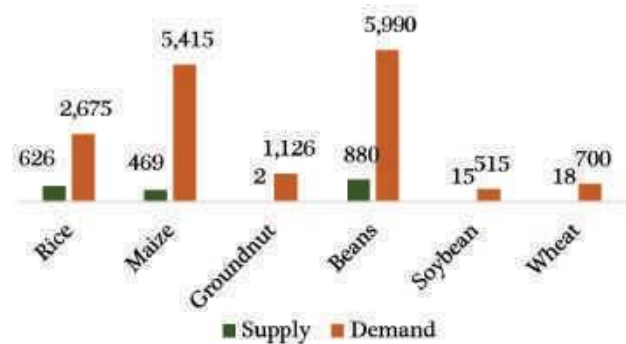


Figure 5: Seed Supply Demand Gap (MT) - Burundi

Table 7: Evolution in seed production in Kg (2016-2019)

Crops	2016		2017		2018		2019	
	Produced quantity)	Approved quantity	Produced quantity	Approved quantity	Produced quantity	Approved quantity	Produced quantity	Approved quantity
Bean	86,413	84,513	95,121	94,671	166,462	165,564	880,552	879,508
Rice	120,534.5	113,034.5	200,071	199,884	377,112	375,826	626,460	619,110
Maize	110,752	109,449	15,3560.5	148,077.5	253,370	231,193	469,257	401,132
Groundnut	10,215	8,772	12,432	10,886	3,030	3,030	1,808	1,492
Soybean	3,811.5	3,479.5	1,697	1,697	7,159	6,258	14,983	14,983
Wheat	36,047	36,047	18,224	18,224	26,204	26,204	17,775	17,775
Sorghum	0	0	0	0	3,395	3,395	0	0
Potatoes	1,878,847	1,376,248	1,986,571	1,742,593	2,588,791	2,192,002	3,243,986	2,926,436

Most of the foundation seed production is done by farmers' organizations on collective plots, and individual farmers who invest in seed production. The balance production is done by public institutions and by private companies on a limited scale. Most of these farmers' organizations rely either on public seed centers for non-repayable land loans and/or technical assistance, or NGOs for technical assistance and/or financial aid often on equipment or infrastructure such as seed sheds. They also receive sporadic training on seed production.



Table 8: Annual foundation seed production (in Kg) from 2016-2019

Crops		2016	2017	2018	2019
Locally produced seed	Potato	889,625	1,392,817	1,830,485	2,291,818
	Maize	76,736	115,896.5	205,499	402,476
	Rice	89,741.5	181,063	366,743	613,760
	Sorghum	0	0	3,395	0
	Wheat	25,000	3,639	11,864	12,645
	Beans	80,958	87,676	157,344	1,021,984
	Groundnut	8,412	10,562	2,630	1,492
	Soybean	2,579	1,101	5,228	13,728

Burundi imports most of its fruit and vegetable seed and produce through NGOs. Efforts are directed towards seed emergency which is distributed to vulnerable people for single cropping seasons and direct consumption.

Table 9: Import of certified seed in Burundi

Crop/seed	2016	2017	2018	2019
Hybrid maize	129,303	238,853	151,095	403,568
Beans	174,340	0	0	0

According to the 2018-2019 National agricultural survey (ENAB), a very low percentage of Burundian farmers use improved seeds (Table 10). The table indicates the percentage of improved seed used during the agricultural year 2018-2019.

Table 10: Rate of the use of improved varieties, by crop, in 2019

Cropping Seasons	Beans	Maize	Rice	Potato	Cassava	Banana	Others
Season A	17.2	18.3	19.0	20.0	15.6	11.4	11.6
Season B	13.9	9.7	28.2	18.2	8.1	5.9	4.1
Season C	12.2	14.6	17.7	16.7	5.4	7.2	5.3
Average	14.4	14.2	21.6	18.3	9.7	8.2	7.0



Table 10 shows the rate of use of improved varieties based on a national agricultural survey (ENAB, 2019). Among the crops monitored, rice is the only major crop that benefits from improved varieties, mostly due to regional Development Society of Imbo County (SRDI), which provides inputs and other technical supports.

