



# **Baseline seed study for Burundi**

## **Harmonization of seed policies, laws and regulations**

by

Mr. Juvent Baramburiye

E-mail: [juventbaramburiye@yahoo.fr](mailto:juventbaramburiye@yahoo.fr)

***August 2010***



# Table of contents

	Page
<b>1. Geographical description</b>	1
<b>2. General agriculture policy and socio-economic aspects</b>	1
<b>3. Background of the seed industry</b>	4
3.1. Coordination and oversight	4
3.2. Development of seed legislation and regulations	4
3.3. Progress made in seed sector	5
<b>4. Variety evaluation, release and registration procedures</b>	6
4.1. Variety evaluation	6
4.2. Variety Release Committee	8
4.3. National catalogue of crops and varieties	8
4.4. Variety release and registration	8
4.5. Future plan for variety evaluation, release and registration	9
<b>5. Plant Variety Protection (Intellectual Property Rights)</b>	9
<b>6. Seed quality control</b>	10
6.1. Current situation	10
6.2. Seed Classes	10
6.3. Field and seed laboratory testing standards	11
<b>7. Phytosanitary measures</b>	15
7.1. Current situation	15
7.2. Quarantine key pest list	16
7.2.1. List of key pests whose importation is prohibited	16
7.2.2. List of key plants and plant products whose importation is subject to phytosanitary certificates and control	17
<b>8. Seed production</b>	18
8.1. Pre-basic seed production	18
8.2. Public seed centers	20
8.2.1. Status of infrastructures	20
8.2.2. Basic and commercial seed production	20
<b>9. Seed export</b>	21
<b>10. Private seed sector</b>	23
10.1. Current situation	23
10.2. Land policy limitation	23
<b>11. Seed importation</b>	24

<b>12. Seed marketing</b>	26
<b>13. Future plan for regulatory and enforcement institutions</b>	27
13.1. Challenges in the implementation of agreements made under harmonization and other constraints to seed sector development	27
13.2. Challenges and sustainability options for existing seed trade associations	28
<b>14. Membership in international protocols seed import and export documentation</b>	28
<b>Key documents consulted</b>	29
<b>List of tables</b>	
Table 1. Annual crop production per year and average area (ha) per crop	2
Table 2. Evolution of prices of products (BIF/kg) in central markets of Bujumbura and Gitega 2000 -2009	3
Table 3. Location of the ISABU research centers and seed production	6
Table 4. Evolution of varieties developed by ISABU over the past 20 years	7
Table 5. Standards for field inspections and laboratory testing	11
Table 6. Quantity (kg) of pre-basic seeds produced by ISABU	19
Table 7. Quantity of beneficiaries of banana plantlets exported to Rwanda and Democratic Republic of Congo and bought locally	22
Table 8. Quantity of Colocasia plantlets exported to Rwanda and Democratic Republic of Congo and bought locally	22
Table 9. Quantity of Banana plantlets exported to Rwanda and Democratic Republic of Congo and bought locally	22
Table 10. Quantity of fruits and vegetables seeds (kg) imported in Burundi	25
<b>Annex:</b>	
Fig.1. Diagram of the seed chain of Burundi	30
Copy of the service required	31

### List of acronyms

AGROBIOTEC:	Agrobiotechnology
BIF	: Burundi franc
BTC	: Belgium Technical Cooperation
CIAT	: Centre International d'Agriculture Tropicale
CIPO	: Centre International de Pomme de terre
CRS	: Catholic Relief Service
DPAE	: Provincial Direction of Agriculture and Livestock
DPSP	: Department of Promotion of Seeds and Plants
DUS	: Distinction, Uniformity and Stability
EAC	: Eastern African Countries
FACAGRO	: Faculty of Agronomy
FAO	: Food and Agriculture Organisation
ICRISAT	: International Crop Research Institute for Semi-Arid Tropics
IFAD	: International Funds for Agriculture Development
IIITA	: International Institute for Tropical Agriculture
IRAZ:	: Institut de Recherche Agronomique et Zootechnique
IRRI	: International Rice Research Institute
ISABU	: Institut des Sciences Agronomiques du Burundi
ISEEBU	: Institut des Statistiques des Etudes Economiques du Burundi
ISTA	: International Seed Testing Association
NSC	: National Seed Council
PHYTOLABU	: Laboratoire de Biotechnologie des Plantes du Burundi
UPOV	: Union pour la Protection des Obtentions Variétales
WW	: World Vision

## 1. Geographical description

Burundi is located between 2°45' and 4°28' of latitude South and between 28°50' and 30°53' of longitude East. It has 27,834 km<sup>2</sup> with 19,000 km<sup>2</sup> of cultivated area and 2,300 km<sup>2</sup> of lakes. The country is divided into 4 main agro-ecological zones: the low lands ranging from 775 to 1000 m; the intermediate lands 1000-1400 m; the plateaux 1400-1800 m and the high lands ranging between 1800-2700 m. The soil is relatively fertile in the lowlands and acid in the plateaux and mountains.

The climate is tropical and divided into 2 main growing seasons: the rainy season normally starting from mid-September to May/June and the dry season covering June to August. The annual mean temperatures vary between 15-20°C and the annual mean rainfall is 700-1600 mm. However, the country is being affected by climate changes with an expanded period of dry season starting from mid-May and ends to later October.

## 2. General agriculture policy and socio-economic aspects

Agriculture sector plays a vital role in the national economy and contributes up to 90% of the National Gross Product. It is a major source of employment and offers more than 90% of the rural labour. The main rationale of the agricultural policy in Burundi as expressed in the National Agricultural Strategic Plan, is to increase agricultural productivity in order to alleviate hunger and poverty of the population.

More than 90% of the people are living in rural area. The population is around 8.6 millions of inhabitants. The growth rate is 3% and the density is relatively high in the most part of the country comprising between 190-300 inhabitants/km<sup>2</sup>. The average cultivated land is around 0.5 ha/household.

Food crops are mainly for household consumption and represent 90% of cultivated area. They contribute to 46% of GDP. In terms volume of production, there are: roots and tubers (sweet potato, cassava, taro, potatoes); legumes (beans, peas); cereals (maize, rice, wheat, sorghum, finger millet); vegetables and fruits; oilseeds (oil palm, sunflower, soybean). Cash crops include (coffee, tea, cotton, oil palm, sugarcane, tobacco) and stand for 10% of cultivated land. They supply 4% of GDP and provide 90% of export earnings. The coffee alone provides about 80% and 10% for tea.

Banana, cassava, sweet potato, dry beans are the major staple crops. Maize, rice, wheat and Irish potato are becoming the main source of income generation for the households and rural merchants. Table 1 shows the state of annual crop production. Food prices (Table 2) of the products are increasing from 2007 for all crops due to drought which affected the crop production. To some extent, some farmers and consumers are not able to buy even one kilo of dry beans per day.

The perspectives are to stick on the intensification of farming systems in the potential areas using water irrigation; the development of early maturing crop/varieties; the improvement of access of the small-scale farmers to the main inputs like fertilizer and improved seeds, and not the last, the promotion of seed marketing sector and other agricultural products by providing credit to seed producers based-organisations.

**Table 1. Annual crop production (tonnes) per year and average area (ha) per crop**

<b>Crop</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Moyenne</b>	<b>Area</b>
<b>Maize</b>	128706	117840	124395	126799	120575	123507	123407	110904	231014	116984	132413	140865
<b>Wheat</b>	7085	6097	8667	8290	8092	7493	7756	8007	15974	16081	9354	15590
<b>Rice</b>	58630	51678	60920	62648	61256	67947	67947	68311	141822	141807	78297	24935
<b>Sorghum</b>	59992	60980	69074	73246	71471	77231	78249	69643	171130	141807	87282	76563
<b>Eleusine</b>	10105	9465	10589	10706	10597	10597	10736	11110	21482	27001	13239	33097
<b>Beans</b>	227428	187437	248934	244659	230241	214206	203005	237518	410392	188629	239245	385879
<b>English peas</b>	31868	29785	33174	33330	33091	32735	32459	33554	65114	32567	35768	55027
<b>Soya bean</b>	3000	3500	3100				3894				3374	4819
<b>Ground nut</b>	11900	12200	10900				12143				11786	2977
<b>Irish potato</b>	24393	24039	27319	27994	26330	26091	23273	29735	53386	266693	52925	8205
<b>Sweet potato</b>	734172	687382	780859	833470	807940	834394	843976	769607	1747326	873663	891279	125887
<b>Cassava</b>	618229	656656	716731	749938	736012	630734	531921	649015	1117114	568557	697491	80915
<b>Ym</b>	9883	9628	9924	9924	9912	15973	9901	10430	19802	9901	11528	1250
<b>Colocasia</b>	90099	80734	84700	85705	82907	61703	58248	81943	116250	58125	80041	11982
<b>Banana</b>	3511960	3435720	3722460	3870318	3366782	1586536	1600258	143763	3401194	1700597	2633959	219497

