

**BASELINE SURVEY OF THE SEED SECTOR IN UGANDA, IN RELATION TO
REGIONAL HARMONIZATION OF SEED LEGISLATION**

Ruth N. Ssebuliba

Uganda Seed Trade Association (USTA).
P.O. Box 29726, Kampala, Uganda

September 2010

Table of Contents

Table of contents.....	2
List of figures.....	3
List of Tables.....	3
Acronyms.....	4
Summary.....	6
1. GENERAL INFORMATION ON THE SEED SECTOR IN UGANDA.....	8
1.1 Introduction.....	8
1.2 Background.....	9
1.3 Seed statistics.....	11
1.4 Challenges of the seed industry in Uganda.....	14
2. STANDARDS FOR SEED CERTIFICATION.....	16
2.1 Existing Seed Classes.....	17
2.2 Seed certification procedures.....	17
2.3 Conformity of seed certification with regional standards adopted.....	19
2.4 Future plans of the country for standards for seed certification.....	21
3. VARIETY EVALUATION, RELEASE AND REGISTRATION.....	21
3.1 Procedures for variety evaluation, release and registration.....	21
3.2 Crops included in the variety evaluation, release and registration.....	22
3.3 Conformity with regional standards adopted by EAC.....	22
3.4 Future plans for variety evaluation, release and registration.....	23
4. PLANT VARIETY PROTECTION (INTELLECTUAL PROPERTY RIGHTS).....	23
4.1 PVP System.....	23
4.2 Conformity with regional PVP in EAC.....	24
4.3 Future plan for the PVP.....	24
4.4 Additional information on the PVP.....	24
5. PHYTOSANITARY MEASURES, SEED IMPORT/EXPORT DOCUMENTATION AND PROCEDURES.....	25
5.1 Procedures for seed import.....	25
5.2 Procedures for seed export.....	26
5.3 Re-export procedures.....	27
5.4 Conformity with regional phytosanitary, import and export procedures and documentation in EAC.....	27
5.5 Future plan of the country for phytosanitary, import and export procedures...	28
6. MEMBERSHIP TO INTERNATIONAL ORGANIZATIONS.....	28
7. SCHEDULE OF SEED CERTIFICATION DOCUMENTS.....	29
Form SR 1: Application for inclusion of a variety in the national performance trials....	29
Form SR 2: Application for release and inclusion of a variety in the National Variety List or East African Common catalogue.....	30
Form SR 3: Request for inclusion of newly released variety in the National Variety List or East African Common Catalogue.....	32

Form SR 4: Notification for release of a new variety	33
Form SR 5: Application for registration as seed merchant.....	34
Form SR 6: Certificate of registration as a seed merchant.....	36
Form SR 7: Application for field inspection of a seed crop.....	37
Form SR 8: Registration of a seed crop for field inspection.....	39
Form SR 9: Routine field inspection result.....	40
Form SR 10a: Final field inspection result.....	41
Form SR 10 b: Farm stock approval certificate.....	42
Form SR 11: Request for seed testing.....	43
Form SR 12a: Official seed test results certificate.....	44
Form SR 12b: Private seed test results certificate.....	44
Form SR 15: Application for a seed import/export permit.....	45
Form SR 16: Seed import/export permit.....	47
Phytosanitary certificate	49
Form X: Authority/licence to export plant/soil materials of uncertain health status.....	50
Model Phytosanitary Certificate for Re-Export.....	52
8. SCHEDULE OF FIELD AND LABOLATORY SEED CERTIFICATION STANDARDS.....	53
Land requirement, minimum isolation distances, off types and other Cultivars.....	53
Diseases.....	54
Weeds.....	56
Laboratory Seed Testing Standards.....	56
List of Figures	
Figure 1: Annual seed production by the Seed Industry in Uganda over years.....	12
Figure 2: African Seed Market.....	15
List of Tables	
Table 1: List of seed companies registered in Uganda.....	10
Table 2: Quantities of seed imported into Uganda over years.....	13
Table 3: Quantities of seed exported from Uganda over years.....	13
Table 4: Bottlenecks affecting the seed value chain in Uganda.....	16

ACRONYMS

AFSTA	African Seed Trade Association
AGRA	Alliance for a Green Revolution in Africa
AMA	Agribusiness Management Associates
APEP	Agricultural Productivity Enhancement Project
ASARECA	Association for Strengthening Agricultural Research in East & Central Africa
ASPS	Agricultural Support Program Sector
CAII	Centre for Agricultural Inputs International
CIMMYT	International Centre for Improvement of Maize and Wheat
COMESA	Common Market for East and Southern Africa
DANIDA	Danish International Development Agency
DRC	Democratic Republic of Congo
EBG	Entebbe Botanical Gardens
FICA	Farm Inputs Care Centre Ltd
GDP	Gross Domestic Product
IITA	International Institute of Tropical Agriculture
ISF	International Seed Federation
ISTA	International Seed Testing Association
KEPHIS	Kenya Plant Health Inspectorate Services
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MT	Metric Tons
NAADS	National Agricultural Advisory Services
NARO	National Agricultural Research Organization
NARS	National Agricultural Research System
NASECO	Nalweyo Seed Company Ltd
NGO	Non Governmental Organization
NPPO	National Plant Protection Organization
NSCS	National Seed Certification Service
NVPT	National Variety Performance Trials
NVRC	National Variety Release Committee
OECD	Organization for Economic Cooperation and Development
PGRC	Plant Genetic Resources Centre
PIU	Phytosanitary Inspection Unit
PMA	Plan for Modernization of Agriculture
PRA	Pest Risk Analysis
PVP	Plant Variety Protection
QMS	Quality Management System
SG	Sasakawa Global
SOP	Standard Operating Procedures
STAK	Seed Trade Association of Kenya
UNADA	Uganda National Agro-Input Dealers' Association
UPBA	Uganda Plant Breeders' Association
UPOV	Union for Protection of Plant Varieties
UQC	USTA Quality Controllers
URA	Uganda Revenue Authority

USAID
USP
USTA

United States Agency for International Development
Uganda Seed Project
Uganda Seed Trade Association

SUMMARY

The report covers the findings of a baseline survey/study on the seed sector of Uganda. The information is required by AFSTA on behalf of COMESA and will be a useful tool in the harmonization of seed regulations and policies in the 19 COMESA Member States. The survey was conducted in the second and third weeks of August 2010, while the report was compiled in the last week of the same month. The methodology used in the survey included interviews with stakeholders in the seed industry and a review of relevant documents. One-on-to-one interviews were conducted with personnel responsible for the five areas under harmonization; and Managing Directors / Chief Executive Officers of leading seed companies in the country. Some of the documents reviewed include the seed act, draft seed regulations, seed certification hand book, draft import/export regulations, draft PVP bill and a series of reports on the harmonization agenda.

The report begins with highlighting the importance of Agriculture in Uganda and the outstanding role of the seed industry in Uganda's economy. Before 1968, the seed sector in Uganda was informal but government later started a seed scheme in the Ministry of Agriculture, fully owned and operated by the public sector. The scheme gained ground in 1990 with funding from the Government of German and African Development Bank. In the late 1990s, the seed sector was liberalized giving way to private seed companies. At the moment, Uganda has more than 20 registered seed companies, out of which 19 are members of USTA. An attempt to present seed statistics has been made although lack of reliable seed data is cited as a big problem. The private sector has steadily increased annual seed production since 1991 to date. A summary of bottlenecks affecting the seed value chain has been presented, giving the relative importance of the bottlenecks.

Uganda is in the process of developing the regulatory framework for the seed industry. The country has a Plant and Seed Act 2006 and a draft of seed regulations. The seed certification standards outlined in two documents are in conformity with the regional standards adopted through rationalization and harmonization of the laws governing the seed sub-sector. However, the country has limited capacity to enforce these standards, which may be partly attributed to lack of autonomy for National Seed Certification Services (NSCS). To enhance implementation of the seed laws, there is need for capacity building for the private sector, for example sensitization on seed laws, training in technical areas and provision of affordable credit facilities. To improve seed demand at farm level, there is need to improve the grain output market, to invest in agro processing and to promote value addition. There is also need to provide appropriate rural infrastructure, for example rural electrification, central storage facilities and road network.

Most of the procedures being followed for variety evaluation, release and registration in Uganda are as stated in the draft seed regulations and are in line with harmonization. However, due to limited resources, NVPT (National Variety Performance Trials) are conducted by breeders in NARO (National Agricultural Research Organization) but not by NSCS as required by the seed regulations. The law also recommends the formation of a NVPT Technical Committee to which NSCS should present its recommendations on

evaluation of candidate varieties, before presenting them to the National Variety Release Committee (NVRC). At the moment, the NVPT Technical Committee is not in place.

The procedures adopted for phytosanitary, import and export procedures and documentation are clearly outlined in the seed regulations as well as the draft import/export regulations; and are in conformity with the regional harmonized procedures. However, one of the main challenges to optimal compliance is lack of adequate capacity to provide quarantine services at the numerous porous border points. There is also need to develop regional capacity to enable the different countries to work more as a team.

Uganda has a draft Bill 2010 which the parliamentary committee on agriculture has discussed with different groups of stakeholders. The bill is in conformity with regional PVP in EAC and it is UPOV compliant.

Uganda is a member of OECD and ISTA. However, although the country is accredited to OECD, it has not yet received accreditation to ISTA.

The report winds up with samples of documents used by the seed certification unit, import/export documents and field/laboratory seed certification standards.

1. GENERAL INFORMATION ON THE SEED SECTOR IN UGANDA

1.1 Introduction

Uganda is a land-locked country astride the equator with a cultivable land area of 16.7 million hectares and an estimated population of over 30 million. Of the total available land, only 5.2 million ha is currently under cultivation. Agriculture dominates the country's economy, contributing 43% of the GDP, providing employment to over 80% of the workforce in rural areas, and a major source of foreign exchange earnings (85% of export earnings). In face of the increasing population growth that is estimated to reach 70 million by 2020, declining soil fertility, changing weather patterns causing frequent crop failure, urbanization just to mention but a few, failure to change from traditional systems to modern production technologies will create food insecurity. Therefore, there is need to proportionately increase production by transforming agricultural sector through sustainable technology transfer to the rural areas in form of improved planting materials, fertilizers, crop protection products, water management, improved agronomic packages and improved seed delivery systems. The government Plan for Modernization of Agriculture (PMA) is one of the initiatives that offer a chance to farmers to profitably engage in crop production. For this to succeed, improved seed of important food and non-food crops are expected to be a major ingredient in increasing production and productivity hence improving family income and reducing food insecurity at the family level and the country.