Despite the promotional policy on seed production and subsidies, many smallholder farmers have limited or no access to the program due to the poor purchasing power. Subsistence farming dominates, with farmers typically producing on small landholdings with only a limited surplus for marketing. Farmers also lack market access with no incentive to increase crop production out of concerns that surplus will not lead to any economic benefit. The lack of market infrastructure, including adequate storage facilities and conditioning services, complicates post-harvest handling. Agricultural produce is mostly consumed fresh and surplus sold at low prices immediately after harvest. Further, the extension services are negligible and do not help sensitizing farmers to adopt modern farming operations, both pre- and post-harvest.

Demand for seeds is far higher than its availability, with supply meeting only 13% of current demand. To alleviate these problems the government has re-launched the seed program by updating seed legislation and the national seed plan. Support for increased seed production is deployed at three levels: strain seeds and pre-basic seed production by ISABU; basic seeds production by the decentralized extension services (BPAE); and commercial seeds production by multiplier groups assisted by Provincial Directorate of Agriculture and Livestock (DPAE). In order to improve seed availability in Burundi, several activities have been undertaken - in 2012, a law on the organization of the seed sector was signed with the aim to: create a framework to enhance the development of the seed sector in order to produce high quality agricultural seeds in sufficient quantity; promote the participation of private operators in the production and marketing of quality seeds; create an institutional system for varietal homologation and seed certification system; and develop international cooperation in the seed trade.

The National Seed Quality Control and Certification (ONCCS) is active, and private seed producers can operate as associations or individuals. In this framework, the PSSD project started its activities in 2018 and will be implemented till 2022.

With the 2012 Seed Act, private companies are encouraged to invest in the agriculture sector to increase variety research and development and produce sufficient quantities of high-quality certified seeds. The Collectif des Compagnies et Coopératives de Production des Semences du Burundi (COPROSEBU) is equivalent to a Burundi Seed Trade Association and has been active in the seed sector since 2010 (ASI, 2018). The group is comprised of private growers involved in the production of certified seeds.



Table 11: Leading seed companies in Burundi

Company	Status	Crops	Countries
COPROSEB-Nyunganira	Private	Field crops, local crops	Burundi
ISABU	Public	Field crops, vegetables, local crops	Burundi
SRDI	Public	Field crops (rice)	Burundi
NASECO	Private	Field crops (maize)	Burundi, Uganda, DRC
SOBUPRODIA/SEED-COM	Private	Field crop (maize)	Burundi, Tanzania
AVET	Private	Field crops, vegetables	Burundi
UHACOM	Private	Vegetables	Burundi

Five other companies are prominent in Burundi: Société Régionale de Développement de l'Imbo (SRDI), NASECO, AVET, and UHACOM, SOBUPRODIA. SRDI is a public seed 116 company with an exclusive focus on rice seed production. AVET imports and markets seeds from neighboring countries. The national research institute ISABU also plays an important role in the Burundi seed sector.

Most of the companies operate exclusively in Burundi, whereas NASECO operates in Burundi, Uganda and Democratic Republic of the Congo. NASECO carries out breeding activities from a research station in Uganda. SOBUPRODIA operates with SEED-CO, which produces hybrid maize in Tanzania. None of the other leading companies in Burundi have breeding programs. In 2019, IFDC started some trials in Burundi. The companies use prebasic seeds from ISABU which are then multiplied. UHACOM works with Haguruka Popular University (UPH) in conducting crop trials and making selections.

Table 12: Private seed companies and their estimated seed supply/annum (Kg)

Company	2016				2017				2018				2019			
	Potato	Beans	Maize	Hybrid maize	Potato	Beans	Maize	Hybrid maize	Potato	Beans	Maize	Hybrid maize	Potato	Beans	Maize	Hybrid maize
AVET	0	0	0	23,570	0	0	0	40,194	0	0	0	14,300	0	0	0	24,000
COPROSEB	132,200	0	360	0	74,000	4,500	0	0	55,000	19,400	0	0	83,000	316,800	0	0
NASECO	0	0	0	60,000	0	0	0	73,955	0	0	0	43,000	0	0	0	0

Most private companies engage farmers' associations to perform seed production activities in rural areas. COPROSEB engages approximately 360 farmers depending on the season.