NB. The empty cells are due to unavailable data

Source : Direction des Statistiques et Information Agricole

**Table 2. Evolution of prices of products (BIF/kg) in central markets of Bujumbura and Gitega 2000- 2009**

Crop	Province	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>1.Beans</b>	Bujumbura	340	350	390	400	400	512	525	710	800	900
	Gitega	300	330	320	320	300	580	500	700	890	810
<b>2.Soya bean</b>	Bujumbura	450	500	550	400	499	420	950	900	950	1200
	Gitega	350	400	380	340	330	340	700	700	820	1000
<b>3.Ground nut</b>	Bujumbura	500	560	650	790	870	950	1000	1100	1200	1300
	Gitega	390	380	400	350	450	500	600	500	560	1300
<b>4. English peas</b>	Bujumbura	370	430	460	400	600	650	660	1150	1170	1000
	Gitega	300	320	520	420	500	690	700	870	950	1000
<b>5.Maize</b>	Bujumbura	360	350	320	375	250	470	470	510	625	725
	Gitega	190	270	210	180	400	320	500	400	430	600
<b>6.Rice</b>	Bujumbura	240	450	520	420	560	640	720	650	1060	1200
	Gitega	330	360	390	400	350	600	620	570	880	1200
<b>7.Sorghum</b>	Bujumbura	230	270	250	290	250	350	380	370	650	500
	Gitega	460	290	250	280	390	330	500	510	650	650
<b>8.Blé farine</b>	Bujumbura	600	600	670	570	500	740	800	900	1250	1900
	Gitega	550	600	500	460	670	580	820	1050	1000	1300
<b>9. Irish potato</b>	Bujumbura	180	190	230	220	160	330	420	370	400	500
	Gitega	20	140	150	130	150	200	260	300	360	340
<b>10. Cassava flour</b>	Bujumbura	230	270	220	200	250	380	480	670	700	720
	Gitega	170	120	140	110	150	300	260	250	290	380
<b>11. Sweet potato</b>	Bujumbura	80	130	140	110	120	150	160	170	270	300
	Gitega	70	50	50	50	60	70	75	70	80	140
<b>12. Banana</b>	Bujumbura	100	120	150	240	350	560	650	700	750	800
	Gitega	80	90	100	130	210	380	490	550	580	600

Gitega : center of the country

Source: ISTEERU: Bulletins annuels des Statistiques Agricoles

### **3. Background of the seed industry**

#### **3.1. Coordination and oversight**

##### **1° Present Situation**

Among the bodies that were created after the enactment of the Seed Act of 1999, and whose orders have been recently revised and will be enacted again, the National Seed Council (NSC) is the one who has kept a semblance of its responsibilities and continues to operate partially. However, it is apparent that his main responsibility is the distribution of seeds produced by ISABU rather than to develop strategies and plan for seed industry development.

The whole seed chain is disorganized as there are any devoted seed centers to produce basic and commercial seeds. Requests of seeds are always higher availability and ISABU cannot meet them all and every seed producer knocks the door of ISABU to get seeds because of lack of basic and commercial seeds. . In ISABU, the Seed production and control programme has started in 2007 using transitional seed standards provided by EAC for quality control in field and using ISTA Rules for laboratory testing.

##### **2° Strengths**

In fact, the NSC has the merit to exist and fulfil certain obligations. With the support of the project BTC (Belgium Technical Cooperation), it should be able to take more importance and involve more actors. With the development of the National Seed Plan and the start of the Belgian project in Burundi to support the sector, the NSC is expected to take on more responsibility.

##### **3° Gaps and weaknesses of the NSC**

The composition of the NSC was certainly a serious shortcoming since the members were listed by name and not by function or institution they represent and only one private seed grower was a member of it. It is very important that equal seed growers and end users will be better represented in the future committee. Some of the NSC died but not were replaced. The Ministry of Agriculture and Livestock in collaboration with the BTC project will thus decide in what proportions, the committee will be composed.

Since the National Seed Plan provides both support for the establishment of the NSC and the creation and strengthening capacities of stakeholders in the sector, representatives must be members of this forum for coordination and planning. They are ultimately the key stakeholders and should also have their weight in a balanced NSC. In the current situation, it would be very useful and even essential that organizations operating in the field of production and distribution of seeds are represented on this committee.

#### **3.2. Development of seed legislation and regulations**

Since the development of the seed sector has been initiated from 1985, the seed industry has not been improved so far. In 1987, the draft of the national seed



programme has been elaborated but it has never been fully operational. In June 1993, the first decree on seed production and trade has been promulgated. Draft of seed legislation was prepared in later 1987 and was promulgated in form of Decree n°01/032 which was signed on 30 June 1993. It emphasized on four main components:

- the development of national catalogue of crops and varieties;
- the provisions on production, importation and commercialization of certified seeds;
- the development of seed control and certification system;
- the identification of role of each partners in the seed chain.

In 1999, the Ministry of Agriculture and Livestock signed a series of ordinances as the application measures of the decree above:

- Ordinance n°710/500 enacted on 25 August 1999 on the establishment of the National Seed Service
- Ordinance n°710/501 on 25 August 1999 on the composition and function of the National Seed Council.

However, all these decree and ordinances didn't enter into effect due to the instability of the government and the civil war which started in October. The National Seed Service was also called Department of Promotion of Seeds and Plants which (DPSP) which is still responsible for implementation of the seed acts. However, it didn't succeed to reorganize the seed sector.

Each component of the seed chain started working at its own means without any coordination among seed actors. The seed sector became totally disorganized. In a such chaotic seed production, the international organization and non-governmental organizations (NGOs) dominated the seed sector by distributing seed emergency to vulnerable people and farmers' associations for seed production or for direct consumption. On the ground, this situation remains unchanged even to date.

### **3.3. Progress made in seed sector**

Following the peace agreement signed between the government and the remaining group of rebels in Bujumbura in April 2008, several international funding agencies are on the way of the rehabilitation of the economy of the country in general, and in agriculture in particular. At present, there is apparent security over the country and people can move safely in the countryside for business and for field works.

The seed sector is under reorganization with the technical and financial support of Belgian Technical Cooperation and some visible achievements can be cited:

- ✓ the seed legislation is now under promulgation in the Parliament;
- ✓ the seed regulations and transitional seed standards have been recently revised;
- ✓ the National Seed Production Service and Seed Certification Service are now two separate legal components and are under institutionalization;

- ✓ the seed chain mostly involving private seed growers and small-scale seed farmers' organizations is now in the process of reorganization;
- ✓ the national seed policy is on the line for formal publication.

The seed law and regulations have been revised taking into account standards of the EAC country members but there are currently under promulgation. It means procedures for regional variety testing and registration are not yet applied.

#### 4. Variety evaluation, release and registration procedures

##### 4. 1. Variety evaluation

The research programmes in charge of crop and variety improvement are particularly under responsibility of the Institut des Sciences Agronomiques du Burundi (ISABU). The main commodity programs are wheat, rice, maize, sorghum, irish potato, sweet potato, cassava, beans, ground nut (peanut), soybean, peas, fruits and vegetables. In brief, the main mandates of the commodity research and development programs are to introduce, develop varieties, conduct performance and adaptability trials in different agroecological zones and disseminate the new and appropriate technologies. The Table 3 shows different locations of ISABU research centers and seed production.

**Table 3. Location of the ISABU research centers and seed production**

Research Centers	Ecological zones	Area	Potential crops
1. Gisozi	Uplands (>2000m)	15 ha	Irish potato, maize, wheat
2. Nyakararo	Uplands	25 ha	Irish potato, maize, wheat
3. Munanira	Uplands	8 ha	Irish potato, maize, wheat
4. Mwokora	Uplands	35 ha	Irish potato, maize, wheat
5. Mahwa	Uplands (1000-2000 m)	30 ha	Irish potato, maize, wheat
6. Imbo Centre	Low lands (750-1000 m)	40 ha	Rice, Maize, Sorghum, Cassava, Sweet potato douce
7. Mparambo	Low land	8 ha	Rice, Maize, Sorghum, Cassava, Beans, Sweet potato, Soybean, Ground nut
8. Murongwe	Middlelands	15 ha	Maize, Sorghum, Cassava, Beans Sweet potato, , Soybean, Gorund nut
9. Ndebe	Middlelands	3 ha	Rice
10. Gasaka	Middlelands	2 ha	Rice
11. Bukemba	Low lands	50 ha	Rice, Maize, Sorghum, Cassava, Sweet potato, Beans, Soybean, Ground nut

Source: ISABU

In addition, there are two other public research institutions namely Faculty of Agronomy (FACAGRO) dealing with rain-fed rice and marshland rice improvement and Institut de Recherche Agronomique et Zootechnique (IRAZ) particularly involved in vitro tissue culture of banana, potato and colocasia.

The variety selection is based on introduction of germplasm in form of raw material or bred-lines. Variety improvement is not based on applied research mostly variety selection for adaptability; yield; diseases, pests and soil salinity tolerance.... The strengths of the programmes are based on close collaboration with the international agricultural research institutions providing raw material such as IITA, ICRISAT, CIP, IRRI.....The variety selection is mainly limited to the screening of many types thus obtained. The whole process of variety evaluation may take around 8 to 10 years depending on seed kind. The imported varieties are tested only for adaptability and diseases tolerance for 2 or 3 seasons.

