

Baseline Study on Seed Sector in Mauritius

Prepared for African Seed Trade Association

Rohit Brizmohun

October 2010

Table of Contents

BACKGROUND	4
Introduction	4
Overview of the Seed Sector in Mauritius	4
Seed Production in Mauritius	5
Constraints of Seed Production at the Government level in Mauritius	6
Agricultural Marketing Board	6
Plant Genetic Resources	7
STANDARDS FOR SEED CERTIFICATION	8
OECD Seed Certification Scheme	9
VARIETY EVALUATION, RELEASE AND REGISTRATION	9
PHYTOSANITARY MEASURES	10
Description of NPPO	10
Activities of the NPPO	10
The contact details of the National Plant Protection Office	11
Seed Pathology Unit	11
Monitoring of locally produced seeds on government stations	11
Seed Health Testing	11
Local Seeds	11
Imported Seeds	12
Imported Potato seeds	12
Advisory and Seed Treatment Facilities from NPPO	12
Status of virus diseases in vegetable crops in seed production stations in Mauritius	12
Introduction of new rice germplasm	13
Preparation of Regulations under the Plant Protection Act (2006)	13
Regional Project on Phytosanitary Protection of Crops	13
Seed Policy Harmonisation at SADC level	13
WTO Sanitary and Phytosanitary	14
Establishment of a National SPS Committee	14
SADC/FAO Regional Agricultural Policy Framework	14
PLANT VARIETY PROTECTION (INTELLECTUAL PROPERTY RIGHTS)	15
SEED IMPORT/ EXPORT DOCUMENTATION AND PROCEDURES	15

EXPORT OF SEEDS	19
INTERNATIONAL COMMITMENTS	19
Cooperation with Other Countries	20
CONCLUSION	20
APPENDIX I	21
APPENDIX II	24
APPENDIX III	27
APPENDIX IV	30
APPENDIX V	35

Background

The Common Market for Eastern and Southern Africa (COMESA), is embarking on the harmonisation of seed regulations and policies in its nineteen Member States according to the declaration of COMESA Ministers in Seychelles in March 2008. The African Seed Trade Association (AFSTA) has been mandated to take the lead in the harmonization process according to the contract agreement signed between AFSTA and COMESA on 4th June 2010.

A baseline study/survey was conducted on the seed sector in Mauritius as a short term consultancy. The survey will be used for the rationalization and harmonization of the seed regulations and policies in the COMESA Member State.

The study covers 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 in areas of Standards for seed certification, Variety Evaluation, release and registration, Phytosanitary Measures, Plant Variety Protection(Intellectual Property Rights), seed Import/Export documentation and procedures.

Introduction

Mauritius officially the Republic of Mauritius is an island nation off the southeast coast of the African continent in the southwest Indian Ocean, about 900 kilometres east of Madagascar. In addition to the island of Mauritius, the Republic includes the island of Rodrigues and the Agalega Islands. Mauritius Island is part of the Mascarene Islands, with the French island of Réunion 200 km to the southwest and the island of Rodrigues 570 km to the northeast.

Uninhabited by humans until the 17th century, the island was ruled first by the Dutch and then by the French after the former abandoned it. The British took control during the Napoleonic Wars and Mauritius became independent from the UK in 1968. Mauritius's area is 2040 km² with Port Louis for capital. It is a parliamentary republic and is a member of the Southern African Development Community, the Common Market for Eastern and Southern Africa, the African Union, the Indian Ocean Commission, La Francophonie and the Commonwealth of Nations. Mauritius has an upper middle income economy.

The main languages spoken in Mauritius are Mauritian Creole, French and English. English is the only official language but the common language is Mauritian Creole and the newspapers and television programmes are usually in French. Ethnically, the majority of the estimated 1,300,000 people are of Indian descent but there are also many people of African descent on the island. There are also European and Chinese minorities. It is the only African nation where the majority religion is Hinduism although Christianity and Islam also have significant populations.