Uganda's crop production acreage traditionally ranges from 9 to 10 million acres annually. In addition, approximately another 2 million acres is used for pastoral activities. Uganda's major food crops are bananas, maize, beans, soybeans, groundnuts, sesame sorghum, finger millet, upland rice, sweet potatoes, Irish potatoes, cassava, and horticultural crops (vegetables and fruits). The traditional cash crops in Uganda are coffee, cotton, tea, sugarcane and tobacco among others. In the recent past, a number of non-traditional cash crops have become important in raising house hold incomes. These include bananas, maize, beans, rice and other food crops. In hectares, the estimates of the cropping pattern are: bananas 1.5 million (28%), cereals 1.34 million (25%), root crops 0.895 million (16.9%), pulses 0.75 million (13.9%), oil crops 0.428 million (7.9%), and other crops 0.44 million (8.2%)

The seed industry in Uganda is characterized by production and marketing of major and minor crop species ranging from agronomic crops to vegetables. In general, the Ugandan seed industry can be described as quite diverse comprised of privately owned seed companies, ranging from small to medium scale companies and a few multinationals. Because of the diversity of food crops, the Seed Industry has to aim at supplying a variety of seeds from dry seed to vegetatively propagated planting materials (for crops and trees) for increased productivity and addressing food security issues.

Although agriculture significantly contributes to the economy of Uganda, average yields obtained by farming communities are low compared to the yield potential of most crop varieties grown in the country and in the region as a whole. This is partly attributed to the

limited use of improved seeds in the country, which is estimated at less than 10%. As a result, many households do not only lack a surplus for sale but also lack enough for their own consumption. Since seed is the key to modernization of agriculture, the seed industry has a major role to play in Uganda's efforts to improve agricultural productivity and foster national development.

The potential benefits from the use of good quality seed of adapted varieties by farmers can be enormous, and the availability of quality seed of a wide-range of varieties and crops to farmers can increase productivity, reduce risks from pest, drought and disease pressure, and increase incomes. Production increases through the use of adapted varieties in a given area can create employment opportunities related to processing, marketing, and other activities generated through quality seed production. Food security is heavily dependent on the seed security of the farming community. Seed sector development is therefore essential to foster agricultural growth.

1.2 Background

Before 1968, the seed sector in Uganda was predominantly informal and improved crop varieties were passed on from farmer to farmer. When a critical number of maize, soybean and groundnuts varieties had been developed and required maintenance, the government started a seed scheme in the Ministry of Agriculture. The scheme maintained and marketed all crop varieties except vegetative crops.

In the 1990s government sourced funding from the Government of German and African Development Bank and injected it into the seed scheme. By 1995, the scheme that later became Uganda Seed Project (USP) was unable to take up and market all the new varieties developed by national research institutes that the farmers adopted. The retail marketing network was still in its infant stages and most seeds were distributed via government channels, being in most cases inefficient. As such, seed often remained unsold in government extension offices. The Project activities of production, processing and marketing of seeds had become too commercialized and intricate to be handled by a government department under civil service regulations.

In line with the project objectives and indeed government policy, the project was transformed into a public liability company, Uganda Seed Ltd. in 1999, and later privatized. Government liberalized the seed sector and encouraged private entrepreneurs to establish seed companies. Following the liberalization of the seed industry, many private seed companies and agro-input dealers came up and organized themselves under the umbrella of USTA (Uganda Seed Trade Association), which was incorporated on August 26, 1999. To date Uganda has more than 20 seed companies involved in seed growing, processing and marketing as well as selling other agro-inputs like fertilizers, chemicals and farm equipment. Out of these, 18 are USTA members companies. The formation of USTA is in line with the International Seed Policies and the Association is now a member of AFSTA and ISF (International Seed Federation).

Table 1: List of seed companies registered in Uganda

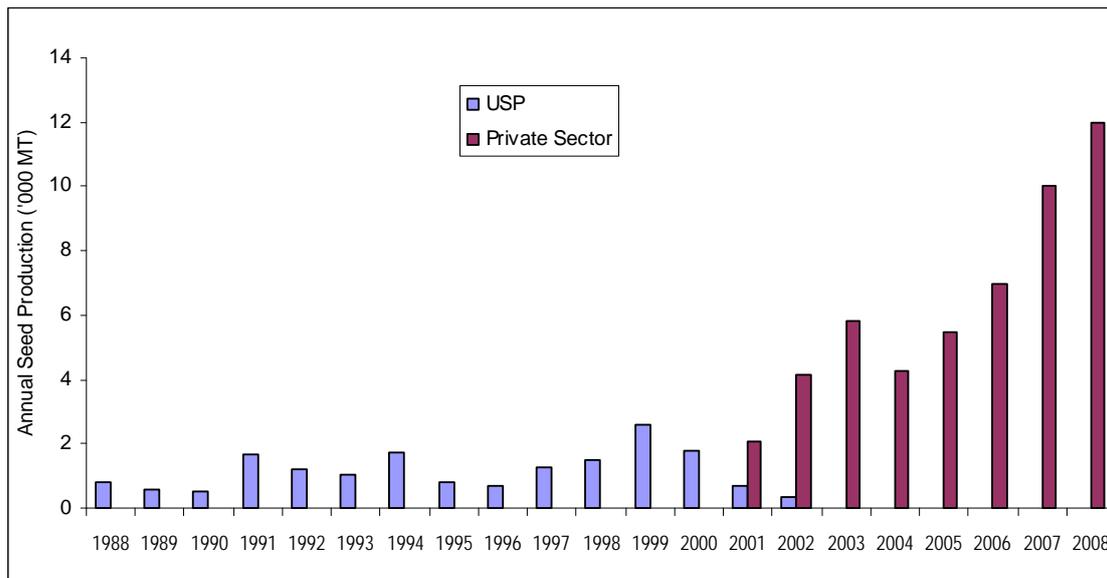
No	Company	Contact person	E-mail and website	Telephone and fax
1	East African Seed (U) Ltd.	Shankar T.D.	easeed@spacenet.co.ug tdshankar@easeed.com www.easeed.com	0414-566585, 0392-773321 0772-583783, 0782-983211 Fax: 0414-566584
2	NASECO (1996) Ltd	Nicolai Rodeyns	nasecoseeds@yahoo.com rodeynsnicolai@yahoo.com www.nasecoseeds.com	0414-236365, 0392-960712 0772-618001, 0754-618001 0465-442070 Fax: 0414-236365, 0392-960712
3	FICA seeds Ltd	Chris Kaijuka	fica.project@mail.com chriskaijuka@yahoo.com www.ficaseeds.ug	0414-566631 0752-374106, 0772-454288 Fax: 0414-567159
4	MONSANTO (U) Ltd	J.S. Matovu	monsanto@africaonline.co.ug www.monsantoafrica.com	0414-255339, 0414-256019 0772 404101, 0752 404101 Fax: 0414-255339
5	General & Allied Ltd	B.N.S. Gowda	gal@utlonline.co.ug gal@infocom.co.ug	0414-349301 0712-732368 Fax: 0414-232368
6	Mt. Elgon Seed Co.	Sylvia N. Kyeyune	mtelgonseed@mtelgon.co.ug snanteza@yahoo.com www.kenyaseed.com	0414-250544, 0782-323334, 0757-323334 Fax: 0414-253898
7	AK Oils & Fats U Ltd	David Luseesa	admin@mukwano.com david.l@mukwano.com www.mukwano.com	0414-313313, 0312-313313 0772-744741 Fax: 0414-250598
8	Otis Garden Seeds	Peter Otimodoch	otisgard@yahoo.com	0414-269520, 0772-442962 Fax: 0414-342504
9	Victoria Seeds Ltd	Josephine Okot	victoriaseeds@infocom.co.ug jo-seeds@infocom.co.ug info@victoriaseeds.com www.victoriaseeds.com	0414-346763 0772 467365 Fax: 0414-230364
10	Akuku Farm	Isiagi	akukufarmseedsltd@yahoo.com	0414-568880

	Seeds Ltd	Stansilas		0772-408304 Fax: 0414-568880
11	Grow More Seeds and Chemicals Limited	Sanjeevi Illa	growmoreseeds@gmail.com isanjeevi@hotmail.com	0414-578380 0312-261487 0774-700818
12	Rial Seeds (U) LTd	Darlington Tindibakira B.	rialseeds@yahoo.com	0312-288721, 0752-778877 0312-290407 Fax: 0312-290407
13	Amla Seeds Enterprises	Lameck Mpoza	amlaseeds@gmail.com amlaseeds@amlags.com	0414-233263 0712-777345, 0712-855521, 0772-855521 Fax: 0414-233109
14	Arolim Seeds(U) Ltd	Wilberforce Mubiru	arolimseeds@yahoo.com	0414-347498, 0772-422627
15	CAII	Tom Baligeya	caiseeds@ymail.com	0772-417150
16	Pearl Seeds Ltd	Richard Masagazi	Pearlseedltd1@gmail.com	0772-451871
17	Mount Meru Millers(U) Ltd	Bhargava R.K.	bhargavammml@gmail.com , chowdry@mountmeru.co.tz	0772-706611, 0772-706610
18	Supa Seeds Africa Ltd	Paul Kagimu	Supa.seed@yahoo.com	0772-349032, 0312-291895
19	El-Shaddai International	Patrick Makwetta	makwetta@yahoo.com	0772-449379 0772-490262
20	Safari Seeds Ltd.	Robert Kaginda	safariseeds@gmail.com	0772446624
21	Masaba Seed Company	Patrick Masaba	soittapatrik@yahoo.com	0772-427142
22	Masindi Seed Company	Luzige Eugene	masindiseed@gmail.com	0772-550802

1.3 Seed statistics

Seed data is useful for decision making and planning purposes. It is required by a cross section of stakeholders including farmers, researchers, investors, government, policy makers, donors, expatriates, consultants, etc. Unfortunately, Uganda currently lacks an accurate source of data on seed demand, seed production, seed import and seed export. Being a young

seed industry, there is limited capacity/resources to collect the required data. Seed companies are routinely requested (e.g., by filling a questionnaire) to provide information on quantities of seed produced, imported and exported. However, some companies are not responsive, sighting sensitivity and confidentiality of the information required. As a result therefore, the available data on seed production, import and export is scanty but amidst all this, improved seed use in Uganda is estimated at 7.5%. Figure 1 illustrates the estimated production of seed by the seed industry in Uganda over years.