Developing a variety follows classical patterns or bulk selection. There is an identification of the types/varieties most appropriate to local environment in terms of yield and disease resistance, followed by the various performance tests in stations and in different agro-climatic environments. The final step consists of participatory research selection in which farmers are involved for two or three seasons evaluation and lastly give the name for the preferred varieties.

After these steps, the research programme starts characterizing the chosen variety for one or two cropping seasons using morphological traits whose formats are provided by the backstopping institutions (CIAT description format for beans, ICCRISAT for sorghum, IRRI for rice, CIP for potatoes, and so on). These are compiled in loose sheets referring to as a variety identification record. It means that there don't exist yet harmonized description formats dedicated for DUS (Distinction, Uniformity and Stability) or for other particular morphological characters along with agronomic aspects to be specifically considered for variety release and registration process.

The regional variety evaluation agreements are not yet implemented as such and each commodity research programme works independently one another. The Table 4 gives the picture of the list of released varieties from 1980 till 2009.

**Table 4. Evolution of varieties developed by ISABU over the past 20 years**

Espèce	<1980	1980-1990	1991-2000	2001-2009	Total	%
Irish potato		3	1	4	8	10
Sweet potato		1	3		4	6
Cassava				5	5	7
Maize		2	1	7	10	12
Rice		1	5	9	15	20
Sorghum		3	1		4	6
Wheat				4	4	6
Dry beans		1	6	3	10	12
Soya bean		3	1	4	8	10
Ground peanut	2	1		4	7	9
English peas	1			1	2	2
Total	2	15	18	40	75	100
%	4	20	23	53	100	

Source: Annual report on breeder's seed production in ISABU

For all these varieties, there are no plot/scientific tests for DHS (Distinction, Uniformity and Stability) to thereby form the National Catalogue of Species and varieties accepted for seed certification process. There occurs many cases of premature genetic erosion of the variety manifested by off-types even in the early generation stages of seed production.

#### **4.2. Variety Release Committee**

The Variety Release Committee (VRC) which was established by ministerial order in 1999, but it has never been operational. It was primarily comprised of representatives (5) from research institutions and public services, but end users were totally absent. Today, that order has lapsed since it should have been reviewed and should be passed again by a passage in Parliament. Hopefully, it has been recently revised taking into account the defects listed above.

The lack of connection of commodity research programmes with the farmers is of primary concern of the VRC. ISABU attempts to remedy these deficiencies through greater participation of farmers in farmers' school fields for variety selection and variety release. However, these strategies remain insufficient because of the scarcity and weakness of the scared farmers' field associations, the failure of the extension system and the weak link between the research programme and the rural population.

#### **4.3. National catalogue of crops and varieties**

The description of the variety is operated by the breeders following the description standards given by individual international institution supporting each commodity crop programme. There is any independent technical body formally allowing or not the multiplication and dissemination of the newly developed varieties.

Since October 2008, the first catalogue of species and varieties has been developed by ISABU. A brief description has been made by the thematic crop research programs. The description of the varieties are informative and more appropriate to the users but are not really adapted as the catalogue dedicated for seed certification or for use in field inspections. It would be more appropriate to characterize varieties based on the international or harmonized seed certification standards in the EAC.

#### **4.4. Variety release and registration**

Today, the decision to release of varieties is based on the appreciation of the breeders (ISABU) and the Scientific committee of ISABU. One can imagine that political pressure and accountability for results can influence the decision and imperfect varieties can be found in the circuit.

The procedure for variety release is to write a formal letter to the authorities of the Institut des Sciences Agronomiques du Burundi (ISABU) recommending release of the candidate variety presumably along with the evidence of its worthiness. If there is no objection the variety is released. The released varieties are casually

described and there is no formal catalogue for seed certification in use in the country. It is common that more productive varieties cannot always match the requirements of users of final products in terms of tastes or traditional technology practices.

#### **4.5. Future plan for variety evaluation, release and registration**

Evaluation of the performance of the varieties should be 1 or 2 seasons at the same time of DUS testing. It is recommended to use the UPOV descriptors which have been specially designed to provide reliable descriptions of conditions for variety registration and seed certification. In addition, Variety release committee must be nominated on scientific experiences basis and composed of private seed growers and farmers or consumers.

### **5. Plant Variety Protection (Intellectual Property Rights)**

In Burundi, there is not yet a plant variety protection act. ISABU and Faculty of Agronomy are the public institutions involved in agriculture research activities. It means that the development of varieties are financially supported by the government and all varieties released are public domain and are of free access but the seeds produced are commercialized to get funds to continue running the seed production activities.

The existing private research institutions AGROBIOTEC and PHYTOLABU don't yet proceed on protection of their developed varieties. They are not involved in fundamental breeding agenda but they are carrying out applied research findings or obtaining germplasm from international institutions (Bioversity International, CIP... for commercial purpose using in tissue culture. That is their main reason they cannot have legal variety protection as they import them from direct use in seed activities.

In the revised seed legislation under promulgation, there are some articles dealing with varieties imported for scientific research purposes or for seed production: *"Article 12: Subject to the Act of August 20, 1964, as amended to date, foreign varieties are subject particularly as regards the registration procedures, to the same conditions as those applied to national varieties. A variety from a foreign country shall bear the same denomination in the country of origin. Otherwise, the name of initial progeny are also given to the catalogue"*.

### **6. Seed quality control**

#### **6.1. Current situation**

The Department of Promotion of Seeds and Plants (DPSP) is currently responsible for seed quality control. It is operating under the General Direction of Agriculture located in Gitega and has a laboratory with equipment for basic seed testing. The staff consists of Director of Department, a department head, two laboratory technicians and five inspectors (one for 2 or 3 provinces).

Following the Ordinance dated from 1999, the DPSP had been changed into the National Seed Services, which has never emerged. His responsibilities were

never clearly defined. Finally, the DPSP that could be considered as the National Service in charge of all inspections of the quality of seeds, should ensure that all stakeholders working conditions for their development and to rural users, obtain goods quality guaranteed. In fact, it is totally absent from the landscape of the seed sector and has virtually no power or activity. In fact, it is especially the laboratory of the production unit of seed in ISABU, located in Bujumbura officially operating as a laboratory for internal controls of quality seed of ISABU. It also carries out some tests on the lots for distribution by aid agencies and it is easily accessible and better equipped.

### **1° Strengths**

The structure exists, and in particular the laboratory. Moreover, most of the equipment is completely new. The latter has been provided by various projects and supports most on projects funded by IFAD and BTC. Seed sampling and testing are paying. The technical staff is enough, being recruited and trained in Belgium for seed production, quality control and seed certification scheme.

### **2° Weaknesses**

On the ground, the main weaknesses of seed quality control by the DPSP are certainly at financial resources. The means of operation that are allocated are too small and the DPSP can not fulfil its duties properly. In particular, it is difficult to inspect crops multiplication or go into storage areas to collect samples.

Another gap in the link in the seed sector is the fail of seed legislation to be applied and all regulations and standards for production and control, as well. Some documents were drafted and promulgated but have never been put into effect. They are all now obsolete. Fortunately, they have been recently revised and should again proceed for adoption by the Parliament and ultimately their enactment, hopefully by the end of 2010. It may be noted that the enactment of legislation is always a very slow process.

Although these documents are required as the seed industry cannot grow in attractive conditions to private investors without specific rules. In absence of these legal tools, they do not guarantee the rights and duties of each. It is also possible to function properly by setting the development and adoption of a code that all actors commit themselves to respect.

For the future plan, once the National Seed Certification Service is promulgated it will have full responsibilities of seed quality activities together with the harmonization process of the national seed laws provisions and regulations in line with the regional seed framework.

## **6.2. Seed Classes**

Referring to the National Seed Plan provided for 1989-1993, the seed production was organized into three categories of seeds:

1. **Pre-basic seed** are produced from the seed strain by ISABU, AGROBIOTEC and PHYTOLABU;

2. **Basic seed** are produced from pre-basic seed by the seed centers of the Provincial Direction of Agriculture and Livestock (DPAEs)..

3. **Commercial seed**: are produced from basic seed by seed producers grouped in associations or private individuals

The future plan is that the revised seed act under promulgation 2010 will recognize the following 4 seed categories: **pre-basic seeds**, **basic seed**, **certified seeds** and **commercial seeds**.