Overview of the Seed Sector in Mauritius

Mauritius presently has a very limited number of seed producers. Seeds are imported by private firms or small planters for domestic use. The Ministry of Agro-Industry supplies 40% of the national requirement of vegetable seeds at subsidized price and is encouraging vegetable growers to embark in the business of seed production for certain selected crops namely squash, cucumber and onion. The Agricultural Research and Extension Unit, a parastatal of the Ministry of Agro Industry and Food Security, has initiated a pilot project, the Quality Declared Seed Project, to encourage vegetable growers to produce quality seeds as per established guidelines for QDS. This project is an endeavour to motivate the grower to produce seeds on a commercial basis following the significant

increase in price of imported seeds and the unavailability of quality seeds on the local market. Support to the seed producers is provided by a multidisciplinary team comprising of extension officers, entomologist, plant pathologist, and agronomist and scientist from AREU and the Agricultural Services.

However, the legislative framework for seed production in Mauritius still remains to be promulgated and enforced. The Seed Bill is being vetted by the State Law Office while the Plant Breeder's Rights Bill is still at draft stage. The main clauses of the Seed Bill can be viewed in Appendix I.

Government Officials are aware of the SADC Initiative on Seed Policies Harmonisation. However because of the delay in passing the Seed Bill, this harmonisation process has somewhat been hindered.

Seed Production in Mauritius

Vegetable seed crops are grown under an area of 40.5 ha in Government stations. However, land under seed production in Government stations is decreasing year by year. Crops are sent to the government seed processing unit for treatment, testing and storage and to be disposed to the public and farming community. A total of 3,749 kgs of different crops seeds were produced in 2009 and sold by the Government Stations. Bean seeds and groundnut seeds are produced solely at the Government Stations. Groundnut seed production on Government Station in 2009 amounted to 703.5kg while bean seed production was 871kg. For the latter crop, in 2005, 6046 kg was produced.

Table showing the different crops and varieties grown on Government Stations

Crop	Variety
Cucumber	local, white
Bittergourd	Local
Pumpkin	local
Calabash	Natal
Eggplant	Rosita
Tomato	Sirius, Mst 32/1
Hot pepper	Carri
Okra	local, Petite Riviere
Squash	Golden Custard
Chinese white cabbage	local, Green Petiole
Onion(seeds)	local red, Veronique
Bean	LTCA ,Long Tom
Coriander	Local
Mustard cabbage	Frisee
Lettuce	Mignonette
Onion (bulb)	red local, Veronique
Radish	Giant globe
Amaranthus	kotachee
Beetroot	Local
Groundnut	Cabri
Watermelon	Sugarbaby
Snake gourd	Local
Tobacco	RG13, CSC301, CSC302

Constraints of Seed Production at the Government level in Mauritius

The main constraints that have been identified in the production of seeds by the Ministry of Agro Industry in Mauritius are as follows:

- (i) Production of seeds and planting material does not respond to the demands of the agro business sector
- (ii) Waste of resources through production of low demand varieties
- (iii) No planned, coordinated and demand-based approach in seed production
- (iv) Planters are not satisfied with quality of seeds/plants
- (v) Plants produced in some Experimental Stations are not economically viable and not required by planters
- (vi) The pricing policy tends to favour private entrepreneurs who may procure plants/seeds at low price from Ministry for resale and high profits
- (vii) There is inadequate focus on new economically and commercially viable products that may be exported or may supply the tourist market
- (viii) There is a tendency to restrict diffusion of new varieties, so as to limit competition in the sector.

Agricultural Marketing Board

The Agricultural Marketing Board is a parastatal organisation under the aegis of the Ministry of Agro Industry and Food Security. AMB is vested with wide powers in matters relating to the production, storage, import, export and sale of a number of commodities declared as 'Controlled Products' by law. Besides, the AMB also provide storage facilities at competitive rates to importers, exporters and other operators.

Products in which AMB currently deals:

- (1) Table Potatoes
- (2) Onions
- (3) Garlic
- (4) Seed Potatoes
- (5) Turmeric (finger & powder)
- (6) Cardamoms
- (7) Bean seeds
- (8) Onion seeds

AMB is mainly involved in imports of above products, local purchase (where applicable) at guaranteed producer price / floor price, storage and sale to dealers (wholesale) at competitive / reasonable prices. Moreover AMB provides facilities for storage of seeds.