Key: USP = Uganda Seed Project

Figure 1: Annual seed production by the Seed Industry in Uganda over years

The figure indicates that seed production is carried out by the private sector, which has managed to increase the quantity of seed produced and sold over years. The quantity of seed has risen from 2,500mt, the highest ever recorded by USP (Muhhuku, 2005) in 1999, to 12,000mt in 2008.

With support from DANIDA, USTA has introduced a tamper proof system of seed labels for the seed industry in Uganda, with the main purpose of checking seed faking. The system, which will be in use at the end of 2010, has an inbuilt seed data base that will generate reliable data on seed production, based on number of labels issued. It is believed that this will solve the problem of seed companies being reluctant to provide seed production data.

Table 2: Quantities of seed imported into Uganda over years

Crop	2004	2005	2006	2007	2008	2009
Hybrid maize (MT)	427	383	597	380	500	670
Sunflower (MT)				5		
Sorghum (MT)						5
Vegetables (Kg)						
Cabbage	12,146	11,876	18,690	17,269	18,567	13,125
Onion	11,248	14,358	15,139	12,145	15,123	8,245
Tomatoes	8,179	13,890	4,695	7,256	12,423	6,346
Egg plant	7,324	8,430	3,189	5,143	8,121	6,438
Okra	6,438	9,150	3,219	4,328	8,935	7,564
Carrot	5,150	850	1,996	732	2,023	985
Collards	217	300	475	335	4,730	2,458
Watermelon	639	955	2,315	243	619	736
Lettuce	53	5	90	23	4,320	1,120
Cucumber	28	20	40	54	2,189	248
Pepper	175	50	700	158	243	645
Spinach	120	400	-	56	154	367
Cauliflower	35	-	50	32	364	548
Kale	75	25	450	24	5,189	3,120
Total (Vegetables Kg)	51,827	60,309	51,048	47,798	83,600	51,945

In general, the table shows an increase in quantities of seed imported, which may be attributed to improvements in import procedures as a result of the harmonization process of regional seed laws.

Table 3: Quantities (MT) of seed exported from Uganda over years

Crop	2004	2005	2006	2007	2008	2009
Maize		110	354	328	244	187
Sorghum	130	300	240	150	33	20
Beans		5	10	215	18	
Rice				12		
Ground nuts			20	270	10	34
Total	130	415	624	975	305	241

The table indicates an increase in quantities of seed imported from 2004 to 2007, which could be a reflection of improvements in import procedures, another benefit from the harmonization program. The drop in seed export in 2008 and 2009 may be attributed to an increase in the local demand for seed due to the following reasons:

- a) Resettlement of the formerly displaced people in Northern Uganda. After more than 20 years of political turmoil, the Northern region had no significant quantities of planting material. The Government and several NGOs purchased large quantities of seed from local seed companies for distribution to farmers in Northern Uganda.
- b) The world food crisis led to an increase in food prices. Many farmers purchased improved seed to produce grain in order to take advantage of the increased food prices.
- c) NAADS (National Agricultural Advisory Services) purchased a lot of seed for distribution to farmers as part of Government's Plan for Modernization of Agriculture (PMA).
- d) UNADA (Uganda National Agro-input Dealers' Association) initiated a program to improve farmers' access to improved seed. The program, supported by AGRA (Alliance for a Green Revolution in Africa), takes up substantial quantities of seed from the local seed industry.

Because of the increase in local demand for seed, there was less seed available for the export market despite an increase in the regional seed demand at that time. In fact, according to MAAIF, the country experienced a shortage of seed, although the deficit could not be quantified. This illustrates the importance of supporting seed companies to increase seed production and to improve their storage capacities as a guard against any future seed crisis.

1.4 Challenges of the seed industry in Uganda

The world seed market is estimated at US\$ 32.5 billion and the market share for Africa is 3.1% of the world seed market. Out of this, Uganda seed market is estimated at only US\$ 10 million (ISF, 2007), the lowest among the countries listed.

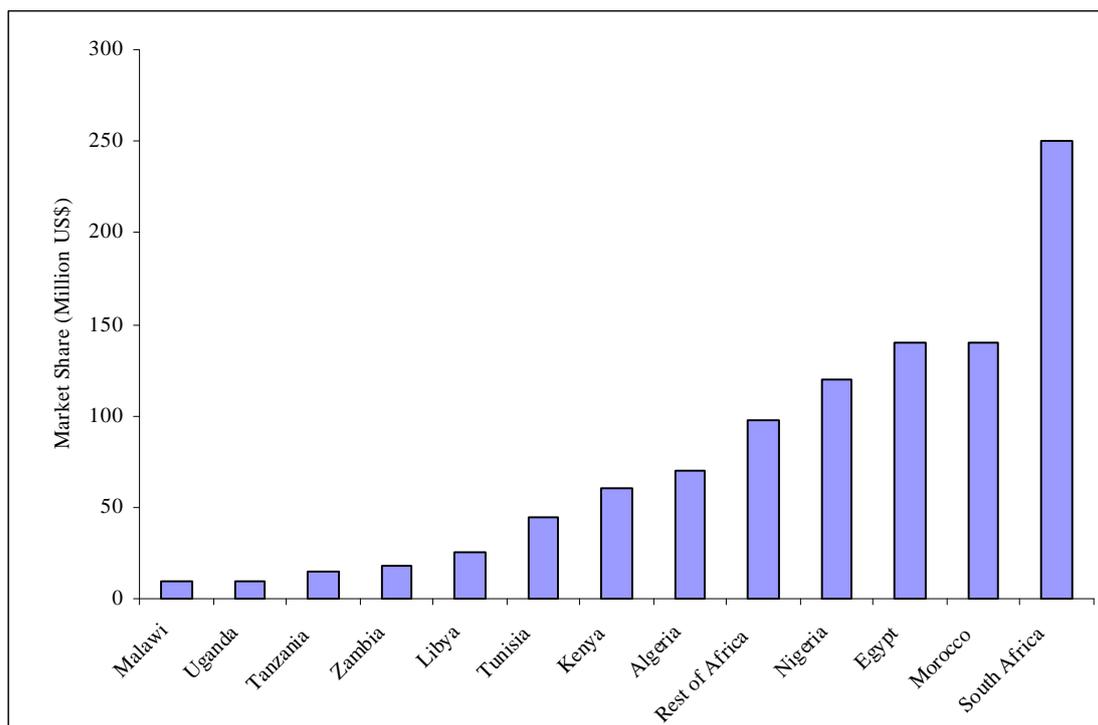


Figure 2: African Seed Market

Uganda has been unable to take full advantage of the recent advances in seed sector development mainly because of institutional bottlenecks affecting the seed value chain. Results of a study undertaken by CIMMYT and IITA in 2007 indicated the following as major bottlenecks affecting the seed value chain in Uganda (Langyintuo, 2008).

Table 4: Bottlenecks affecting the seed value chain in Uganda

Stage along the chain	Relative importance (%)	Bottlenecks and respective relative importance (%)
The establishment of a seed company	26	<ul style="list-style-type: none"> • High investment (start up) cost: 22% • Lack of qualified man power and technical know-how: 45% • Lack of operational credit: 33%
Seed production and processing	29	<ul style="list-style-type: none"> • Lack of access to germplasm: 30% • Technical constraints: 42% • Lack of production credit: 8% • Others: 20%
Seed marketing and distribution	20	<ul style="list-style-type: none"> • Poor roads: 45% • Limited transport facilities: 33% • Poor rural storage facilities: 22%
Seed demand at the farm level	11	<ul style="list-style-type: none"> • Poor grain markets: 38% • Lack of awareness: 34% • Lack of access to quality seed: 12% • Reluctance to change: 9% • Access to credit: 7%
The seed policy environment	14	<ul style="list-style-type: none"> • Unfavorable seed policies (import/export restrictions, taxation, etc): 61% • Lengthy variety release process: 31% • Controlled seed market: 8%

2. STANDARDS FOR SEED CERTIFICATION

The components of a seed program include plant breeding, variety release, seed production, seed processing, seed certification, seed marketing and extension. These components have to be interlinked in order to function towards the desired goal.

Seed Certification is a system for ensuring the production of genetically pure, good quality seed of improved varieties. The task of seed certification is accomplished through various steps: determining the eligibility of cultivars, verifying that the seed source is authentic, field inspection, lot examination, sampling, seed testing, labeling, sealing and establishment/evaluation of pre-and post-control plots.

The Seeds and Plant Act 2006 provides for the establishment of the National Seed Certification Service (NSCS) as a regulatory unit within the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). In MAAIF, NSCS is in the Department of Crop Protection. The Head of NSCS is Mr. Joseph Bazaale on the following address: Ministry of Agriculture, Animal Industry and Fisheries, P.O. Box 102, Entebbe; Tel +256-414-320115 or +256-772-405561, email address: jbazaale@yahoo.co.uk or joebazaale@yahoo.co.uk

2.1 Existing Seed Classes

Uganda has adopted the OECD seed scheme that recognizes five seed classes namely breeder's seed, pre-basic seed, basic seed, certified seed and standard seed. Breeder's seed is the original nucleus seed from the breeder. Breeder's seed is multiplied into pre-basic seed by the breeder or his agent under the breeder's supervision. Pre-basic seed is multiplied into basic seed under regulation by NSCS. Basic seed is finally multiplied into certified seed under regulation by NSCS. In Uganda, certified seed can be of two or more generations. The first generation from basic seed is known as certified seed 1st generation. Further generations are known as Certified seed 2nd, 3rd, etc generation, the appropriate generation being designated. Standard seed means any seed which is not grown under a certification program but may enter the market in case of certified seed shortage and meets laboratory seed testing standards as certified seed. Standard seed therefore is seed that has not had field approval but meets laboratory purity and germination standards.