In Burundi, seed producers work as individuals, farmers' organizations or NGOs. Most mix seed production with other farming operations. NGOs also support farmers working in the seed production sector by providing either technical support or financial assistance. The major contributors are: World Vision, CAPADE, UCODE, Reseau 2000+, PNSADR, ZOA, PAIVAB/FIDA, PRODEFI/FIDA, Fondation STAM, PROVAPA, CRS, and PRDAIGL. Table 13 provides the number of all seed producers monitored by ONCCS during the last four years. Tables 14-20 provide lists of active seed producers and their locations.

Table 13: Evolution in seed producers of Burundi

Crops	2016		2017		2018		2019	
	Field checked producers	Lab checked producers	Field checked producers	Lab checked producers	Field checked producers	Lab checked producers	Field checked producers	Lab checked producers
Beans	160	129	140	84	192	138	290	198
Rice	65	36	58	45	85	59	81	62
Maize	110	55	149	89	227	117	270	159
Groundnut	28	25	33	30	24	12	14	10
Soybean	2	0	2	2	4	4	5	3
Wheat	5	5	14	8	21	11	5	5
Sorghum	0	0	1	0	2	2	1	0
Potatoes	153	85	136	98	135	90	151	122



Table 14: Main active seed producers for rice (2019)

	Producer	Location	Produced quantity (Kg)
1	Coop Kazoza keza mubikorwa /SRDI	Bubanza	145,249
2	Coop.Urumuri mw'Iterambere/SRDI	Bubanza	102,500
3	Coop.Bwiza bwa Ninga/Urumuri mw'Iterambere	Bubanza	96,325
4	Coop.Dukorerehamwe/Nitegetse Gédéon/ISABU-PRODEFI	Bubanza	29,926
5	Ass.Sangwa Umwimbu/Gahungu Berchmans/ISABU PRODEFI	Ngozi	27,023
6	Ass.Twijukiruburimi/Ntisezerana Léa/PAIVA-B	Kayanza	15,780
7	Ass.Twiyunge/ISABU PRODEFI	Karusi	13,425
8	Ass.Twizamure/ISABU PRODEFI	Karusi	9,960
9	Ass.Girumwete Murimi/PAIVA-B	Karusi	9,850
10	Ass.Twitegurirerekazoza/Sinzotuma Frédéric/PAIVA-B	Kayanza	9,590
11	Ass.Kazozakeza/ISABU-PRODEFI	Bubanza	8,623
12	Ass.Turwizimbuto/Nyandwi Gérard/PAIVA-B	Kayanza	6,339
13	Nyamweru Samuel/PNSADR-IM	Rutana	5,600
14	Turwizimbuto z'Umuceri/ISABU PRODEFI	Ngozi	5,309
15	Dushigikire Uburimye/ISABU PRODEFI	Karusi	5,261
16	Ejoniheza/PAIVA-B	Karusi	4,850
17	Twunguranubwenge/PAIVA-B	Karusi	4,781
18	Turwanyinzara/Nduwimana Claudine/PAIVA-B	Kayanza	4,269
19	Nzirubusa Alfred/PNSADR-IM	Rutana	4,200
20	Twerekanubuhinga/Nyandwi Gasilde/ISABU PRODEFI	Ngozi	4,185
21	Terimberemurimi/PAIVA-B	Karusi	3,780
22	Ngendakumana Etienne	Bubanza	3,500
23	Turwizimbuto z'Umuceri/Gakobwa Génévieve/ISABU PRODEFI	Ngozi	3,476
24	Kundibikorwa/Ngendakumana Philbert/PAIVA-B	Kayanza	3,431
25	Shugikira Igiterwa c'Umuceri/ISABU-PRODEFI	Kayanza	3,370
26	Twitezimbere/PAIVA-B	Karusi	3,327
27	Turwanyinzara/Barusasiyeko Etienne /ISABU PRODEFI	Ngozi	3,269
Total			540,525

The western, northern and central regions are the most represented in active rice seed production (Table 14). Only two seed producers from southern Burundi (Rutana) are active while the eastern part is not represented.