Storage Capacity of AMB

The AMB has the following storage rooms:

- At Head Office Moka - 7000 tonnes (Cold Rooms with controlled temperature & Relative Humidity) using ozone friendly refrigerants; Temperature down to 0 deg Celcius
- At Trou Fanfaron Cold Store: 300 tonnes - Temp down to -25 deg Celcius

- Airport Cold Store: To facilitate export; import and goods in transit necessitating cold chain; capacity 1600 cubic metre
- Cluny Cold Store: Capacity 2000 tonnes - Temp down to 2 deg Celcius

The AMB also allocates quota for imports of table potatoes, onions and seed potatoes to private importers since imports of these products have been liberalised.

IMPORTATION OF POTATO SEEDS FOR WARE POTATOES DURING YEAR 2009

Variety	Quantity (tons)	Origin
AGRICULTURAL MARKETING BOARD		
Delaware	794	Australia
Spunta	338	Australia
Private Importers		
Delaware and Spunta	749 T	Australia

IMPORTATION OF POTATO SEEDS FOR SEED BY AMB

Variety	Quantity (tons)	Origin
Spunta	1935	Holland
Bellini	107	Holland
Spunta normal size	536	
Spunta oversize	149	
Belle Isle	66	

Plant Genetic Resources

The Ministry of Agro Industry and Food Security, through its Plant Genetic Resources Unit, which falls under the Horticulture Division, carries out, amongst others, the following activities:

- (a) Collection of locally available crop varieties and wild relatives
- (b) Conservation of locally available crop biodiversity
- (c) Maintenance of crop accessions in the field gene bank
- (d) Collaboration in the rescue of endangered species by planting rare seeds
- (e) Field conservation

A Seed Gene Bank for the collection, multiplication, regeneration, maintenance, characterisation and documentation of seed accession is being maintained and data entry on SADC Documentation and Information Systems (SDIS) into database started in December 2009.

Standards for Seed Certification

The Horticulture Division of the Ministry of Agro Industry and Food Security is responsible for the sales of seeds produced by the Government Stations. Although capacity in seed certification through training and setting up of seed laboratory has been built, no official standards for seed certification currently exists. It is expected that the forthcoming Seed Bill will address this shortcoming. Government officials are well aware of this constraint; however there has been a delay in the procedures to pass the Seed Bill. In addition, the officials state that information acquisition and further training are important requirements for a national seed certification system

The essence of the Seed Bill as regards to administrative matters will involve the setting up of a National Plant Varieties and Seeds Office and Committee.

The following clauses are extracts from the draft bill relevant to the Administration:

National Plant Varieties and Seeds Office

- (i) *There shall be a department under the aegis of the Ministry which shall:*
 - (a) *Be known as the National Plant Varieties and Seeds office or the NPVSO and*
 - (b) *Under the guidance and the supervision of the committee referred to below, be responsible for the enforcement of this Act*
- (ii) *The NPVSO shall be under the immediate control of a Director appointed by the Ministry according to the eligibility requirements*
- (iii) *The NPVSO shall consist of such scientific, technical, administrative and other staff as may be appointed to carry out duties under this Act*

National Plant Varieties and Seeds Committee

- (i) *The Minister shall by notification constitute a committee to be known as the National Plant Varieties and Seeds Committee (hereinafter referred to as the “Committee”) for advising the NPVSO on all matters arising out of the enforcement of this Act and Government on all matters relating to seeds.*

Moreover, part VIII of the draft Seed bill relates to Seed Certification. The following provides a brief of the relevant Sub Clauses:

Establishment of Seed Certification Schemes

The NPVSO shall establish schemes for certification of seed produced in the Republic of Mauritius by registered seed producers under and in accordance with the provisions of the Part. The Office shall notify the kind and variety of plant which are eligible for certification of seed under different schemes. The NPVSO may recognise certification schemes in other countries to be equal or higher

standard than the certification schemes established under this Act and may, in such cases recognise seed produced under such schemes as imported certified schemes. The NPVSO may approve seed producing organisations to carry out self certification in the prescribed manner.