2.2 Seed certification procedures

Under regional harmonization, 10 crops were identified as economically vital and recommended for compulsory seed certification. These include beans, cassava, ground nuts, Irish potatoes, maize, rice, sorghum, soybeans, sunflower and wheat. In Uganda, wheat is not yet a major crop and therefore not part of the crops whose seed must be produced under compulsory certification. Standards for cassava have not yet been developed and the crop therefore is not part of the list in Uganda. As the law provides, Uganda has identified other crops of national importance whose seed is produced under certification. These include millet (finger millet, bulrush millet and pearl millet), peas (cow peas and pigeon peas), cotton and sesame.

In Seed Certification, all field inspections, lot inspections and seed testing must be made by well - trained and qualified staff. The procedures and techniques to be used are clearly set out in the seed certification hand book to avoid decisions based on personal opinion and ensure the use of uniform criteria among the seed inspectors and analysts. The handbook has been harmonized with provisions under OECD and ISTA. The procedures in the hand book are reflected in the seed regulations being developed, which are in line with the harmonized regional standards. The hand book gives a detailed account of the procedures for seed certification, which can be summarized as follows:

- i. To deal in seed in Uganda, a person must first apply for registration to the NSCS by filling form SR 5.
- ii. Any successful applicant is then registered with NSCS as a seed merchant and must be in possession of a valid registration certificate on Form SR 6.
- iii. With a valid Form SR 6, a seed merchant then proceeds with growing seed. Two weeks after planting, a seed grower or merchant applies to the NSCS for inspection of the seed crop by completing Form SR 7. In Uganda, this is commonly referred to as submission of planting returns. The form should clearly spell out the name of the grower, location, crop, variety and acreage among others. The origin of the seed sown for inspection and certification must be known and linked to the breeders' seed. Therefore, Form SR 7 must be accompanied by proof of origin of the seed, which is a certification label. When necessary, a letter from the breeder can be accepted as confirmation of origin of breeders' seed.
- iv. NSCS registers the seed crop by completing Form SR 8, which confirms that the crop is eligible for inspection.
- v. The number of field inspections depends on the crop but the minimum recommended is two.
 - a. Preliminary inspection is done 1 to 2 weeks before flowering. This is to give time for rouging off-types and make any other corrective measures before contamination occurs.
 - b. Flowering inspection is the most crucial activity in seed certification and involves cultivar identification, off-type counts to determine the degree of contamination and assessing pest/disease occurrence. In hybrid seed production, 3 inspections must be made when the silks are receptive and can be termed 1st, 2nd or 3rd inspection.
 - c. Pre-harvest inspection is done when the crop is physiologically mature, before harvesting. At this stage the inspector checks on the diseases and pests that occur late in the season, makes further cultivar identification, checks on off types and make counts, ensures total removal of male lines in hybrid seed production and assesses yield.
- vi. During processing inspection, also known as post-harvest inspection or farm stock approval, the inspector checks on sorting, checks on storage facilities, estimates or confirms yields and takes samples for laboratory testing.
- vii. On completing crop inspection, the inspector informs the grower of his recommendation for the crop by leaving behind a clearly written statement, for any operation, on which approval of the crop may depend by completing Form SR 9.
- viii. Not all defects in seeds can be seen during field inspections. To confirm the value of the seed to the farmer, seed testing is done on a sample in a laboratory against various attributes as specified in the certification standards. Submitted samples are received in the laboratory from the processing plant, other farmers and NGO's. Samples originating from seed inspectors or seed analysts are referred to as official samples while the rest are private samples. Official samples are accompanied by a seed test request form.
- ix. The inspector finally approves or rejects a seed crop by completing Form SR 10A.
- x. A representative sample of the harvested crop is taken for a laboratory test that will lead to either farm stock approval or rejection by completing Form SR 10B.

- xi. Only seed from a registered crop that has been conditioned in accordance with the provisions of seed regulations is sampled for laboratory tests and post control verification. A representative sample is taken using ISTA or other internationally recognized procedures by completing Form SR 11. The sample is subdivided into three parts.
- xii. The three sealed samples are then sent to the National Seed Testing Laboratory as follows; one sample for laboratory analysis, a second sample for post control planting and the third sample to be held as a reserve sample.
- xiii. The results obtained from the National Seed Testing Laboratory together with the field inspection reports enable the NSCS to grant or reject certification of the seed lot. Certification includes labeling and sealing.
- xiv. Test results are recorded on a certificate, Form 12 A.

- xv. For private samples, the test report is furnished to the sender by completing Form SR 12B. All test reports of private seed samples are stamped “Not for Sale”- own use only.
- xvi. Seed samples are retained and stored under optimum storage conditions for at least 12 months from the date of the original test result. Any person aggrieved by the results of the official seed test may appeal to the Head of NSCS who shall order a retest on the original sample submitted. Official labels shall be attached under the supervision of an official seed inspector.

2.3 Conformity of seed certification with regional standards adopted by EAC

The seed certification standards outlined in the certification hand book and the draft seed regulations are in conformity with the regional standards adopted through rationalization and harmonization of the laws governing the seed sub-sector. However, there is limited capacity to enforce regional and international standards, giving way to substandard seed that can not penetrate the regional market. There is therefore need for capacity building for the public sector to enable them to enforce quality standards. For efficiency, Government should be encouraged to make NSCS an autonomous body, just like KEPHIS (Kenya Plant Health Inspectorate Service). In Uganda, delivery of services has improved through formation of similar autonomous bodies, for example National Drug Authority, National Forestry Authority, National Coffee Development Authority, Cotton Development Authority, etc.

By law, the Government should provide facilitation for inspectors to carry out their regulatory duties with the various seed companies. However, due to limited resources, Government can not provide inspectors with sufficient facilitation like transport, fuel, hotel accommodation, meals, etc during the performance of their duties. The seed companies therefore have to foot these bills during the few times inspectors visit them. This is in addition to the official inspection fee. This may compromise standards because inspectors find it unfit or unfair to reject a technically unsuitable field after being facilitated by the owner to carry out the inspection.

Although a number of stakeholders have played significant roles in ensuring seed laws are in place, a lot still needs to be done. The Plant Variety Protection bill has not yet been passed by parliament. There is no legal guidance for bio-safety activities beyond confined field trails; the draft Biotechnology and Bio-safety Bill is yet to be tabled before cabinet and Parliament. Seed regulations are not yet tabled before cabinet and parliament. These delays in establishing the legal frame work for the seed industry impact negatively on the introduction of planting material in the country and enforcement of quality standards. Regional bodies like COMESA and ASARECA should sensitize the Government on the need for this legal framework. To earn more political will, the regional bodies may have to look at the possibility of linking with the Government through the African Union.

Seed business is a highly specialized and technical area. In Uganda, seed companies are owned and managed by a cross section of people, some of whom have not had an opportunity to undergo training in seed business. To ensure success in the implementation of the harmonized laws/regulations, the private sector should be educated and trained on the requirements of the law/regulations and minimum standards. The private sector should also be equipped with appropriate technical knowledge to enable them to attain the required minimum standards.

There is need to provide cheap financing for the private sector to enable them acquire the appropriate investment and working capital that will enable them to meet the required quality standards. This can be in form of cheap loans at affordable interest rates of less than 10% with a long repayment period. The loans should also be extended to those interested in investing in agriculture because without them, there will be no market for improved seed, meaning that harmonization will not offer the intended benefits to farmers.

Harmonization aims at improving the movement of seed across borders so that farmers can get access to improved germplasm to improve productivity. However, this may be more of a dream than a reality if the demand for seed at farm level remains low. To improve seed demand, there is need for improving the output market for grain. Farmers can not buy seed if they do not have a stable grain market with attractive prices. Entrepreneurs should be inspired to invest in agro-processing and value addition in order to encourage productivity. Provision of appropriate storage facilities for produce is required especially during seasons of excess production so that farmers do not sell their grain at give away prices.

The availability of appropriate rural infrastructure has a directly positive relationship with seed quality. Some seed companies in Uganda are located in areas with no electricity. All processing activities are carried out with generators. This is very expensive and may force companies to compromise quality in order to make a profit. The road network in some of the rural areas does not favour seed business or agriculture in general. With roads in poor conditions, farmers will not have access to improved seed because agro-input dealers will not open up business in those areas. If they do, seed will be too expensive for farmers to afford and may lose viability on the way due to transport problems. If by any luck farmers get access to improved seed, they may not be able to get market for their produce if traders can not easily access the area due to bad roads. This will be a disincentive for them to use improved seed again, which will defeat the objective of harmonization.

2.4 Future plans of the country for standards for seed certification

With the newly introduced system of tamper proof seed labels, it is believed that the level of seed faking will reduce, which will not only improve agricultural productivity, but will also create more market for genuine seed producers and seed dealers. The system will also be a useful asset in generating data on seed production. The sustainability of the system is however a challenge, with NSCS still under MAAIF.

As the production of foundation seed improves, the industry will set a time frame for phasing out the use of standard seed in favour of certified seed. The available foundation seed for crops like maize is enough to meet the national requirement for certified maize seed. There is no justification therefore for the country to continue using standard maize seed, except in cases of natural disasters like floods, drought, hail storms, etc.

One of the future plans of MAAIF is to strengthen NSCS with sufficient resources like man power, financial resources and infrastructure to enable the unit to enforce standards. It is however not clearly understood when and how this is going to be a reality.

3. VARIETY EVALUATION, RELEASE AND REGISTRATION

In Uganda, the National Agricultural Research System (NARS) has the mandate to generate and disseminate agricultural technologies. Development of new crop varieties is one of the outstanding technologies generated by the system. In the recent past, the private sector has also been an active player in variety development.