### 6.3. Field and seed laboratory testing standards

**Table 5. Standards for field inspections and laboratory testing**

Crops	Parameters for field inspections	Pre-basic	Basic	Certified
<b>Wheat</b>	Off-types (max %)	0,1	0,2	0,3
	Diseased plants (dark blast, yellow blast...) max %)	0	1/	1/100 m <sup>2</sup>
	Other cultivated species (%)	0	0	0,05
	Noxious seeds (max %)	0	0	0
<b>Rice</b>	Off-types (max %)	0,1	0,2	0,3
	Diseased plants (max %)	0,01	0,1	2
	Other cultivated species (max %)	0	0	0,05
	Noxious seeds (max %)	0	0	0
	Wild rice or red grains rice(max %)	0	0	0,1
Crops	Seed standards for laboratory testing	Prebasic	Basic	Certified
<b>Wheat</b>	Pure seed (minimum % )	99,9	99,9	99,8
	Inert matter (maximum en %)	0,95	0,95	0,95
	Other cultivated grain species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	85	85	85
	Moisture Content (maximum %)	13	13	13
	Diseases maximum (%)	1	3	5
	Noxious weed seed (maximum: number grains/kg)	10	10	0,50%
<b>Rice</b>	Pure seed (minimum % )	99,9	99,8	99,7
	Inert matter (maximum en %)	2	2	2
	Other cultivated grain species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	80	80	80
	Moisture Content (maximum %)	12	12	12
	Diseases maximum (%)	0	0	0
	Noxious weed seed (maximum: number grains/kg)	10	10	0,50%
	Red rice (maximum number grains/kg)	0	0	5

\* : 1% tolerance for bacterial leaf blight bacterial root rot

Crops	Standards for field inspections	Prebasic	Basic	Certified
Maize	Off-types (max %)	0,05	0,1	0,5
	Seed-born diseases (helminthosporiose....)	0,1	0,1	0,2
	Head smut (%)	0	0	0
Sorghum	Off-types (max %)	1/50m <sup>2</sup>	1/30m <sup>2</sup>	1/10m <sup>2</sup>
	Seed-born diseases (mildew, bunt, ergot %)	0,1	0,1	0,2
	Head covered smut (max %)	0	0	0

Crops	Seed laboratory testing	Prebasic	Basic	Certified
Maize	Pure seed (minimum % )	99,5	99	98
	Inert matter (maximum en %)	0,95	0,95	0,95
	Other cultivated grain species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	90	90	90
	Moisture Content (maximum %)	13	13	13
	Diseases maximum (%)	0	0	0
	Noxious weed seed (max in 1 kg)	5	10	10
Sorghum	Pure seed (minimum % )	99,5	99	98
	Inert matter (maximum en %)	1,95	1,95	1,95
	Other cultivated grain species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	75	75	75
	Moisture Content (maximum %)	11	11	11
	Diseases maximum (%)	0	1	2
	Noxious weed seed (max in 1 kg)	5	10	10

Crops	Standards for field inspections	Prebasic and basic	Certified
Beans	Off-types (max %)	1/30 m <sup>2</sup>	1/10 m <sup>2</sup>
	Common bean mosaic (max (%))	0	0,1
	Anthrachnose (max %)	0,02	0,02
	Halo blight (max %)	0	0,01
	Brown bacterial spot (max %)	0	0,02
	Angural spot (%)	0,02	0,02
	Concentric spot (max %)	0,02	0,02
Ground nut	Off-type (max (%))	0,1	0,5
	Rosette virus (GRAV) (max %)	1/1000 plant	5/1000 plant



Crops	Seed laboratory testing	Prebasic	Basic	Certified
Beans	Pure seed (minimum % )	99,5	99,5	98
	Inert matter (maximum en %)	0,95	0,95	0,95
	Other grain cultivated species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	80	80	85
	Moisture Content (maximum %)	14	14	14
	Diseases maximum (%)	0	0	0
	Noxious weed seed (max in 1 kg)	0	0	0
Ground nut	Pure seed (minimum % )	99,5	99,5	99
	Inert matter (maximum en %)	0,95	1,95	2,95
	Other grain cultivated species (maximum %)	0,05	0,05	0,05
	Germination (minimum %)	75	75	75
	Moisture Content (maximum %)	10	10	10

	Field standards	Prebasic	Basic	Certified
Irish potato	Off-types (max %)	1	2	3
	Brown rot (*)	0	0	0
	Synchytrium endobiotium	0	0	0
	Globodera spp	0	0	0
	Ringrot	0	0	0
	PSTV	0	0	0
	Mycoplasme par 1000 plantes	0	1	1
	Erwinia spp (Pectobacterium, dyckeya)	0	0	0
	PVY par 1000 plantes	1	10	13
	SMV (soybean mosaïque virus) / 1000 pl	0	0	15
	Fusarium (number/1000 plants)	0	0	3
	Verticillium (number/1000 plants)	0	0	4

**(\*) Diseases tolerance for Brown rot will be applied in progress**

A waiver of standards in the field of brown rot is granted for a period of five years for basic seed and certified only by the following scheme (method of estimating the number of poles, resulting from cleaning operations).

Classes	2010	2011	2012	2013	2014	2015
Prebasic	0	0	0	0	0	0
Basic	0,02	0,01	0,005	0,002	0	0
Certified	0,1	0,05	0,02	0,01	0,005	0

**Detailed list of diseases which need to be considered in the seed certification scheme**

Crops	Disease	Pathogenic	
<b>Wheat</b>	Septoriose	champignon	<i>Septoria tritici</i>
	Charbons	champignon	<i>Sphacelotheca /Tilletia</i>
	Helminthosporiose	champignon	<i>Helminthosporium tritici</i>
<b>Rice</b>	Pyriculariose	champignon	<i>Pyricularia oryzae</i>
	Pourriture fongique des gaines	champignon	<i>Sacrocladium oryzae</i>
	Maladie des taches brunes	champignon	<i>Drechslera (Helminthosporium) oryzae</i>
	Pourriture du pied	champignon	<i>Fusarium spp.</i>
	Pourriture bactérienne des gaines	bactérie	<i>Pseudomonas fuscovagina</i>

Crops	Disease	Pathogenic	
<b>Maize</b>	Mosaïque nanisant du maïs	virus	MDMV
	Maladie des bandes	virus	Mosaic Streak Virus
	Maladie des taches grises	champignon	<i>Cercospora zea-maydis</i>
	Maladies des taches brunes	champignon	<i>Helminthosporium maydis</i>
<b>Sorghum</b>	Mosaïque nanisant du maïs	virus	MDMV
	Anthraxose	champignon	<i>Colletotrichum graminicola</i>
	Taches ovales	champignon	<i>Ramulispora sorghicola</i>
	Taches zonées	champignon	<i>Gloeocercospora sorghi</i>
	Mildiou	champignon	<i>Peronosclerospora sorghi</i>
	Charbons	champignon	<i>Sphacelotheca sorghi</i>

Crops	Disease	Pathogenic	
<b>Ground nut</b>	Rouille	Champignon	<i>Puccinia arachides</i>
<b>Beans</b>	Mosaïque commune	Virus	BCMV
	Anthraxose	Champignon	<i>Colletotrichum lindemuthianum</i>
	Taches anguleuses	Champignon	<i>Phaeoisariopsis griseola</i>
	Taches concentriques	Champignon	<i>Ascochyta phaseolorum</i>
	Bactériose commune	Bactérie	<i>Xanthomonas phaseolorum</i>
	Bactériose à halo	Bactérie	<i>Pseudomonas syringae pv phaesolicola</i>
	Taches bactériennes brunes	Bactérie	<i>Pseudomonas syringae pv syringae</i>

**NB. Seeds from generation F0, F1, F2 et F3 are subject to zero tolerance of free diseases and pests namely :**

- *Ralstonia solanaceum* (pourriture brune)
- *Pectobacterium atrosepticum* (ancien dénomination : *Erwinia atrosepticum*)
- *Pectobacterium carotovorum carotovorum* (ancien dénomination : *Erwinia car.car.*)
- *Dickeya* spp. (ancien dénomination : *Erwinia chrysanthemi*).
- *Meloidogyne* spp.
- Virus : PLRV, PVY, PVX, PVA, PVM eddt PVS
- Galle poudreuse (*Spongospora*)

The future plan of field and laboratory testing is to continue organizing regional workshops on joint field inspections and laboratory testing using the same protocols and seed standards.

## **7. Phytosanitary measures**

### **7.1. Current situation**

The application of appropriate phytosanitary control measures is crucial for limiting the spread of harmful diseases within and out of the country. On 25 February 1990, it has been signed a convention on Phytosanitary protection between Democratic Republic of Congo (DRC), Rwanda and Burundi aiming at the limitation of the movement of dangerous seed-borne diseases across the borders of each country member.

On 31 May 1990, a Law n°1/017 and other general provisions have been promulgated between the three countries regarding the regulations of seed import/exportation, control of restricted pesticides crossing the neighbouring borders. In addition, every country member should develop its own quarantine regulations.

Later on, a series of regulations have been elaborated and promulgated by the Ministry of Agriculture bearing in importation, production and distribution system of health and good quality seeds. These regulations focused on avoiding the spread of pests (insects and mites), pathogenic fungi, virus, bacteria, nematodes and others diseases where they do not occur. Some of the regulations are:

- Ordinance n°710/241 dated from 26 April 1999 which gave emphasis on appointing a National Committee in charge of Pesticides homologation and control:
- Ordinance n° 710/550/309 dated from 21 May 1999 aiming at creation of the National Card empowering Authorized Officers acting as Phytosanitary Inspectors;
- Ordinance n°710/954/98 dating from 29 December 1999 regarding the application of the provisions of the decree promulgated on 30 June 1993.