Table 15: Main active seed producers for maize (2019)

Producers	Location	Produced quantity (Kg)
1 GPC Tuzamuruburimy/Minani Jean Prime	Rutana	45,000
2 Hatungimana Richard	Rutana	41,966
3 Coop.Twungubumwe/Hatungimana Jean/PRDAIGL	Rumonge	30,000
4 Kabirori Régine	Kirundo	20,400
5 ISABU (Gisozi, Munanira, Karusi)	Mwaro, Gitega, Karusi	15,730
6 Nkurunziza Jean Claude/UCODE-AMR/CSUB	Rutana	13,760
7 Barungura Jean/Société NAJ Training Company/Habarugira Fidélité	Gitega	12,000
8 Nkeshimana Sicaire	Karusi	11,800
9 Manirakiza Alexis alias Wajama	Makamba	11,100
10 Urunani Ishaka/Ndayikengurukiye Elie	Karusi	10,067
11 CMVIA	Ngozi	10,000
12 Sayukubara Serges	Muyinga	10,000
13 Gateranya Emmanuel/PROVAPA	Makamba	9,100
14 Congrégation des Apôtres du Bon Pasteur (CABP)	Karusi, Gitega	7,000
15 Nyamoya Béatrice	Bubanza	4,782
16 Nayabagabo Nestor	Muyinga	4,500
17 Niyokwizera Marie Rose	Karusi	4,500
18 Bakame Pancrace	Muyinga	3,800
20 Niyonkuru Michel	Cankuzo	3,700
21 Yamuremye Emmanuel	Bururi	3,500
22 Gatabazi Jean	Kirundo	3,250
23 Baragasirika Chartiel	Ruyigi	3,200
25 Ass.Inguvu za Bose/Ngaruye Télesphore/PNSADR-IM	Cibitoke	3,050
26 Ciza Jean	Ruyigi	3,025
27 Coop.Terimberemurimy/Sezirahiga Juvénal	Kirundo	3,000
Total		288,230

For maize seed production, the western region is less represented than are others. This could be due to a recent maize borer invasion in the region.



Table 16: Active seed producers for wheat (2019)

	Producer	Location	Produced quantity (Kg)
1	Hatungimana Athanase alias Cokoroko	Bururi	8,645
2	ISABU Munanira	Kayanza	5,130
3	Biha Suzane	Muramvya	2,800
4	Butoke François	Bururi	1,200
Total			14,975

These four producers are the only farmers who entered the certification process for wheat in 2019. They are from south, north and center of the country. All these cropping zones are in highlands (Bututsi and Mugamba).



Table 17: Main active seed producers for beans (2019)

	Producer	Location	Produced quantity (Kg)
1	COPROSEB-Nyunganira	Mwaro, 7 others	19,400
2	Ass.Tezimberimbutu/Mugabo Pasteur	Muyinga	17,453
3	Gatabazi Jean	Kirundo	8,850
4	Hatungimana Richard	Rutana	8,380
5	Ntirampeba Mariette	Muyinga	5,500
6	CABP;Congrégation des Apôtres du Bon Pasteur	Karusi	4,549
7	Coop.Tubehoneza/Nshemezimana Claude	Makamba	4,446
8	Niyokwizera Marie Rose	Bururi	3,440
9	Nimubona Maurice	Bururi	2,921
10	Biha Suzane	Muramvya	2,635
11	Kagayo Jeanne d'Arc	Karusi	2,583
12	Nahimana Annick	Mwaro	2,511
13	Paroisse Munanira/Abbé Déo Nitunga/World Vision	Muramvya	2,395
14	Nahimana janvière	Ngozi	2,316
15	CDLK -Kiryama	Bururi	2,250
16	ASSOPRO Buramata/Kamanayo Marius	Bubanza	2,227
17	Coop.Kazozakeza/FAO	Bubanza	2,025
18	Nayabagabo Nestor	Muyinga	1,800
19	Bakame Pancrace/CRS	Muyinga	1,750
20	Nduwimana Alexia	Mwaro	1,600
21	Ass.Terimberemurimy/Sezirahiga Juvénal	Kirundo	1,500
22	Niyokindi Jean	Muyinga	1,500
23	Rwasa Régina Paccis	Muyinga	1,500
24	Ass.Akarorero/Manirakiza Alexix alias Wajama	Makamba	1,318
25	Ndike André/UCODE-AMR/PADASIO	Cankuzo	1,020
26	Sabuwatsinze Michel/CRS	Muyinga	1,000
	Total		106,869