The body in charge of variety evaluation, release and registration is NSCS, in the Department of Crop Protection, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). The Head of NSCS is Mr. Joseph Bazaale on the following address: Ministry of Agriculture, Animal Industry and Fisheries, P.O. Box 102, Entebbe; Tel +256-414-320115 or +256-772-405561, email address: jbazaale@yahoo.co.uk or joebazaale@yahoo.co.uk

Before a variety can be recognized and entered in the National List of varieties, it has to be tested both for agronomic value and for Distinctness, Uniformity and Stability (DUS). The testing for agronomic value is carried out by the breeders while the DUS testing is the responsibility of the NSCS.

3.1 Procedures for variety evaluation, release and registration

NSCS ensures that only those varieties which undergo National Variety Performance Trials (NVPT) for two seasons are released for commercial production. Where a variety is already released in another country, such variety undergoes national variety performance trials for at least one main growing season before release provided that the breeder of such variety

provides data used for release in similar agro-ecological zones. The purpose of National Variety Performance trials is to determine (a) Agricultural value (b) Distinctness, Uniformity and Stability (DUS)

- i. Any person or institution wishing to have their variety tested in National Performance Trials and DUS applies to the NSCS by filling Form SR 1 which is accompanied by the required seed sample and the prescribed fees. While applying for NVPT, the applicant must show evidence of high performance of the variety in yield trials while on farm trials may be undertaken simultaneously with the NVPT.
- ii. The law, which is still in the making, states that NSCS shall independently carry out NVPT in accordance with the established standards/protocol. However, due to limited resources, the trials are conducted by NARO breeders. NSCS then uses these trials to carry out DUS testing.
- iii. After evaluation of the candidate varieties in the NVPT, the Institution/individual wishing to have the variety released applies to NSCS by filling Form SR 2.
- iv. The National Variety Release Committee (NVRC), upon receipt of the application acknowledges it by filling Form SR 3.
- v. The NVRC considers the applications and release of new varieties through meetings during which breeders and NSCS make presentations of the NVPT and DUS testing respectively. Any variety with superior agricultural value is released by the NVRC and registered onto the National Variety List. The applicant is informed of the decision of the NVRC through a notification on Form SR 4. If a variety is released in more than one country of the East African Community, it qualifies to be on the East African Catalogue.

3.2 Crops included in the variety evaluation, release and registration

All crops handled by the NARS are subject to variety evaluation, release and registration. These include cereals (maize, rice, sorghum, finger millet and pearl millet), pulses (beans, pigeon peas and cow peas), oil crops (ground nuts, sunflower, soybeans and sesame), fiber crops (cotton), root crops (Irish potatoes, cassava and sweet potatoes), fruits and vegetables.

3.3 Conformity with regional variety evaluation, release and registration adopted by EAC

The procedures outlined in the seed regulations for variety evaluation, release and registration are in line with harmonization. Although these seed regulations have neither been passed nor debated in parliament, most of the procedures outlined are already being implemented by NSCS, with the exception of the following:

- a) According to the law, NSCS is supposed to carry out NVPT. However, due to limited resources, NVPT are conducted by breeders in NARO (National Agricultural Research Organization). NARO is structured into programs that are crop based. Some of the programs are well funded, while others are not. For well funded programs, NVPT are subsidized because the costs are embedded within the daily operations and

activities of the program. For poorly funded programs, seed companies wishing to have their materials tested must meet the costs of transport, accommodation and meals for the breeders as they conduct these trials. At times, these costs are too high for companies to afford, for example a breeder can request for US\$ 25,000 to conduct a trial. As a matter of fact, it is on record that the high NVPT cost has made it unaffordable for some companies to introduce superior varieties, thus denying farmers access to these materials.

- b) The law states that on evaluation of the candidate varieties in the NVPT, NSCS will present its recommendations to the NVPT Technical Committee before the varieties are presented to the National Variety Release Committee (NVRC) that approves the varieties for release. At the moment, the NVPT Technical Committee is not in place and after evaluation of candidate varieties, the breeders and NSCS present their reports to the NVRC in a variety release committee meeting.

3.4 Future plans for variety evaluation, release and registration

MAAIF recognizes the short comings brought about by having NVPT conducted by breeders in NARO. It is the wish of MAAIF therefore that if resources ever allow, these trials will be conducted by NSCS.

4. PLANT VARIETY PROTECTION (INTELLECTUAL PROPERTY RIGHTS)

Although Uganda is making progress with the Plant Variety Protection (PVP), this area still lags behind the rest of the areas of the harmonization agenda. This may be partly attributed to the lack of a functional plant breeders' association in Uganda. Some efforts were made to form a Uganda Plant Breeders' Association (UPBA) in 2006 with negligible tangible results. A meeting to revive the association was held in April 2010 during which four working groups were formed and assigned various responsibilities including drafting the constitution, drafting a proposal to seek funds for the association, look into the possibility of organizing annual symposia and streamlining NPT. Progress by the working groups appears to be limited due to lack of momentum.

The body responsible for PVP in Uganda is the Plant genetic Resources Centre (PGRC), Entebbe Botanical Gardens (EBG), under NARO. Mr. John Wasswa Mulumba is the Head of PGRC and Curator EBG, on the following address: Plot 2 – 4, Barkeley Road, P.O. Box 40 or 295, Entebbe, Uganda; Tel +256-414-320638 or +256-782-671698; email address curator@infocom.co.ug or jwmulumba@yahoo.com

4.1 PVP System

Uganda developed a draft PVP Bill (2002) but for the past few years, discussion of the bill was at a slow pace, attracting criticism from stakeholders. Efforts to have serious discussions were however recently revived, leading to a PVP Bill 2010, which was forwarded to the

parliamentary committee on agriculture for consideration and scrutiny in March 2010. The committee then organized a series of meetings with different groups of stakeholders to enable them present their views on the bill. These groups included USTA, which had their meeting with the parliamentarians on April 21, 2010.

A recent study by the Department of Crop Science at Makerere University revealed that although a PVP draft bill had been made for Uganda, the majority of the stakeholders in the seed sector were not well informed of the contents of this bill. As a matter of fact, some breeders were not aware that a PVP Bill was different from the Draft Seed Regulations! It was against this background that Makerere University in collaboration with the Uganda National Council for Science and Technology organized a one day seed stakeholders' workshop to deliberate on the PVP draft law in Uganda and to assess how it relates to international treaties on plant genetic resources (PGR). The workshop was held on April 28, 2010 and stakeholders noted that this workshop should have taken place before discussions of the draft with the parliamentarians. This would have put the stakeholders in a better position to make better contributions during the discussion with the parliamentarians. This demonstrates the importance of educating stakeholders on any upcoming seed laws; nothing should be taken for granted. Lack of education of people about any upcoming law will not only limit their effective contribution to the formation of the law but will also limit its effective implementation.

4.2 Conformity with regional PVP in EAC

The draft Bill is in conformity with regional PVP in EAC because it is UPOV compliant. During the development of the bill, a lot of consultations were made both outside and within the country; and several relevant documents were considered to ensure conformity. The first draft of 2002 had a clause on farmers' rights. However, UPOV does not recognize farmers' rights. Therefore, to make it UPOV compliant, the requirement for farmers' rights has been removed from the PVP Bill 2010 and placed under the Plant Genetic Resources Bill.

4.3 Future plan for the PVP

The short term plan for the PVP is to continue advocacy and lobbying of parliamentarians so that they speed up the process of passing the PVP bill into a PVP Law. Once passed, there is need to sensitize stakeholders to implement the law so that the country can achieve the intended benefits. The plant breeders' association will also be revived into a vibrant dynamic association that will spearhead the implementation of the PVP law to achieve its expected benefits.

4.4 Additional information on the PVP

One of the major concerns of the private sector is that the implementation of the PVP law will attract mega companies because they will be assured of the protection of their varieties

within the country. This, coupled with the inauguration of the EAC market may see local companies out competed and running out of business. A major appeal by the private sector therefore is that the law should ensure protection of local companies as the giant seed companies come in. The law should also ensure protection and motivation of local breeders as an assurance for continued variety development in case multinational companies decide to pull out due to problems like political instability in the country.

The insecurity expressed by the private sector is a clear indication of the need to build the capacity of the private sector to enable them benefit from the upcoming PVP Law and to assure them that the PVP is intended for the protection of the private and multinational companies as well as the public breeders.

5. PHYTOSANITARY MEASURES, SEED IMPORT/EXPORT DOCUMENTATION AND PROCEDURES

Although the terms of reference seemed to imply that phytosanitary and import/export procedures are different topics, the two are actually too related to be separated. They have therefore been discussed as one topic.

The procedures for phytosanitary measures, seed import and export are handled by two units in the Department of Crop Protection under the Ministry of Agriculture, Animal Industry and Fisheries. The first unit is the NSCS, headed by Mr. Joseph Bazaale on the following address: Ministry of Agriculture, Animal Industry and Fisheries, P.O. Box 102, Entebbe; Tel +256-414-320115 or +256-772-405561, email address: jbazaale@yahoo.co.uk or joebazaale@yahoo.co.uk The second unit is Phytosanitary Inspection Unit, headed by Mrs. Euphrans Tumuboine on the following address: Ministry of Agriculture, Animal Industry and Fisheries, P.O. Box 102, Entebbe; Tel +256-414-320115 or + 256-392-823060; email etumuboine@gmail.com

No person imports or exports seed unless:

- (a) The variety to be imported complies with the minimum field and laboratory standards, and is included on the National Variety List or the East African Common Catalogue.
- (b) Such seed is imported/exported in a form that allows easy sampling.
- (c) Seed for experimental purposes requires only a Phytosanitary certificate.

5.1 Procedures for seed import

In Uganda, no person is allowed to import seed unless he is a licensed seed merchant. The variety to be imported should comply with the minimum field and laboratory standards, and should be included on the National Variety List or the East African Common Catalogue. All imported seed is accompanied by an ISTA Orange International Certificate and a Phytosanitary Certificate. The seed is imported in a form that allows easy sampling. Seed for experimental purposes requires only a Phytosanitary certificate.