The Department of Crop Protection under administration of the General Direction of Agriculture is responsible for the application of the issues regarding phytosanitary regulations. Those ordinances give power to Phytosanitary Inspectors: to require inspections for importation/exportation of seeds or planting material and phytosanitary certificates; to issue permit; to identify infested seeds and to propose quarantine measures if necessary, to detain or reject infested seeds; etc.. ; to impose penalties for contravention of any provisions pertaining to the Decree.

Today, the ordinance designating the National Committee in charge of Pesticides homologation and control has lapsed since most of the list of members is not complete as some of them left the Ministry of Agriculture and Livestock. Practically, the committee is not properly working and all the 9 members were from public institutions.

There are now more than 14 phytosanitary inspectors for all entry points of the country, but they don't have enough capacity in skilled human resources, material and equipment to properly implement the phytosanitary regulations. Indeed, there is a laboratory testing which is located in ISABU referred to as a transitional laboratory before the Department of Crop Protection gets its own. There is a quarantine pest list which includes a large number of diseases and pests, but they need to be reduced in harmony with the EAC pest list by considering only the harmful ones economically affecting the seed production.

## **7.2. Quarantine key pest list:**

### **7.2.1. List of key pests whose importation is prohibited in Burundi**

#### **1°. Organismes live animal kingdom at all stages of their development**

- |                           |                            |
|---------------------------|----------------------------|
| - Anastrepha spp          | - Anthonomus grandis       |
| - Bostrychopsis villosula | - Ceratitis spp            |
| - Chilo spp               | - Coccus hesperida         |
| - Ducus spp               | - Ditylenchus spp          |
| - Heterodera spp          | - Leptinotarsa ecemlineata |
| - Lyriomyza spp           | - Nillaparvata lugens      |
| - Oryctes rhinoceros      | - Phenacoccus manihoti     |
| - Phoracanth semipunctata | - Popila japonica          |
| - Protephamus truncatus   | - Radophus                 |
| - Rastracoccus invadens   | - Similis                  |

#### **2° Cryptogames**

- Helicobasidium purpureum
- Tilletia caries
- Stachylidium thecbromas et/ou Trachysphaera fructigena
- Ustilago avenae

#### **3° Bacteria**

- Corynebacterium frasciens
- Pseudomonas passiflora p.glycine
- Pseudomonas syringae pv.phaseolicola cabaci

- Pseudomonas syringae spp
- Pseudomonas fuscovaginae trabslascens
- Erwinia stewartii
- Xanthomonas campestris

#### 4°Virus

- Banana bunchy top virus (B.B.T.V.)
- Banana streak virus
- Bean common mosaic virus (B.C.M.V.)
- Cucumber mosaic virus
- Sweet potato mild mottle virus (S.P.M.M.V.)
- Cassava mosaic virus (C.M.V.)
- Sweet potato feathery mottle virus

#### 5°Phanerogames

- Cuscuta spp
- Striga spp

### 7.2.2. List of key plants and plant products whose importation is subject to phytosanitary certificates and control

06.01.10.K.00	Bulbs, corms, tuberous roots, crowns and rhizomes dormant vegetative in growth or in flower
06.02	Other plants including roots, cuttings and slips
06.03.10800	Flowers and flower buds
06.049IK000	Foliage, leaves and other parts of plants, mosses and lichens for bouquets or for ornamental fresh
07.01-07.09	Vegetables, fresh or chilled
7.13	Pulses dried, shelled, skinned or split
7.14	Cassava root, and arrow-root salep, topinambours artichokes, sweet potatoes and other roots and tubers like
8.1	Coconuts, Brazil nuts, cashew nuts, fresh or dried/shelled
8.2	Nuts other than 08.01.and fresh or dried even shelled
08.03.00800	Bananas, including plantains fresh or dried
08.04	Dates, figs, pineapples, avocados, guavas, mangoes and mangosteems fresh or dried
08.05	Citrus fruit fresh pears and quinces
08.08	Apples, pears and quinces, fresh
08.10	Stone fruit fresh, fresh berries and other fresh
08.1210	Dried fruit, other than 08.01 08.0610.0200R00 Rye , 10.0400100 Oats, corn and rice10.0700K00 Sorghum grains
10.08	Millet, finger millet and other grains
12.01-12.07	Seeds and oleaginous fruits whether or not broken
12.09	Seeds, fruit and spores for sowing
12.11	Plants or plant parts, seeds and fruit species used in medicine or use of insecticides, fungicidal and similar fresh or dried

Presently, there is not yet an harmonized quarantine pest list with regards to EAC provisions.

### **7.3. Future plan for phytosanitary measures**

The future plan will need to reduce and harmonize the list of diseases most affecting crop production and the seed quality and which require regional collective restriction and prohibition as well. It is also important to put in place quarantine service to enable the implementation of the phytosanitary regulations.

## **8. Seed production**

### **8.1. Pre-basic seed**

#### **1° Evolution of pre-basic seeds production**

Seed strains are obtained by the maintenance and after one or several generations providing pre-basic seed. The pre-basic seeds are produced in the different research centers of ISABU as shown in the Table 3. The table 6 gives the evolution of quantity of pre-basic seeds produced by ISABU. It is clear that Irish potato, maize, rice and beans are the most favoured crops producing most of the seeds requested by the seed producers and farmers. They are the main source of income for more than 90% of farmers.

#### **2° Strengths**

The strengths of ISABU are the many facilities and well trained personnel/technicians in seed production techniques. The training, experience and the relative stability of the workforce (even if a relative number of staff have joined NGOs) are of a great importance to obtain materials whose quality is relatively appreciated by the users / buyers of breeder seeds basis (whatever the end users they make). It sometimes happens that the application of these pre-basic seed exceeds availability. ISABU is in fact the only supplier of pre-basic seed especially grain seeds. At planting time, it may be that buyers are very numerous and ISABU be unable to meet their needs. In terms of seed centers, their number, size and location, relatively good quality land ... have enormous potential in terms of land and basic infrastructures. They represent an excellent opportunity for the development of seed sector development.

#### **3° Weakness**

In terms of seed processing and conservation, the infrastructures are still rudimentary. There is no seed dryer and the drying is done naturally on concreted areas when they are available or more often on the floor. This is not the best way to achieve optimum quality, especially when the amounts become larger (several tons), the climatic conditions of Burundi and especially for the harvest season occurring in during the wet season. This is the most important production volumes but also the least conducive to a natural drying.

**Table 6. Quantity (kg) of pre-basic seeds produced by ISABU**

Crop	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1. Potato	308346	285576	250316	303926	238777	303556	367948	406678	277873	317578	299553
2. Maize	19361	18437	250316	14374	8452	18979	36065	51641	30845	30806	32876
3. Wheat	11047	5862	4078	7437	6428	12747	13435	7240	7245	11645	8034
4. Rice	50838	58282	33750	63139	25403	56560	39251	51641	49734	34431	47134
5. Soghum	3841	4216	2424	4005	2556	12747	11096	4793	4336	23619	9289
6. Beans	5803	6033	8926	9741	5295	17007	13312	5161	4471	11269	10000
7. Soybean	470	1390	461	1691	2323	3884	4531	2549	1624	1687	3065
8. Ground Peanut	547	320	246	609	2779	2532	4661	3127	1000	429	1093

Source: Annual report on Seed production programme ISABU

## **8.2. Public seed centers**

### **8.2.1. Status of infrastructures**

#### **1° Strengths**

A number of public seed centers (around 60) more or less well endowed with infrastructure and facilities are spread across all countries and there are generally four or five in each province. Infrastructure includes buildings for offices, a storage shed for inputs and seed grains, warehouses seed storage, a drying area at the ambient conditions (temperature and humidity), a shelter for tools ... and other buildings, barn.

Some seed centers have cattle, goat, sheep for manure production. In terms of equipment and tools, they have tractors (Kajondi seed farm has even the combine for wheat and conditioning unit (ginning, grading, processing plant, packaging and sewing).

#### **2° Weaknesses**

Seed storage is a very serious problem in the public seed centers and private seed companies. After harvest, the seeds usually suffer poor packaging operations postharvest. This phase includes the threshing or shelling, processing and storage in bags, baskets ... These bags are deposited in bulk storage.

Under current conditions, it is remarkable that the conservation infrastructure seeds are not appropriate to assure proper preservation to protect from deterioration. The fact is that it is difficult for growers to use seed carryover stocks and they are stressed to buy seed each season due to deterioration in attics. This is especially due to the non-mastery of appropriate conditions for the conservation of seeds that are in dynamic equilibrium of moisture content and other quality standards with the climatic conditions of the surrounding environment.

Seed saving is expected to allow the producer to ensure the availability of seeds during the following season and any time he wants to use for planting or for marketing. However, the degree of drying seed (seed moisture content <11%) is one of the key parameters for proper preservation of seed security. Additionally, seed drying is still rudimentary. After the experiences of loss of seeds by deterioration (loss of germinability ... ..) in the attic, most of seed producers sell most of the production immediately after harvest.