The lower limit for seed production quantity for beans was fixed to 1,000 kg. Beans are the most important staple crop among legumes produced in Burundi. There are many seed producers in the eastern region but they produce small quantities indicating that bean seed production associations are less developed in this region than elsewhere in the country.



Table 18: Active seed producers for soybean (2019)

	Producer	Location	Produced quantity (Kg)
1	CMVIA	Ngozi	4,500
2	Centre de Développement de Bugenyuzi/CEDEBU/Bahebura Dismans	Karusi	2,089
3	Ndihokubwayo Domitien	Ngozi	1,838
4	ISABU Murongwe	Gitega	1,255
5	Coopérative Twijukiruburimy/PNSADR	Cibitoke	916
6	Hatungimana Athanase alias Cokoroko	Bururi	850
7	Njiyobiri Antoine/PNSADR-IM	Ruyigi	800
8	Nyamoya Béatrice	Bubanza	719
9	Ciza Jean	Ruyigi	500
10	Hakizima Léonie	Bubanza	450
11	Ass.Twiyungunganye/PNSADR-IM	Rutana	410
12	Hatungimana Richard	Rutana	401
13	Nijimbere Richard	Ruyigi	150
14	Nyandwi Félicien /PNSADR-IM	Rutana	105
Total			14,983

Table 19: Active seed producers for groundnut (2019)

	Producer	Location	Produced quantity (Kg)
1	Ngizizmana Gad	Bujumbura	300
2	Nyawenda Bonaventure/UCODE-AMR/CSUB	Ruyigi	262
3	Nyandwi Célestin/UCODE-AMR/CSUB	Ruyigi	251
4	Toyi Astérie/UCODE-AMR/CSUB	Ruyigi	204
5	Habonimana Protais/UCODE-AMR/CSUB	Ruyigi	159
6	Manirakiza Françoise/UCODE-AMR/CSUB	Ruyigi	118
7	Bizindavyi Oswald/UCODE-AMR/CSUB	Ruyigi	100
8	Ntiruhava Félix Simon/UCODE-AMR/CSUB	Ruyigi	58
9	Ndihokubwayo Pascal/UCODE-AMR/CSUB	Ruyigi	40
Total			1,492

Groundnut seed production is less developed than soybean by numbers of producers, produced quantities and the cropped area. Groundnut is produced in only the west and east zones.



Table 20: Main active seed producers for potato (2019)

Pre-basic seed

	Producer	Province (Region)	Produced quantity (Kg)
1	ISABU (Gisozi, Mahwa, Mwokora, Nyakararo)	Mwaro, Gitega, Cibitoke	386,261
2	AGRINODE	Bururi	146,000
4	COPROSEB	Mwaro	47,000
5	Mbonankira Charles	Ngozi	10,000
6	Nimubona Maurice	Bururi	5,875
7	Butoke François	Bururi	4,055
8	CDLK Kiryama	Bururi	3,364
9	Niyonizigiye Marie Rose	Bururi	1,063