The procedures for seed import are as follows:

- i. An application for a seed import permit is made to NSCS on Form SR 15. The application specifies the details of the commodity to be imported and country of origin.
- ii. An inspector in the Phytosanitary Inspection Unit (PIU) conducts a Pest Risk Analysis (PRA) for the seed intended for importation.
- iii. Upon being satisfied that the importation of the consignment poses no or low risk to Ugandan agriculture, the Inspector issues an Import Permit on Form SR 16.
- iv. Where the import poses a high risk, the available phytosanitary measures are examined and the most suitable indicated. The permit issued specifies the phytosanitary measures in the form of additional declarations. An annex is provided for additional declaration.
- v. The importer furnishes the exporting country with a copy of the Import Permit for the processing of the consignment. Seed must be accompanied by a phytosanitary certificate from the country of origin. Where there are additional declarations, the exporting country is required to endorse the additional declarations on the Phytosanitary Certificate issued for the importation of the commodity.
- vi. The importer notifies the NSCS/PIU of the date and time of the arrival of the consignment in Uganda.
- vii. Upon arrival of the consignment at the entry point, the importer declares the commodity and accompanying documents to a Customs official from the Uganda Revenue Authority. The official is trained in quarantine issues for clearance purposes. The Customs official informs the Inspectors of the arrival of the consignment.
- viii. The Inspector examines the consignment and verifies the authenticity or otherwise of the accompanying documents (original copy of the Import Permit and Phytosanitary Certificate). A Report is submitted to the NSCS/PIU.
- ix. If the consignment requires testing or treatment, the Inspector recommends the type of testing or treatment required and supervises the same. The Inspector makes a report to the Crop Protection Department.
- x. Where the consignment must be destroyed, the destruction is carried out under the direction and supervision of the Commissioner at the owner's expense. The Commissioner informs the relevant bodies/agencies of the action taken and reasons for such action.

5.2 Procedures for seed export

In Uganda, no person is allowed to export seed unless he is a licensed seed merchant. The procedures for seed export are as follows:

- i. Prior to seed exportation, the exporter obtains an Import Permit from the National Plant Protection Organization (NPPO) of the importing country when so required, and present it to NSCS.
- ii. Upon the receipt of the Import Permit, the exporter prepares the commodity for inspection prior to export. The exporter furnishes the Inspector with all relevant documents, including documents issued by Inspectors during inspection of the crop during active growth, water and pesticide residue analysis reports and import permit.

- iii. The Inspector conducts an inspection of the documents and the seed through visual, sampling and other means depending on the nature of the commodity and the contents of the import permit.
- iv. Upon determination by the Inspector that the commodity inspected is fit to be exported and the accompanying documents are in order, the exporter is required to make a formal application on Form SR 15 for a Phytosanitary Certificate, which is issued not more than 14 days prior to shipment or in accordance with the requirements of the country of destination.
- v. If the material to be exported presents any risk for the exportation and spread of regulated pests in the importing country, it is, at the expense of the exporter, subjected to appropriate treatment in order to remove the risk or otherwise be denied a phytosanitary certificate.
- vi. Packaging material is examined for the maintenance of the safety and quality of the seed, and vehicles used in the transportation of consignments are inspected for the cleanliness and safety of the consignments.

Any person exporting material of unknown phytosanitary status obtains a license or authority on form X.

5.3 Re-export procedures

A Re-export certificate is a requirement where seeds in transit are repackaged. For a consignment of seeds to be re-exported out of Uganda, it must be accompanied by the original Phytosanitary Certificate and a Re-export Phytosanitary Certificate. The consignment must also be clearly marked and identified. The re-export certificate is issued upon assurance that the phytosanitary certificate is original, the consignment has not been exposed to the risk of infestation and the importing country's requirements have been met.

5.4 Conformity with regional phytosanitary, import and export procedures and documentation in EAC

One of the main challenges to optimal compliance is lack of adequate capacity to provide quarantine services at the numerous porous border points. As a country, Uganda lacks sufficient resources in terms of personnel, laboratory space, microscopes, inspection kits, refrigerators, transport, computers, internet facilities, etc. Although a quarantine pest list has been developed for 10 crops, the lack of resources has hindered the verification process. There is need to develop capacity to work more as a team, for example during pest risk analysis (PRA), surveillance of trans-boundary pests, dissemination of information, etc. At the moment, individual countries have adopted international standards with individual modifications. Building capacity to work as a team will enhance the harmonization process.

5.5 Future plan of the country for phytosanitary, import and export procedures

The country plans to finalize phytosanitary protocols and to implement them in conformity with regional harmonized standards. The quarantine pest list will be updated and validated. The country will build capacity at high risk entry/exit points and will enhance surveillance of trans-boundary pests. The unit loses well qualified staff to greener pastures; one of the plans therefore is to motivate and facilitate staff as a strategy to retain them. However, all this will remain more of a dream than a reality if resources still remain limiting.

6. MEMBERSHIP TO INTERNATIONAL ORGANIZATIONS

Uganda is a member of OECD (Organization for Economic Cooperation and Development), ISTA (International Seed Testing Association) and the Catagena Protocol. However, although the country is accredited to OECD, it has not yet received accreditation to ISTA. In cases where an Orange Certificate is required before seed is exported out of the country, Uganda always relies on KEPHIS. This process is expensive, inconvenient, time consuming and does not provide a conducive environment for the export market in the seed industry in Uganda. Uganda is endowed with abundant natural resources and is a potential regional seed producer. Therefore Ugandan seed companies are looking at the regional export market as an opportunity for expanding their business networks. Lack of an ISTA accredited laboratory in the country affects cross border seed trade and therefore hinders the development of the seed industry in the country. The country stands to earn foreign exchange if companies can easily export seed. Although MAAIF started on the process of obtaining accreditation to ISTA, the process has delayed for several years. This problem needs to be addressed as soon as possible.

7. SCHEDULE OF SEED CERTIFICATION DOCUMENTS

FORM SR 1

APPLICATION FOR INCLUSION OF A VARIETY IN THE NATIONAL PERFORMANCE TRIALS

**TO: National Seed Certification Services
P.O.Box 102
Entebbe**

Name of Applicant.....

Name of Employer.....

Location and address.....

**Variety/Varieties/ Experimental lines for inclusion in the NPT are;
.....
.....**

Origin

**Genetic Composition: Pure line/Hybrid/Composite/Synthetic/Vegetatively propagated, other (Specify)
.....**

**Has this variety been released/registered in another country? ----Yes/No
If yes, please specify country**

**Record of previous performance (Attach)
.....**

Additional information.....

**I/We enclose a sum of Ush..... only as testing fees (in form of crossed cheque No..... dated..... payable to NSCS .
Seed following seed samples are hereby submitted**

**Signature.....
Date.....**

FORM SR 2

APPLICATION FOR RELEASE AND INCLUSION OF A VARIETY IN THE NATIONAL VARIETY LIST/EAST AFRICAN COMMON CATALOGUE

**TO: The Secretary
National Variety Release Committee
P.O.Box 102
Entebbe**

Name of Breeder.....

Name of Employer.....

Location and address.....

Variety/Varieties/ are:
.....

Origin

Genetic Composition: Pure line/Hybrid/Composite/Synthetic/Vegetatively propagated *etc.....

End use.....

Record of previous performance tests including statistical analysis where a local check was used and /or on farm trial results (attach evidence)
.....

The variety or line most closely resembles
.....variety (ies) which is/are
***currently in commercial production**

A. Similarities are

B. Differences are.....

The variety/line has the following special features and characteristics
.....

.....

Proposed Name.....

Additional information.....

I/We enclose a sum of Ush..... only as registration fees (in form of crossed cheque No..... dated..... payable to NSCS.

Signature.....

Date.....

*** Delete whichever is not applicable**

FORM SR 3

REQUEST FOR INCLUSION OF NEWLY RELEASED VARIETY IN THE NATIONAL VARIETY LIST/EAST AFRICAN COMMON CATALOGUE (*One form for each variety*)

**TO: The Chairperson,
National Seed Board**

Name of Applicant.....

P.O.Box Tel.....

Name of Institution.....

P.O.Box

has/have developed a new variety and has/have proposed to name it as.....

The performance of the variety is as follows:

(i) It is suitable for agronomic zones

(ii) Yields aremt/ha

(iii) Requiresmm of rainfall distributed overdays

(iv) It is resistant to

(v) Matures within days

(vi)The variety stores best under conditions

Secretary Variety Release Committee

Signature.....

Date.....

FORM SR 4

NOTIFICATION FOR RELEASE OF A NEW VARIETY

TO: Applicant

Address

This is to inform you that your variety/varieties*

**.....
which you submitted for consideration for release is/are* now officially
released and will be included in the National variety list/East African Common
Catalogues.**

Signature.....

Chairperson, National Seed Board

Date.....

**C.C. The Secretary
National Variety Release Committee
P.O.Box 102
Entebbe**

*** Delete whichever is not applicable**

FORM SR 5

APPLICATION FOR REGISTRATION AS SEED MERCHANT

**TO: National Seed Certification Services
P.O. Box 102
Entebbe**

Name of Applicant.....

Address.....

Location of premises.....

Years of experience..... as

I/We wish to apply for a license as a seed merchant.....

I/We wish to deal in the:

1. Production of	
(i) Agricultural Crops (ii) Horticultural Crops (iii) Other (specify)	
2. Processing of	
(i) Agricultural Crops (ii) Horticultural Crops (iii) Other (specify)	
Marketing of	
(i) Agricultural Crops (ii) Horticultural Crops (iii) Other (specify)	

- (1) Merchant Do you have adequate and knowledgeable personnel who are conversant with seed matters? Yes/No
- (2) Production (i) Do you have adequate land and equipment to handle basic seed? Yes/No
(ii) Do you have contractual agreement with growers you have recruited? Yes/No
(iii) Do you have adequate field officers to supervise and advise growers on all operations of seed production? Yes/No
- (3) Processing (i) Do you have all equipment and machinery necessary to process seed? Yes/No

- | | | |
|---------------|--|--------|
| | (ii)Do you have adequate storage space? | Yes/No |
| | (iii)Do you have capacity to print and label packets/
containers as required by the regulations? | Yes/No |
| (4) Marketing | (i)Do you have adequate distribution channels that cover
all agriculturally important regions of the country? | Yes/No |
| | (ii) Do you have registered agents and stockists? .. | Yes/No |
| | (iii)Does your agent, and stockist have an agreement
with you for distributing seed on your behalf? | Yes/No |
| | (iv)Do they have a card that makes them identifiable as
your agent, sub-agent or stockist? | Yes/No |
| | (v)Do they have adequate understanding and knowledge
of seed? | Yes/No |
| | (vi)Do they have adequate storage facilities | Yes/No |
| | (vii)Do they understand that seed is living and should not
be mixed with dangerous chemicals, kept in high humidity
on moist floors, and excessive temperatures? | Yes/No |
| | (viii)Do they make sales returns to you? | Yes/No |
| | (ix) Do they know that packets/containers should not be
opened, i.e. sell seed in the whole units as packed by you? | Yes/No |

The seed will be kept in a store where adequate provisions are available to separate the various seed lots and where no other articles will be kept which could have an adverse effect on the quality of the seeds.