### **8.2.2. Basic and commercial seed production**

Most of the basic and commercial seed production activities are carried out by associations of farmers on collective plots where tillage should be conducted jointly. They principally borrow lands or properties from public seed centers and are technically supervised by the services of Provincial Direction of Agriculture (PDA). The structural strength of these groups is very variable. They are often



trained or have been created for the sole purpose of producing seed in the emergency operations that are inherently short-term individual.

In some cases, farmers' associations are also more or less technically supervised by the staff of the umbrella NGO, or in the case of multiplication made by FAO, a financial allowance may be granted for staff (technicians) motivation. Rarely, logistical support is provided as a means of transport (motorbikes or bicycles).

It was not possible to find reliable statistics on the quantity of basic seeds and commercial seeds produced and commercialized by the seed growers or farmers' associations because from 1993, the seed chain was disturbed and dominated by informal seed supply lacking organization and quality control systems.

The future plan is to let private seed growers organize in formal cooperatives and seed companies so that it is easy to supervise them technically and carry out field inspections and produce high quality seeds. It will be possible to them to collectively sign contracts with the government to exploit the lands belonging to the public seed centers. It would be better to constitute seed stock for at least 2 seasons for seed sector security.

## 9. Seed export

### 1° Strengths

The seed industry in Burundi is still at the embryonic stage. Besides the quality, the quantity of seed produced ever the country is not even enough to cover the needs of the farmers. The exportation of seed to the neighbouring countries is not yet possible expect for some private initiatives involved in tissue culture of banana, irish potatoes, colocasia..

Since 1999, **two private institutions** have emerged in tissue culture activities by producing planting material of banana and colocasia crops: **AGROBIOTEC** producing around 250,000 banana planting materials per year; **PHYTOLABU** producing around 140,000 colocasia planting materials per year. The two private laboratories are operating in complementarity with ISABU. The plants produced are called pre-basic seed as those produced by ISABU.

Most of the plantlets (Tables 7, 8 and 9) are bought by international NGOs, FAO and other UN organizations to assist vulnerable persons, poor families, and other farmers' associations suffered from the effect of civil war. These private seed enterprises contribute a lot to the increase of quantity and diversity of planting material of those crops not improved in ISABU.

**Table 7. Quantity of banana plantlets exported to Rwanda and Democratic Republic of Congo and bought locally**

Year	Rwa	DR C	WV	CONCERN	CRS	AAA	CARITAS	FAO	GTZ	Others	TOTAL
2000	30000		40000							10000	80000
2001	50000		40000					50000		10000	150000
2002			60000	30000			6000	80000		74000	250000
2003		5000	50000					120000		75000	250000
2004			40000		20000	30000		120000		40000	250000
2005		5000	30000		20000			100000		45000	200000
2006			50000					200000		100000	350000
2007								120000		20000	150000
2008	10000							200000	40000	110000	350000
2009								250000		170000	420000

Source: AGROBIOTEC in vitro culture Statistics, August 2010

**Table 8. Quantity of Colocasia plantlets exported to Rwanda and Democratic Republic of Congo and bought locally**

Year	FAO	ISCOS (*)	CARITAS	FIDA	FLM (*)	WV (Banana)	ISABU	TOTAL
2008	58200	60000	60000	5000	36000			219200
2009					6500	30000		36500
2010	15000						36500	51500

Source: PHYOTLABU in vitro culture Statistics, August 2010

**Table 9. Quantity of Banana plantlets exported to Rwanda and Democratic Republic of Congo and bought locally**

Year	FLM (*)	WV (Banana)	CIALCA (*) Banana	FAO	TOTAL
2009		30000	4100		341000
2010	36500			22000	58500

Source: PHYOTLABU in vitro culture Statistics, August 2010

These two private institutions have capacity of production of 77000 plantlets of banana and 100000 plantlets of colocasia every two months. They are also producing in tissue culture plantlets of coffee and cassava based on the demand. They make contracts with ISABU and other regional agriculture research institution

## 2° Constraints for the private research institutions

At present, these private laboratories are somewhat limited in terms of infrastructure and equipment to produce enough tissue culture (more than 100,000 to 200,000 plantlets per year on the average). They have few greenhouses of low capacity for acclimatation. These plantlets are almost purchased by NGOs.

For the case of AGROBIOTEC, the banana plantlets are transferred to weaning nurseries located in the different locations in rural area (north and middle lands (Ngozi province and Kirundo and Gitega provinces) from which NGOs and

farmers and can easily buy plantlets. For the case of PHYTOLABU, the planting material coming from tissue culture of colocasia are acclimated directly on site and are accessible to any buyer.

For all these laboratories, it is clear that these plants are not subject to any official regulations of quality control and seed certification, customers simply faith in the tech vendors who provide suitable sanitation of the varieties or clones from the laboratories of Gembloux in Belgium.

## **10. Private seed sector**

### **10.1. Current situation**

As stated in the revised seed legislation and regulations under promulgation in the near future (by the end of the year 2010), the private companies are encouraged to invest in the agriculture sector in order to increase capacity in variety research and development and to produce sufficient quantity and high quality of seed

However, the traditional seed supply systems is still prevailing for more than 90% over the formal seed supply. The informal seed supply arrangements in use in the traditional agriculture sectors is based on seed saving, local market and sharing with neighbours and other communities when seeds are consumed during famine or lost caused by pests and natural disasters. There is virtually no private sector participation in seed sector development.

Starting from In 2010, the future plan is that seed producers have already developed a private seed sector called "Collectif des Compagnies et Coopératives de Production des Semences du Burundi (COPOSEBU) equivalent to Burundi Seed Trade Association. This association has recently elaborated its Constitution and Internal rules of conduct which are under promulgation in the Ministry of Interior Affairs. There are now 30 members in this association and some of them are professional in seed production techniques. That seed organization will contribute to seed sector development by increasing in transparency seed production and seed quality.

### **10.2. Land policy limitation**

The development of agriculture and seed production will depend on the involvement and investment and will be made both by the state (and donors) and the private sector. Most of the private seed producers do lack of sufficient lands for seed production: it is difficult for them to get more than full 3 to 10 hectares on the same lands due to overpopulation. In consequence, the government must solve the problem in borrowing some of the public seed centers in form of contracts. The involvement of the latter depend on if the insurance at least the probability of return on his investment.

The threat posed by the lack of guarantees in the occupied lands is certainly an obstacle to the development of investment facilities and equipment on which depreciation is long. It is therefore necessary that the land problem is considered.

It is likely that seed production is growing on land that seed centers "owned" by the Provincial Direction of Agriculture (PDA). Any other organizations or individuals who engage in seed production will contribute to the seed sector development or rehabilitation (enhancement of land, buildings, irrigation ...). The valuation of these investments will be guaranteed by an agreement that ensures minimum time of use. She will be sufficiently long to amortize and return all commitments. The Land Code is being updated and it is hoped that this problem of uncertainty of available land for a long period can be solved

## **11. Seed importation**

Agriculture sector is characterized by a farming system which is dominated by traditional cultivars and very few farmers utilize improved inputs like fertilizer, pesticides....They are not used to utilizing improved varieties because of the limitation of access to the high prices of improved seeds in most cases. The importation of seed crops is mainly done by NGOs and is directed towards seed emergency which is distributed to vulnerable people for one cropping season and for direct consumption. It is difficult even impossible to get statistics data of imported seeds by NGOs.

The fruit and vegetable seeds are formally imported by the Horticulture Center of Ngagara. The main supply seed companies located in Netherlands and Kenya. The annual quantities imported are around 2000 kg/year. They are packaged in small pouches unit containing 5 to 10 grammes that are sold by farmers for garden production and consumption.

The circuit for importing seed by some private operators and NGOs doesn't respect any regulations and the imported seed are not subjected to any quality evaluation process. FAO and other UN agencies import (3000 - 4.000kg/ in estimate) to distribute freely to vulnerable people. The seeds most sought after in the market gardens and gardening are tomatoes, carrots, cabbage, leeks, peppers, onions, eggplants, beets, etc

Burundi imports most of the seed fruits and vegetables from Kenya and Netherlands even if the quantities are not regular and too much. According to the demand in terms of market and urban and rural consumption, it is seen that the main species imported are: onions, cabbages, leeks, green beans, peppers, tomatoes eggplants, beets... They are the main source of income generation for many rural farmers which are recycling the seeds/plantlets of these species for two or more cropping seasons. The table 10 shows the quantity of fruits and vegetable seeds annually imported by Horticulture Public Center of Ngagara located in Bujumbura.