Basic seed

	Producer		Produced quantity (Kg)
1	Association Twiyunge	Kayanza	188,000
2	AGRINODE	Bururi	164,000
	Niyungeko François	Bururi	110,526
3	PASS-Kajondi	Bururi	95,731
4	Déo Guide Rurema	Kayanza	69,686
5	Simenya Diomède (Association Imbanzaguseruka)	Kayanza	61,000
6	Manirakiza Thérence	Ngozi	48,000
7	Ntiharirizwa Christine	Bujumbura	48,000
8	Gnl Ndirakobuca Gervais	Cibitoke	47,749
9	Ndayiziga Alice	Mwaro	45,000
10	BPEAE Kayanza	Kayanza	41,500
11	Association Dufatanemunda	Mwaro	39,224
12	AGROSERVE	Kayanza	36,784
13	COPROSEB	Mwaro	36,000
14	BPEAE Mwaro	Mwaro	32,178.5



15	Ass.Twiyungunganye	Kayanza	26,324
16	Hatungimana Athanase	Bururi	25,000
17	NDARUVUKANYE Zénon	Bujumbura	24,963
18	CADAP Rwira	Bururi	23,300
19	Nahimana Gabriel	Bujumbura	20,000
20	Nduwimana Alexia	Mwaro	19,000
21	Ndimuribo Simon	Mwaro	18,290
22	Nahimana Anick	Mwaro	18,000
23	CODECI Niyonzima Jeanine)	Kayanza	16,600
24	CEDEBU-Bugenyuzi	Karusi	12,245
Total			1,264,000

Producers for pre-basic seeds were distinguished from those of basic seeds. Potatoes are only grown in highlands and mid-altitude lands.

The COPROSEB company is involved in potato, maize and bean seed production in 12 of the 17 provinces. The capacity of COPROSEB is summarized in Table 21.

Table 21: Capacity of COPROCEB Seed company

Assets		Size or comment
1	Land for seed production	COPROSEB uses the land of its partner farmers. The latter are supplied with inputs (seed, fertilizer, etc/) and sell the production to COPROSEB
2	Infrastructure	<ul style="list-style-type: none"> - Laboratory (will be included in the building under construction). A new complex and laboratory is being built in the capital, Gitega - Two vehicles (1 car for CEO and 1 four-wheel vehicle for field activities)
3	Productive assets	1 tractor
4	Personnel	20 permanent staff memmebrs (including two with bachelor degrees and 15 with secondary degrees)
5	Capital investment	500,000,000 BIF annually (average USD\$270,000)



Seed processing and packaging activities are done by producer/dealers under the control of the ONCCS. The ONCCS aims for each producer-dealer to create specific packaging with his/her own personal information. However, progress is very slow. First, packaging manufacturing in Burundi is nascent and most packaging bags are still imported. Seed processing activities are mainly carried out manually in Burundi with some exception at IRRISA where there is a threshing machine and a winnower seed cleaner. Recently, small maize and bean sheller machines were manufactured locally under the supervision of ISABU and marketed within the country. Some mechanical maize and beans shellers invented by individuals under assistance of some NGOs are also in use.

Despite the adoption of several seed policy measures, the presence of commercial seed is limited. Most of the seed is marketed by the respective producers. Among those seed traders, some are organized in associations while others act as companies (such as AVET, which sells hybrid maize imports seeds from NASECO based in Uganda) or sell seeds as individuals. AVET has five points-of-sale for hybrid maize seed: Gitega, Bujumbura, Cibitoke, Bururi and Kayanza). Agro-dealers, including Selemani, conduct seed business during the agricultural seasons and sell about 1 to 2 tons of hybrid maize from Uganda. Most of these agro-dealers are not recognized by ONCCS but are members of groups that are officially recognized. Table 22 lists some of the officially recognized agro-dealers.

Apart from these which are dealing with imported seeds, other agro-dealers are also producing seeds. The situation is the same for all crops involved in seed certification except maize, for which hybrid seed is provided from neighboring countries. 122 Despite the fact that certified seed prices are fixed at 1,500 BIF (~USD 0.79), hybrid maize is sold at 5,000 BIF (~USD 2.63) due to transaction costs passed on to the traders. Selemani makes a profit of 1,000 BIF (~USD 0.53) per kg of maize seed.