Registration of seed producers

Any seed producer who intends to cultivate a specified variety or varieties to produce certified seeds for the purpose of cultivation shall apply to the NPVSO for registration as a registered seed producer. Conditions and limitations as deemed necessary may be imposed by the NPVSO, such as acreage to be used in the cultivation of any particular variety.

Register of seed producers

The NPVSO shall maintain a register of seed producers with relevant information.

Certification of seeds

The NPVSO shall certify a seed upon satisfaction of the following:

- Is of a specified variety
- Is of known derivation
- Has been produced by a registered seed producer
- Has been produced on the land approved by the NPVSO
- Has been sold cultivated and produced as prescribed
- Has been inspected during cultivation as prescribed
- Has been tested in a prescribed manner and found to conform as applicable with the prescribed standards of germination, varietal and physical purity, and seed health, and other requirements prescribed in respect thereof.

Production of certified seed from approved seed

No registered seed producer shall use for the production of certified seeds any certified seed which has not been approved for such purpose by the NPVSO.

Certificate to be produced on sale of certified seed by registered seed producer

Upon any sale of certified seed by any registered seed producer, the latter shall at the time of such sale, produce for inspection by the buyer the prescribed certificate issued and he shall furnish to the buyer a true copy of the said prescribed certificate countersigned by him as the producer of the said certified seed.

OECD Seed Certification Scheme

Mauritius has so far not felt the need to be part of the OECD Seed certification scheme given the fact that the volume of seed exported from Mauritius has been very limited. However, with the recent setting up of a private company involved in production of rice seeds, it is expected that the scope to export seeds from Mauritius exist and the volume of seeds exported may increase in the future.

Variety evaluation, release and registration

In Mauritius, a variety release committee for sugarcane exists. Only approved cane varieties can be grown in Mauritius. However for other seeds, no legislation is currently available, thereby emphasising the urgent need for the Seed Bill. Variety Registration is covered under Part III of the annexed clauses of the draft Seed Bill.

Extracts of Part III – Variety Registration are as follows:

6. National Variety List

(i) No seed of any variety of any kind of plant shall, for the purposes of cultivation by any person be traded in the Republic of Mauritius, unless such variety (hereinafter called a listed variety) is entered in an official register of varieties to be called the National Variety List wherein all specifications, as prescribed shall be maintained.

(ii) The National Variety List shall be kept under the control and management of the NPVSO.

(iii) The NPVSO shall, within such intervals as deemed necessary, publish in the prescribed manner the list of varieties which have been registered during that interval.

(viii) A new variety may also enter the National Variety List as a result of bilateral or regional agreements concerning variety release and registration between the Republic of Mauritius and the country or countries concerned.

Phytosanitary Measures

The National Plant Protection Office, falling under the aegis of the Ministry of Agro Industry and Food Security in Mauritius, has the mandate to protect the country's agricultural economy and natural resources from introduction, establishment and spread of exotic pests as per provisions of the Plant Protection Act 2006 and to help towards plant health improvement and to facilitate export certification of plant and plant products for safe global trade in agricultural commodities as per our obligations under international agreements.

Description of NPPO

The responsibilities of the National Plant Protection Office include the implementation of measures to protect plant health and human health under the Sanitary and Phytosanitary (SPS) Agreement of the World Trade Organisation (WTO) as well as preventing or limiting damage from risks arising from entry, establishment or spread of plants.

Activities of the NPPO

- Implement quarantine regulations under the Plant Protection Act (2006);
- Regulate and enforce activities as well as biosecurity measures and the implementation of Quarantine Protocols e.g White Grub Protocol with Reunion, protocol on Giant African Snail with Australia
- Policy formulation of Phytosanitary measure related to International Trade;
- Implement SPS measures in the context of WTO;
- Provide a wide range of services to importers, exporters and the planting community ;
 - Phytosanitary certification
 - Pest Risk Analysis
- Carry research and development activities in specialised disciplines of phytopathology and quarantine

- Examination and clearance of incoming agricultural commodities
- Inspection of incoming ship vessels
- Post entry quarantine monitoring of introduced planting materials
- Disease surveillance
- Policy formulation of phytosanitary measures related to International trade
Pest and disease reporting
- Enquiry point for SPS
- Managing the Indian Ocean crop protection network
- Seed health testing and monitoring of imported and locally produced seeds
- Seed health monitoring on seed production stations
- Importation and maintenance of certified citrus germplasm in insect proof repository
- Quarantine awareness programme

The contact details of the National Plant Protection Office

National Plant Protection Office

Reduit, Mauritius.