**Table 10. Quantity of fruits and vegetables seeds (kg) imported in Burundi**

Species	2000	2001	2002	2003	2006	2010	Total
Eggplant black beauty	50	80	25	25			180
Beet black beauty							0
Beet Detroit 2	50						50
Beet detroit dark red	12						12
Broccoli calabrese	12						12
Calendar royal sluis	100	100					200
Carrot nantes produco rs	150	75	162		70	50	507
Celery utah (2-70	12	12				5	29
Celery golden selfblancnching				5			5
Cabbage Golden Acre	100	300	100		2		502
Cabbage walk of Copenhagen	700	300	150	250	100	250	1750
Cabbage broccoli calabrese		12					12
Cabbage cabus brunswick	50	125	100				275
Cabbaga cabus golden acre	200		50				250
Cauliflower snowball	12		5	5			22
Cucumber ashley	12		10			12	34
Zucchini white						20	20
Spinach matador						12	12
Bean n mangetu paulista	100		100	25			225
Green bean paulista	100	50	50			50	250
Hybrid cabbage cabus amphion F1		75					75
Hybrid cabbage cabus oxylus F1	100	75	150	150		20	495
Hybrid zucchini ambassador	25						25
Iceberg lettuce sommer			10		5	10	25
Onion SD redbone			10			300	310
Onion red creole	550	650	750	300	100	200	2550
Onion sd texas early grano 502	50	50	500	50	50		700
Watermelon sugar baby						10	10
Parsley frieze dark green	12		10				22
Parsley giant leaves						10	10
Leek carentan 2	300	75	175		20	100	670
Pepper california wonder	50	12	25	25	20	100	232
Radis hnivered RS			5				5
Tomato floradel CFS		50	62		20	50	182
Tomato Roma VF				5			
TOTAL	2747	2041	2449	840	387	1187	9646

Source: Statistcs of Projet Maraïcher de Ngagara, August 2010

## **12. Seed marketing**

### **1° Current situation**

Despite the fail that can be found in the management of the seed production and disposal, it can be seen that only the pre-basic seed is sold and follow a normal pattern of production and distribution on a commercial basis. At ISABU, the price of pre-basic seed is known as established by the National Seed Committee.

The other categories (basic and commercial seeds) are difficult to identify and move through the system of special humanitarian operations characterized by the distributions more or less openly free. The seed marketing of these categories is almost nonexistent. The production of basic seed and commercial takes place in closed systems. Most often, there are organizations like FAO and international NGOs (CRS, World Vision, Caritas, ...) to provide pre-basic seed from ISABU. This material then follows a path particularly obscure. It is distributed to farmers' associations for multiplication whose product is (or should) be designed, in part, to reimbursement of input received and redistributed to other beneficiaries and to the other party multiplied for sale commercial seed ...

It is practically impossible to know what the seed production by various groups or become what is their quality. What is certain is that they are rarely marketed conventionally. For emergency operations with direct distributions, large quantities of seeds are purchased in lots of large tonnages whose origin can be easily understood through the local markets given that the seed sector is largely unable to produce these volumes.

### **2° Strengths**

At ISABU for pre-basic seed, the sale is made on normal commercial principles. And it seems that the flow quantities produced, far superior to the seed needs of this category does not pose a problem. Instead, buyers complain that they are inadequate and could be inferred that the real demand and solvent pre-basic seed is not met.

For basic and commercial seeds, we can find strengths. The only concern was to try to help the populations most affected by the conflict and its consequences. It is hoped that the supply of material necessary for the resumption of agricultural activities (seeds, cuttings, seedlings ...) will restart their production or acquisition of their food and prepare for their reintegration into normal life. The quality of this material and the development of the seed sector are sometimes secondary concerns.

### **3° Constraints**

The main constraints to commercialization are currently residing in the following characteristics:

- Weakness or lack of system distribution and marketing outside circuit more or less closed NGOs; the lack of seed merchants; poor physical accessibility (scarcity or remoteness from distribution centers and delivery delay); low purchasing power of farmers; inadequate packaging needs (packages too large

so that the plots are small); competition from informal seed system; distributions and habits more or less free emergency operations, humanitarian and others.

Generally, seeds should be closer to consumers. Farmers should not have to search. It is therefore imperative that there is decentralization and increased sales outlets. The state or producers can increase the storage warehouses and distribution. These should be near places of production or central collection area.

The second pitfall to be solved is formed by the timely availability. It will gradually build up seed stocks to be used one or season two. For this, it is necessary to dispose of stores sufficient storage capacity and provide optimal conditions for storage and conservation.

### **13. Future plan for regulatory and enforcement institutions**

#### **13.1. Challenges in the implementation of agreements made under harmonization and other constraints to seed sector development**

The institutional regulatory framework in Burundi to support agreements of harmonization of policies and seed regulations in the region is fortunately in the process of establishment and promulgation of the National Seed Certification Service under organization. It will work independently with the National Seed Production Service, even if both will be physically housed in the General Direction of Agriculture.

The harmonization of policies and seed regulations is of a great importance in the development of more emerging and competitive seed industries in the region. No country is economically self-sufficient and all countries need cooperation among themselves. In Burundi, the main constraints may be the misunderstanding and less support at high levels of decision makers about the objectives of the process of seed policy harmonization under development. The national legislation and seed standards under promulgation are the crucial legal instruments to help the rehabilitation and organization of the viable seed sector.

Once the seed market chain comprising of most the private seed growers and grouped seed cooperatives is organized and quality control system operationalized, it will be the starting point to help in internalizing the harmonized seed policies and regulations at regional level. It will therefore help to promote exchange of agriculture products in order to alleviate hunger in the participating countries.

The National seed workshop which has been organized in Bujumbura in 2001 under the support of ECAPAPA (Eastern and central Africa for Agriculture Policy Analysis) came up with fruitful recommendations regarding the necessity to join other pilot countries (Kenya, Uganda and Tanzania) in the process of the regional seed harmonization process. However, the major constraints of seed standards harmonization may arise from the capability of the national seed sector to compete with the advanced countries in seed industry development. As most of the country is overpopulated, it will not be easy to get enough farmlands to produce seeds for market, and moreover to have access to chemical fertilizers which are expensive.

### 13.2. Challenges and sustainability options for existing seed trade associations

A decentralized seed society of Burundi is not yet organized. The initial perception of the development of the national seed programme in 1993 was to establish big public seed farms to produce and supply the main marketable crops to other small-scale seed farms. The development of the seed society was felt as the only one responsible for the production, trade and supply of improved seed in chain. The trends in the later future were to be a pivotal in the work of privatization of seed production and supply. However, it didn't take into account the role of the informal seed system and the role of the private seed sector in the development of a viable and sustainable seed industry.

Actually, the model of view is to organize a seed improvement association in form of seed cooperatives and companies (COPROSEBU) while organizing and promoting the system of seed control and certification which may be progressively effective. It can emerge into private seed professional organizations and can be also a vehicle for continuing modest programmes for the kind of seeds that are difficult to privatize. The kind of seeds that have good profit potential and make good candidates for privatization are well known and documented such as: maize, wheat, rice, irish potato.

However, public sector in seed production and supply has to continue existing for those seed kinds not attractive to the private sector. It is needed to maintain an adequate flow of seeds of new and superior varieties of important food and feed crops released by the national research programmes into the agricultural arena.

### 14. Membership in international protocols seed import and export documentation

Burundi is full member of many international organizations: **ISTA** (International Seed Testing Association), **OECD** (Organisation de Coopération et de Développement Economique), **IPPC** (International Plant Protection Convention), **TRIPS** (Trade Related Intellectual Property Rights), **UPOV** (Union pour la Protection des Obtentions Variétales), **WTO** (World Trade Organization), **CBD** (Convention on Biological Diversity), **IT** (International Treaty on Plant Genetic Resources for Food and Agriculture), **COMESA** (Common Market for Eastern and Southern Africa), **ZEP** (Zone d'Echange Préférentielle), **SMTA** (Standard Material Transfer Agreement), **EAC** (Eastern African Community), **Cartagena** and **Bonn** protocols, etc., Burundi always ratifies all the international conventions and treaties from which it is a membership and signatory. **NEPAD** (New Partnership for Africa Development), and so on.