Table 22: Recognized exclusive agro-dealers

Agro-dealers	Province (Region)	Traded quantity (kgs)
SOBUPRODIA//SEED-COM	Kayanza	200,000
Société Fatale Alliance et Idéale/PANNAR/Budeba Serges	Bujumbura	100,000
Société EAST AFRICAN SUPERMARKET/NASECO	Kayanza	50,000
OAF -Tubura Asbl//PANNAR	Gitega	24,068
AVET BUJA/NASECO	Bujumbura-Kayanza	24,000
Rupereza Célestin/PANNAR	Bujumbura	3,000
COFGN/NASECO/Emery	Bujumbura	2,500



ONCCS recognizes only one exclusive agro-dealer company and six associations/ organizations. NASECO has been operating in Burundi since 2013, with the first round of hybrid maize seed imports in 2015. Farmers prefer hybrid maize varieties in Burundi, but there is lack of information about its availability. NASECO has set up a system of extension service to train farmers, dealers and others seed purchasers on how to best handle the seed. Ten agricultural agents are working in different provinces of the country (Ngozi, Gitega, Rumonge, Bubanza, Karusi, Makamba, Kirundo, Rutana, Bujumbura and Kayanza). Some of the challenges faced by NASECO are high market competition with non-registered companies, difficulties in conducting breeding programs due to the higher costs, and the registration of the varieties by ONCCS and recognition by ISABU.

Based on information collected from agro dealers, on average 2 tons of seed can be sold depending on the agriculture season. Using the price applied by the hybrid maize sellers, the annual turnover of an agro-dealer is estimated at 10,000,000 BIF (USD 5,260). Subtracting the estimated capital investment, the benefit margin is estimated at 2,000,000 BIF (USD 1,052).

Policy Advocacy

Agricultural extension activities are coordinated by the General Directorate of Mobilization for Self-Development and Agricultural Extension (DGMAVA) at the Ministry of Environment, Agriculture and Livestock. The directorate has two main sub-directorates: directorate of agricultural training and animation, and the directorate of agriculture and livestock. DGMAVA was established in 1992, and the extension services were decentralized to lower administrative levels to make them more accessible to the local communities (IFAD, 2008). The main NGOs contributing to extension services in Burundi are:

Confederation of Associations of Agricultural Producers for Development: Confédération des Associations des Producteurs Agricoles pour le Développement (CAPAD) is a confederation of producers whose main objective is to train and build farmer capacity on various technologies based on specific needs and agro-ecological conditions. CAPAD is made up of 107,570 family farm households (62% of which are headed by women) growing food crops, fruit and vegetables and also animal husbandry. These farmers are brought together in 108 cooperatives located in 68 municipalities in 15 provinces. Its areas of 123 intervention are: intensification of agriculture and livestock; promoting rural entrepreneurship; advising operators through knowledge management and access to information; and support for capacity building

Cooperation Agency for Research and Development: ACORD is an NGO under the IFAD funded programmes PRODEFI and PAIVA-B. These programmes focus on agriculture intensification and value chain development. Major activities include:



management of marshlands for rice production, rice intensification, banana intensification, livestock intensification, crop intensification, manufacturing agricultural produce, land management soil conservation and land use optimization. Agriculture production and land management are integrated in the food security component.

NGO Twitezimbere: “Twitezimbere” in the local language means “We move forward”. Its main activities include training farmers on crop production focusing on integrated soil fertility management, use of organic manure and inorganic fertilizers, soil analyses to determine fertilizer requirements, crop spacing, crop varieties, positive seed selection, disease control, seed multiplication and soil erosion control (such as planting trees and fodder grasses). Farmers are organized into farmer groups and cooperatives in various communes in which they are trained and provided with inputs such as seeds and fertilizers, more than 4,000 farmers have been engaged. The NGO covers 70% of input costs. It works with the government technicians who provide assistance in mobilizing and training farmers. Monitoring and follow-up of activities is done during farm visits. An agronomist collects primary data which shows farmer opinions and willingness to continue with the technologies.

FAO, Farmer Field School (FFS): In Burundi, FAO is providing support for the implementation of this approach with a special focus on efforts to build the agricultural and nutritional skills of vulnerable populations. FAO also encourages men and women smallholders to share good practices that could help them increase their agricultural production. FFS is mainly focused on the consolidation and networking of the existing farmer field schools, which have served as an excellent basis for running multiple innovative and participatory initiatives.