Declaration

I/We* AT ANY TIME DURING OFFICIAL WORKING HOURS EVEN WITHOUT Previous appointment will allow the inspectors entry to the seed stores and thereby provide them with the facilities necessary to carry out their inspection work as laid out in the Seed Regulations. I/We* further declare that I/We* am/are* conversant with seed regulations and shall observe the various clauses and conditions of the Regulations. In addition I/We * will send a list of all seed lots in our stores on and or at such a date as can be mutually agreed upon between the NSCS and ourselves.

Signature

Date.....

Note: If this application is successful as a merchant, you will be required to furnish the details of the seed crop in Form SR7. The Head of NSCS shall advise unsuccessful applicants.

*** Delete whichever is not applicable**

FORM SR 7

APPLICATION FOR FIELD INSPECTION OF A SEED CROP

**TO: National Seed Certification Services
P.O.Box 102
Entebbe**

Name of Grower.....

Postal address..... Tel No.....

Farm on which crops (every crop regardless of size) must be mentioned separately. (A crop is field where planting was completed within five days).

SPECIES	VARIETY	LOT NO. OF SEED USED	HECTARES

Seed Rate per hectare..... kg

**Registered Seed merchant/Dealer to whom the entire seed stock will be sold
.....**

I/We *enclose a sum of Ush..... only in payment of inspection fees (in form of crossed cheque No..... dated..... payable to NSCS and number of labels which were attached to seed containers which contained the seed used in planting the seed crop.

Crop No.	Variety	Date planted	Approximate date of harvest	Previous cropping for 3 seasons
1				
2				
3				
4				
5				
6				

Give a sketch map of route to your farm from the nearest main road and also the position where the seed crop is grown within your farm. Use additional paper if necessary.

Signature of applicant

Date.....

*Delete whichever is not applicable

FORM SR 8

REGISTRATION OF SEED CROPS FOR FIELD INSPECTION

NATIONAL SEED CERTIFICATION SERVICE

To: Company/Seed Grower.....
P.O. Box

REGISTRATION OF SEED CROPS FOR FIELD INSPECTION

Your application has been approved and registered as a seed crop of
.....ha at.....

Parish..... Sub-county..... District.....

The seed shall be harvested and delivered to the processor if the seed crop
meets the prescribed field standards.

Signature

Head of NSCS

Date.....

FORM SR 9

ROUTINE FIELD INSPECTION RESULT

Grower's Name.....

Species..... **Crop No**..... **Variety**.....

Class..... **Hectares**.....

1. Does the crop have proper cultivar characteristics?.....

Counts	Off types	Diseases	Other features	Noxious weeds	Other weeds
1					
2					
3					
4					
5					
6					
Total					
Average					
Percentage					
Identity					

2. The isolation distance/time of meters/days* is adequate/inadequate and should be corrected.

3. General condition of the crop e.g. drought, crop husbandry, etc
.....

4. Further Remarks.....

5. Estimated Yield..... **Bags/hectare**

6. The crop is approved/rejected

Signature of Grower or his representative.....

Signature of Seed Inspector.....

Date.....

* Delete whichever is not applicable

FORM SR 10A

FINAL FIELD INSPECTION RESULT

Grower's Name.....

Species..... **Crop No**..... **Variety**.....

Class..... **Hectares**.....

Factor	1 st inspection	2 nd inspection	3 rd inspection	Total no. or %
Off types				
Diseases				
Tassels				
Weeds				
Other crops				
Others (Specify)				

Remarks.....

.....

The crop is approved/rejected*

Signature.....

Head of Seed Inspectorate

Date.....

*** Delete whichever is not applicable**

FORM SR10 B

FARM STOCK APPROVAL CERTIFICATE

TO.....

Address.....

Your field of ha of (crop/variety), which was inspected and approved on and which yielded kg/ton of seed and whose sample for stock approval analysis was taken on..... has been approved/rejected*

The results were:-

(i) Purity

(ii) Germination.....

(iii) Moisture content.....

(iv) Insect damage.....

(v) Mouldiness.....

(vi) Noxious seeds observable.....

Signature of Seed Inspector.....

Date.....

*** Delete whichever is not applicable**

FORM SR 11

Owner of sample and address.....

Location of the Farm/Firm/Store.....

Number of samples.....

Date of submission.....

Date of sampling.....sampled by.....

Weight of sample..... Quantity represented.....

Type of packing.....

Number of units.....

Label Numbers.....

Crop..... Variety.....

Class of seed Lot number.....

1. Condition of sample

*Clean/Uncleaned

*Treated/Untreated

*Fumigated/Unfumigated

*Shelled/unshelled

Chemical(s) used.....

Fumigant used.....

2. Remarks

.....

3. Tests required:

Moisture content..... Purity.....

Germination..... Seed Health.....

Received by..... Date..... Test No. Allotted.....

* Delete whichever is not applicable

FORM SR 12A

OFFICIAL SEED TEST RESULTS CERTIFICATE

Date Received:				TEST NUMBER			
Lot Number:							
Crop Species and Variety:				Weight of Lot:			
Country of Origin:				(As stated by Seed Inspector)			
RESULTS OF THE ANALYSIS							

FORM SR 12B

PRIVATE SEED TEST RESULTS CERTIFICATE

Date Received:				TEST NUMBER			
Lot Number:							
Crop Species and Variety:				Weight of Lot:			
Country of Origin:				(As stated by Seed Inspector)			
RESULTS OF THE ANALYSIS							

*Private sample results are not for commercial use

FORM SR 15

APPLICATION FOR A SEED IMPORT/EXPORT PERMIT

TO: NSCS
P.O.Box 102
ENTEBBE

I/We* hereby apply to import/export* the seeds as described below in accordance with the terms laid down in the Seeds and Plant Act 2006 and the Seeds and Plant Regulations made under.

1. Name of Applicant.....

2. Postal Address.....
.....

Tel No.....

3. NSCS Registration Number is.....

4. Location of the stores where the seeds will be kept after arrival/where the seed is being kept before export*.....

5. Quantities of Seed of the same variety held in stock.....

6. Name and address of Origin.....
.....

7. Particulars of the seed imported/exported*

Species	Variety	Category	Weight in Kg

8. The Seed import consignment shall be accompanied by:

- (a) The Orange International (ISTA) Certificate (not a requirement if seed is for experimental purposes)
- (b) Phytosanitary Certificate

Signature.....
Date.....

Recommendation by Head of NSCS

- (i) The applicant is registered a Seed Merchant/Importer/**Conditioner** (where is this in the regulations??).
- (ii) The Quantity of seed of the same variety held in stock is..... tons/Kgs.
- (iii) The source of importation is recommended/not recommended.
- (iv) The varieties intended for importation have been tested for adaptability in Uganda and found to be suitable/unsuitable*.

Signature.....
Head of NSCS
Date.....

**= delete where not applicable*

FORM SR 16

SEED IMPORT/EXPORT PERMIT

Seeds and Plant Act 2006

Permit No.....

Date.....

Permission is hereby granted to (name of applicant).....

Of.....

With NSCS Registration No.....

to import from/export to*.....

the following seeds.....

Species	Variety	Category	Weight (Kg)

Subject to the following conditions:

1. The consignment of seed shall be accompanied by:-

(i) The Orange certificate of the International Seed Testing Association (ISTA)

(ii) Phytosanitary Certificate

2. The seeds shall not be distributed prior to the release of the results of samples unless with express permission of Head of NSCS or his agent if they do not meet the conditions set under Regulation 14.

3. Fulfillment of Commerce/Customs requirement and adherence to regulations pertaining to importation of seed.

4. Additional Conditions.....

.....

Signature.....

Head of NSCS

** Delete whichever is not applicable*

PHYTOSANITARY CERTIFICATE

No. _____

Plant Protection Organization of Uganda

TO: Plant Protection Organization(s) _____

of _____

I. Description of Consignment

Name and address of exporter: _____

Declared name and address of consignee: _____

Number and description of packages: _____

Distinguishing marks: _____

Place of origin: _____

Declared means of conveyance: _____

Declared point of entry: _____

Name of produce and quantity declared: _____

Botanical name of plants: _____

This is to certify that the plants, plant products or other regulated articles described herein have been inspected and/or tested according to appropriate official procedures and are considered to be free from the quarantine pests specified by the importing contracting party and to conform with the current phytosanitary requirements of the importing contracting party, including those for regulated non quarantine pests.

They are deemed to be practically free from other pests.*

II. Additional Declaration

III. Disinfestation and/or Disinfection Treatment

Date _____ Treatment _____ Chemical (active ingredient) _____

Duration and temperature _____

Concentration _____

Additional information _____

Place of issue _____

(Stamp of Organization) Name of authorized officer _____

Date _____ (Signature) _____

No financial liability with respect to this certificate shall attach to (name of Plant Protection Organization) or to any of its officers or representatives.*

* Optional clause

**FORM X: AUTHORITY/LICENCE TO EXPORT PLANT/SOIL MATERIALS OF
UNCERTAIN HEALTH STATUS**

In accordance with Section Of the Plant Protection Act, 2005, the National Plant Protection Organisation hereby authorises:

Dr/Mr./Mrs./Miss/Ms
of

.....
.....
(the "Licencee") to take to (country) between ...
..... and (dates)
..... (material) from (country), with the agreement of
the National Plant Protection Organisation of the importing country, and for research
purposes in designated laboratories as specified in the Plant Health Regulations of the
importing country material(s) specified
above, possibly infected with pathogenic pests or pest arthropods.