**Key documents consulted**

1. ISABU annual seed production reports
2. ISABU crop research commodity programmes
3. ISTEERU Bureau of statistics
4. Ministerial orders on seed regulations
5. Ministerial orders on plant protection regulations
6. National Seed Plan, 2009
7. National Strategies of Ministry of Agriculture and Livestock, 2008-2015
8. Plant Protection Act, 1993
9. Rules for seed production, 2009
10. Seed legislation, 1993
11. Revised seed legislation, 2010

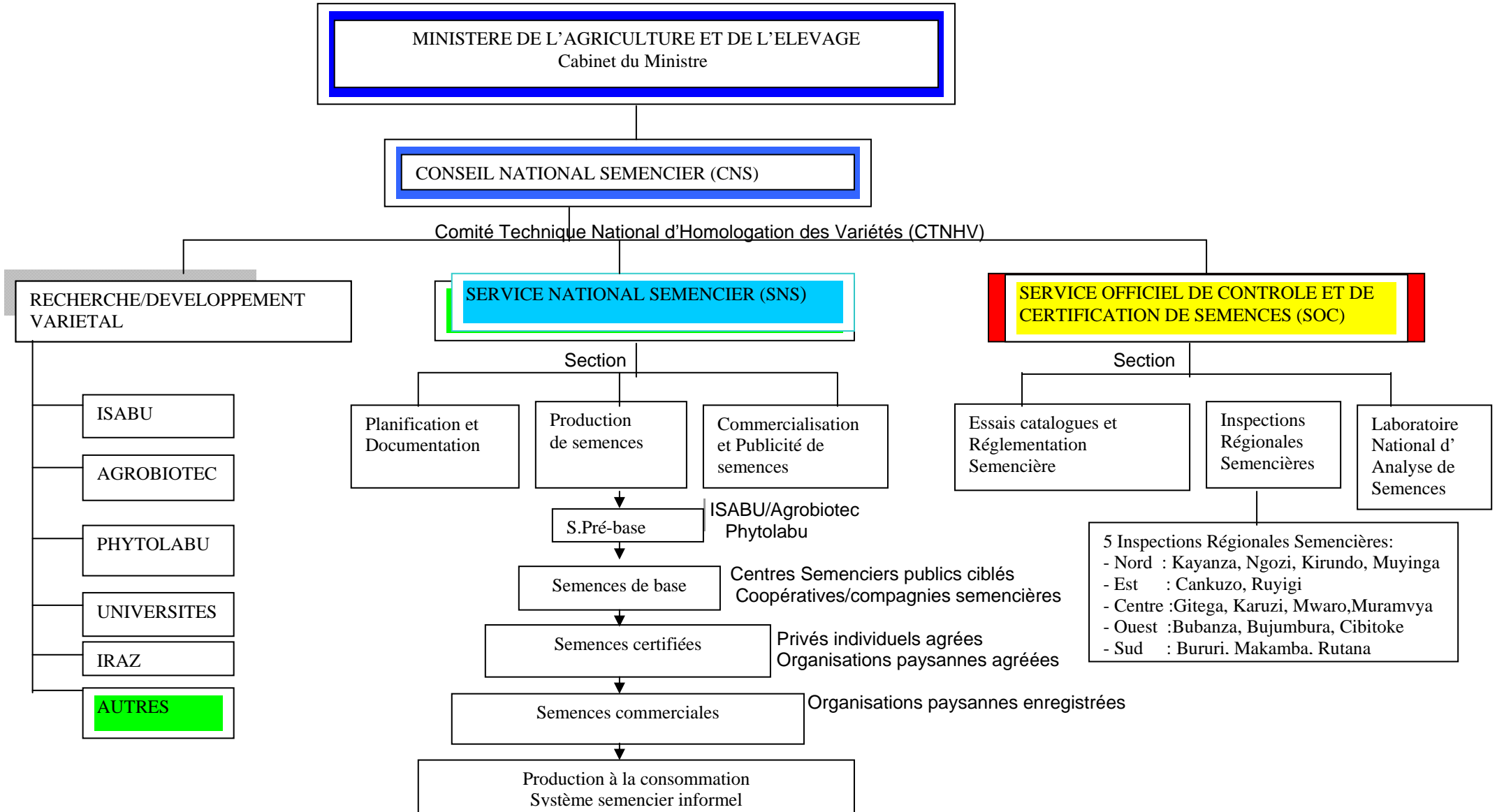


Fig. 1. Diagramme of the seed chain of Burundi

### Current contact addresses of the five areas of harmonization

Harmonization area	Institution	Department	Responsible	Addresses
<b>Variety evaluation, release and registration</b>	Direction Générale de l'Institut des Sciences Agronomiques du Burundi (ISABU)	Department des Productions	Juvent BARAMBURIYE - Head of Seed production/ quality control Programme - President of National Variety Release Committee	<a href="mailto:juventbamburiye@yahoo.fr">juventbamburiye@yahoo.fr</a> <a href="mailto:dgisabu@cbinf.com">dgisabu@cbinf.com</a> BP 795 Bujumbura Tél: 257 22 22 3349 Fax : 257 22 22 5798
<b>Seed certification (*)</b>	Direction Générale de l'Agriculture	Département de la Promotion des Semences et Plants	Vianey MANIRAKIZA Head of Department	<a href="mailto:manisper@yahoo.fr">manisper@yahoo.fr</a> <a href="mailto:dgamina@yahoo.fr">dgamina@yahoo.fr</a> PB. 114 Gitega Tél : 257 22 40 2084 Fax :257 22 40 2104
<b>Phytosanitary Services</b>	Direction Générale de l'Agriculture	Département de la Protection des Végétaux	Eliakim SAKAYOYA Head of Department	<a href="mailto:sakayoyaeliakim@yahoo.fr">sakayoyaeliakim@yahoo.fr</a> <a href="mailto:dgamina@yahoo.fr">dgamina@yahoo.fr</a> PB. 114 Gitega Tél : 257 22 40 2036 Fax :257 22 40 2104
<b>Plant Variety Protection</b>	-	No formal institution in place		
<b>Import and export issues (**)</b>	Direction Générale de l'Agriculture	Département de la Protection des Végétaux	Eliakim SAKAYOYA Head of Department	<a href="mailto:sakayoyaeliakim@yahoo.fr">sakayoyaeliakim@yahoo.fr</a> <a href="mailto:dgamina@yahoo.fr">dgamina@yahoo.fr</a> PB. 114 Gitega Tél : 257 22 40 2036 Fax :257 22 40 2104

(\*) The seed certification service is not yet in place. The Department de la Promotion des Semences et Plants will be divided into the National Seed Certification Service (**SOC**) which will deal with **seed certifications issues** and the National Seed Service (NSS). The **NSS** which will be in charge of coordination of seed production partners and activities and seed importation/exportation with regards to the **types and quantity of seeds needed at the national level** .

(\*\*) The **Department of Crop Protection** is currently delivering **importation and exportation permits with regards to phytosanitary issues**.

NB. Responsibilities of these departments (and contact addresses) are presently transitional and their clear roles will be respected once the Seed Legislation and the National Seed Plan are promulgated at the parliament level by the end of 2010.

## 1- Services Required

The overall task is to conduct a baseline study/survey on the Burundian seed sector to be used for the rationalization and harmonization of the seed regulations and policies in the COMESA Member States, which especially covers the areas listed below on point A to F. This study also should give general background information on the seed sector including seed statistics (production and import/export), availability and status of seed infrastructure, and assessment of capacity of the country to implement requirements about the five areas mentioned below on point A to F i.e. In another word, identify the potential weaknesses to implement effectively the forthcoming harmonized seed legislation.

*Bj*

### A. Standards for seed certification

Give the following among others:

- *Background information and body, which is responsible for seed certification including the name and contact addresses of the head of this body;*
- *Existing seed classes (Breeders, Pre-basic, foundation/basic, certified, etc.)*
- *Standards for the crops handled (moisture content, germination rates, disease, etc.) and process for seed certification including necessary documentation;*
- *Check conformity with regional standards adopted by EAC;*
- *Future plan of the country for standards for seed certification;*
- *Any additional information on standards for the seed certification that is necessary for the purpose of the harmonization at COMESA level.*

### B. Variety evaluation, release and registration

- *Background information and body, which is responsible for variety evaluation, release and registration including the name and contact addresses of the head of this body;*
- *Variety evaluation, release and registration system/process including the number of years required*
- *Crops included in the variety evaluation, release and registration system/process and necessary documentation;*
- *Check conformity with regional variety evaluation, release and registration adopted by EAC;*
- *Future plan of the country for variety evaluation, release and registration;*
- *Any additional information on the variety evaluation, release and registration that is necessary for the purpose of harmonization at COMESA level.*

### C. Phytosanitary measures

- *Background information and body, which is responsible for phytosanitary measures including the name and contact addresses of the head of this body;*
- *Phytosanitary measures including the overall process, necessary documentation, and quarantine pest list for the country;*
- *Check conformity with regional phytosanitary measures in EAC if there is harmonized quarantine pest list or any other harmonized standards on phytosanitary measures;*
- *Future plan of the country for phytosanitary measures;*
- *Any additional information on the phytosanitary measures that is necessary for the purpose of harmonization at COMESA level.*

**D. Plant Variety Protection (Intellectual Property Rights)**

- *Background information and body, which is responsible for Plant Variety Protection including the name and contact addresses of the head of this body;*
- *Plant Variety Protection system in the country including the overall process for running the Plant Variety Protection and necessary documentation;*
- *Check conformity with regional Plant Variety Protection in EAC;*
- *Future plan of the country for Plant Variety Protection;*
- *Any additional information on the Plant Variety Protection that is necessary for the purpose of harmonization at COMESA level.*

*Bj***E. Seed import/export documentation and procedures**

- *Background information and body, which is responsible for seed import and export;*
- *Seed import and export procedures and documentation including the name and contact addresses of the head of this body;*
- *Check conformity with regional seed import and export procedures and documentation in EAC;*
- *Future plan of the country for seed import and export;*
- *Any additional information on seed import and export procedures and documentation that is necessary for the purpose of harmonization at COMESA level.*

**F. Membership to International Organization**

- OECD
- ISTA
- Cartagena Protocol/CBD
- Etc.