Proposed Interventions

- Provide seed grant funding to five private national companies like COPROSEBU, NASECO and SOBUPRODIA to:
 - Improve quality seed production capacity with the aim to increase the quality seed production of existing varieties/hybrids and introduce new varieties/hybrids by 35%
 - Produce hybrid seeds and capacity development
 - Inform business management practices and vital information systems
 - Improve technical skills such as seed standards and quality and controlled storage especially for early-generation seed
 - Strengthen business entrepreneurship skills of 80 personnel through professional training courses over a period of 5 years
- Support ISABU for accelerating the testing and release of new varieties of major food crops and EGS seed production through infrastructure development



- Strengthen seed processing infrastructure by installing additional capacity of 3-4 tons/day in the country at private-sector premises
- Training for varieties/hybrid seed production technology in field crops/vegetables and nursery/ clonal production technology in vegetative propagated crops
- Agro-dealer development:
 - ° Provide matching grants to 500 agro-dealers to open new outlets, refurbish or relocate shops, procure inventory supplies and build cost-effective storage units,
 - ° Build capacity 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 500 agro-dealers will be trained on these modules over a period of 5 years,
 - ° Strengthen agro-dealer networking and association building
- Extension and knowledge dissemination:
 - ° Enable wider adoption of improved varieties/introduced hybrids through grants to NGOs for demos, small packs, etc.,
 - ° Promote and introduce ICT-enabled infrastructure through various stakeholders to accelerate adoption of quality seeds
 - ° Professional training to more than 900 extension professionals over a period of 5 years. Trainings will be provided on aspects related to farm demonstrations and deployment of ICT tools.
- Seed policy and advocacy:
 - ° Continued dialogue with public sector stakeholders for sensitization on national seed laws implementation and outreach methods, seed standards and regulations refinement, oversight of the seed delivery by national and international players and harmonization of regional policy
 - ° Professional trainings to 60 seed inspectors on proper seed quality assessment and seed certification aspects



Facilitate an incremental increase to 3,408 tons of quality seed of key crops covering an area of 21% under quality seeds (Figure 6) at the end of five-year period, and 5,851 tons covering 36% area at the end of 10 years

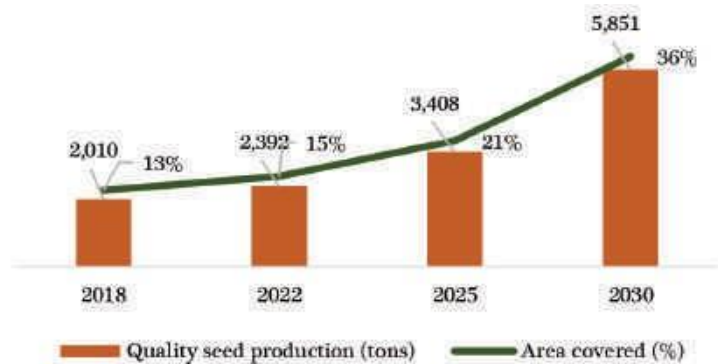


Figure 6: Projected Seed Quantity (MT) - Burundi

Budget

Table 23: Burundi 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	0.08	0.00	0.00	0.45
Early generation seed production	0.05	0.08	0.00	0.00	0.00	0.12
MSc fellowships	0.14	0.14	0.07	0.00	0.00	0.35
PhD fellowships	0.15	0.15	0.00	0.00	0.00	0.30
Component 2: Seed Enterprise Development						
Grants for start-up seed companies	0.15	0.15	0.23	0.23	0.00	0.75
Multiplication support for vegetative crops	0.10	0.10	0.00	0.00	0.00	0.20
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	0.15	0.00	0.00	0.75
Capacity Development (Bookkeeping, 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	0.03	0.00	0.00	0.14
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	0.00	0.00	0.00	0.05
Total	2.06	1.86	0.71	0.23	0.00	4.85