This licence/authority is subject to all other provisions of the above law and the International Plant Protection Convention 1997 and to the following conditions:

1. This licence or a copy shall be surrendered to officials of the National Plant Protection Organisation of the importing country, who will decide on the entry status, mode of transport and handling of materials/organisms.
2. The licensee, while still in Uganda, shall take all the necessary precautions to prevent dissemination of the (material(s)) from his or her package(s)/custody.
3. The licensee shall permit an authorised officer of the National Plant Protection Organisation, to inspect the conditions under which the materials/organisms are kept or packed.
4. In the event of loss of the (materials/organisms) while still in Uganda, the licensee shall immediately notify the National Plant Protection Organisation.
5. This licence may be varied or revoked by the Head of the National Plant Protection Organisation or his or her designated representative at any time.
6. Subject to condition five above, this licence/authority expires at the end of one month from the date of issue.
7. See Appendix.

Dated

Official Stamp

.....
Signature of Authorised Officer

.....
Name of Authorised Officer

.....
Title of Authorised Officer

Model Phytosanitary Certificate for Re-Export

No. _____

Plant Protection Organization of _____ (contracting party of re-export)

TO: Plant Protection Organization(s) of _____ (contracting party(ies) of import)

I. Description of Consignment

Name and address of exporter: _____

Declared name and address of consignee: _____

Number and description of packages: _____

Distinguishing marks: _____

Place of origin: _____

Declared means of conveyance: _____

Declared point of entry: _____

Name of produce and quantity declared: _____

Botanical name of plants: _____

This is to certify that the plants, plant products or other regulated articles described above

_____ were imported into (contracting party of re-export) _____ from

_____ (contracting party of origin) covered by Phytosanitary certificate No. _____,

*original certified true copy of which is attached to this certificate; that they are packed
repacked in original *new containers, that based on the original phytosanitary certificate

and additional inspection , they are considered to conform with the current phytosanitary requirements of the importing contracting party, and that during storage in _____ (contracting party of re-export), the consignment has not been subjected to the risk of infestation or infection.

* Insert tick in appropriate boxes

II. Additional Declaration

III. Disinfestation and/or Disinfection Treatment

Date _____ Treatment _____ Chemical (active ingredient) _____

Duration and temperature _____

Concentration _____

Additional information _____

Place of issue _____

(Stamp of Organization) Name of authorized officer _____

Date _____ (Signature) _____

No financial liability with respect to this certificate shall attach to _____ (name of Plant Protection Organization) or to any of its officers or representatives.**

** Optional clause

8. SCHEDULE OF FIELD AND LABORATORY SEED CERTIFICATION STANDARDS

Land Requirement, Minimum Isolation Distances (m), off types and other Cultivars permissible:

Species	Land Rotation	Minimum Isolation (Metres)			OFF Types &/or other cultivars		
		BR	BASIC	CERT	BR	BASIC	CERT
CEREALS					Maximum number.		
** Maize (Hybrid)	1	400	400	200	0	0	1/100 plants
* Sorghum	1	400	400	200	0	0	1/30m 1.10m ²
Rice	1 (Rain): 2 (Paddy)	5	5	0	0.01%	0.01%	0.1%
Bulrush millet		400?	400?	200?	0	0	20/10,000 plant
Finger millet		<u>10</u>	<u>10</u>	4	<u>1/100m²</u>	<u>1/100²</u>	<u>5-6/100m²</u>
Wheat	1	10	10	5	1/100m ²	1	1
Barley	1	10	10	4	1	1	6
PULSES					Maximum number per 10, 000 plants		
Beans	1	25	25	10	0	0	10
Soyabeans	1	10	5	4	0	0	10
Cow peas		50	50	25	0	0	2
OIL CROPS					Maximum number per 1,000 plants		
Ground nuts	1	20??	5	3	0	0	10
Sun flower (km)	1	17??	1.7	1	0	0	5
Sesame		20	10	5	0	0	5
ROOT / TUBER					Maximum number per 1,00 plants		
Irish potato	(5 seasons for BS; 3 for C1-C3; 7 for Bacterial wilt)	10	10	5	0	2	3

Note: *Open Pollinated; **Off-types in male parents **M**; Off-types in female parents **F**; ***For Sunflower, the isolation is subject to having bee hives within the seed field.

Diseases

CROP	DISEASE	TOLERANCE
Maize	Head smut (<i>Sphacelotheca reijiana</i>)	Nil during any inspection
	Common Smut (<i>Ustilago maydis</i>)	Nil during any inspection
Sorghum	Covered smut (<i>Sphacelotheca sorghi</i>)	1 plant per 1,000 plants for basic seed; 2 plants/1,000 for C ₁ and C ₂
	Bunt (<i>Sphacelotheca cruenta</i>)	1 plant per 1,000 plants for BS; 2/1,000 plants for C ₁ and C ₂
	Mildew (<i>Perenosclerospora sorghi</i>)	1 plant per 1,000 plants for BS and 2 plants/1,000 for C ₁ and C ₂
	Head smut (<i>Sporisorium relianum</i>)	1 plant per 1,000 plants for BS; 2 plants/1,000 for C ₁ and C ₂
Beans	Halo blight (<i>Pseudomonas phaseolicola</i>)	0 for BS; 0.01% for C ₁ and C ₂ during final inspection
	Anthraxnose (<i>Colletotricum lindemuthianum</i>)	0.02% for BS, C ₁ and C ₂
	Bean Common Mosaic Virus	0 for BS, 0.1% for C ₁ and C ₂ during final inspection
	Common blight (<i>Xanthomonas phaseoli</i>)	0 for BS, 0.02% for C ₁ and C ₂ during final inspection
Cowpeas	Leaf spots (<i>Aschocyta</i> spp.)	Nil during final inspection
	Bacteria blight (<i>Xanthonomas vignicola</i>)	Nil during final inspection
	Pod spots (<i>Mycosphaerella pinodes</i>)	Nil during final inspection
Soybean	Bacterial blight (<i>Pseudomonas</i> spp.)	Nil during final inspection
	Bacterial pustule (<i>Xanthomonas phaseoli</i>)	Nil during final inspection
	Soybean Mosaaic Virus	0 for BS; 0.02% for C ₁ and C ₂
Sunflower	<i>Sclerotinia</i> wilt & Head rot (<i>Sclerotinia sclerotiorum</i>)	0 for BS; 5 plants per 1,000 for C ₁ and C ₂
	<i>Verticillium</i> wilt (<i>Verticillium dahliae</i>)	0 for BS; 5 plants per 1,000 for C ₁ and C ₂
	<i>Botrytis</i> head rot/Grey mould (<i>Botrytis cinerea</i>)	0 for BS; 5 plants per 1,000 for C ₁ and C ₂
	Downey mildew (<i>Plasmopara halstedii</i>)	0 for BS; 5 plants per 1,000 for C ₁ and C ₂

	<i>Altemaria helianthi</i>	0 for BS; 5 plants per 1,000 for C ₁ and C ₂				
Ground nuts	Rosette Virus (<i>Alphisdnuts craccivoa</i>)	1/1,000 plants for BS; 5 plants per 1,000 for C ₁ and C ₂				
	Bacterial wilt (<i>Pseudomonas salanacearum</i>)	Nil for BS, C ₁ and C ₂				
Finger-millet	Blast (<i>Piricularia grisea</i>)	1 plant per 100 m ²				
	Ergot (<i>Claviceps</i> spp.)	1 plant per 100 m ²				
Rice	Blast (<i>Piricularia oryzae</i>)	1 plant per 1,000 plants				
	False smut (<i>Ustilaginoidea virens</i>)	1 plant per 1,000 plants				
	Kernel smut (<i>Tilletia barclayana</i>)	1 plant per 1,000 plants				
	Ergot (<i>Claviceps</i> spp.)	1 plant per 1,000 plants				
Irish Potato	Bacterial wilt/brown rot (<i>Pseudomonas solanacearum</i>)	Nil during any inspection				
	Wart disease (<i>Synchytrium endobioticum</i>)	Nil during any inspection				
	Golden nematode (<i>Heterodera rostochionsis</i>)	Nil during any inspection				
	Ring rot (<i>Corynebacterium sepeclonicum</i>)	Nil during any inspection				
	Potato spindle viroid	Nil during any inspecti				
	Mycoplasma	1/1,000 plants during any inspection				
		Per Thousand Plants				
		BR	PB	B	C1	C₂ – C₄
	Black leg (<i>Erwinia</i> spp.)	0	0	0	0	0
	Severe virus disease: Leaf roll, Y- group virus Severe mosaic) (too severe for BS; use 5??)	0	0	0	13	15
	PVY	0	1	1	10	13
	Mild mosaic visible in the field (too low? Use 10 for BS, and 13-15 for C ₁ -C ₂ ??)	0	0	1	3	5
<i>Fusarium</i> wilt, <i>Verticillium</i> wilt	0	0	0	2	3	
Nematodes: (<i>Meloidogyne</i> spp. and <i>Ditylenchus</i>)	0	0	0	1	2	

Key: BR = breeder's seed; BS = basic seed, C_{1,2} = Certified generation 1, 2

Weeds

Crop	Weed	Tolerance
Wheat, Barley, Triticale	Wild oats (<i>Avena fatua</i> , <i>Avena sterilis</i> (<i>Avena ludoviciana</i>))	Nil
	Thorn apple (<i>Datura stramonium</i>)	Nil
Sorghum	<i>Striga</i> spp. and <i>Orobanche</i>	Nil
Finger Millet	Wild oats	Nil
Maize	Wild oats	Nil

Laboratory Seed Testing Standards

Crop	Purity (%)	Germination (%)	Moisture Content (%)
Maize	99	90	13
Sorghum	98	80	11
Finger Millet	98	80	11
Bulrush Millet	98	80	13
Rice	99	80	11
Wheat	99	80	13
Beans	99	85	13
Cowpeas	99	80	13
Pigeon peas	99	80	12
Ground nuts	98	80	13
Sunflower	99	75	10
Soybeans	99	75	11
Cotton	98	75	10
Sesame	98	75	10