Contact Person: **Mrs N R Leckraz**

Position: Principal Research and Development Officer

Tel: (230) 464 4872

Fax: (230) 465 9591

Email: moa-pathology@mail.gov.mu

Seed Pathology Unit

The Seed Pathology Unit, falling under the NPPO, has the following main activities:

- (a) Field inspections are, carried out on various government stations to monitor disease status of seed production fields and that of propagating materials.
- (b) Health testing of seeds produced on government stations, prior to sale to the public.
- (c) Seed health testing of all seeds imported by various organizations, research bodies, members of public and main seed importers.
- (d) Provision of Disease Diagnosis Service to the public at large.
- (e) Provision of a free seed treatment service to small planters, on request.

Monitoring of locally produced seeds on government stations

The division is responsible for the monitoring and control of diseases on seed production stations of the Agricultural Services and for seed health monitoring of locally produced seeds

Seed Health Testing

Local Seeds

Further to regular field monitoring, seed health testing is carried out for seeds taken at the Seed Processing Section Barkly Experimental Station of the Ministry of Agriculture, prior to sale. The testing is done under laboratory conditions on seeds which are particularly known to be affected by seed borne diseases of economic importance. Seed health testing involving standard blotter tests according to ISTA norms (International Seed Testing Association), artificial growing media, biological, serological and growing on tests are currently used for detection and identification of, seed borne fungi, bacteria and viruses in seeds samples collected from the seed Processing Section at Barkly Experimental Station.

Imported Seeds

Phytosanitary measures for imported seeds are very stringent in Mauritius. Seeds imported into Mauritius undergo the growing-on test to detect the presence of any seed-borne pathogen (e.g., viruses) in the seeds. The test is carried out on a wide range of seeds prior to their release. It is based on a visual examination of the first leaves developing from sown imported seeds.

Samples of imported seeds of vegetable, flower, aromatic herb and feed seeds were received during the course of the year 2009 for the growing-on test. These vegetable seeds included the following: Rice (*Oryza sativa*), maize (*Zea mays*), pepper (*Capsicum sp.*), coriander (*Coriandrum sativum*), melon, okra (*Hibiscus esculenta*), canavalia, palm, eggplant (*Solanum melongena*), cauliflower (*Brassica oleracea*), squash (*Cucurbita pepo*), tomato (*Lycopersicon esculentum*), lettuce (*Lactuca sativa*), beet (*Beta vulgaris*), cabbage (*Brassica oleracea*), pumpkin (*Cucurbita maxima*), carrot (*Daucus carota*), marigold (*Calendula officinalis*), sunflower (*Helianthus annuus*), carnation (*Dianthus Caryophyllus*), , strawflower (*Helichrysum*), Zinnia, and phlox (*Phlox subulata*). Potato seeds were also screened for seed borne diseases.

These seeds were imported from Thailand, Korea, Denmark, India, Japan, Netherlands, France, USA, South Africa, Hong Kong, Vietnam, Singapore, Philippines, Brazil and Madagascar.

Imported Potato seeds

Samples of potato seeds were taken from imported seed potato consignments for testing purposes. There has been introduction of 26 varieties of potato from Australia, France, Netherlands and Western Australia. No major quarantine fungal pathogens were detected except for traces of Silver scurf were observed in a few potato consignments. Seed potatoes infected with common scab pathogen *Streptomyces sp.*

Advisory and Seed Treatment Facilities from NPPO

A free treatment service (Hot water, fungicidal dressing and with tri-sodium phosphate) of seeds produced by local planters is provided to the members of the public at large for the control of seedborne diseases for the following:

- Tomato (*Lycopersicon esculentum*) – against tomato scab (*Xanthomonas campestris pv vesicatoria*) and tomato speck (*Pseudomonas syringae pv tomato*)
- Chilli (*Capsicum spp.*) – against *Xanthomonas campestris pv vesicatoria*
- Cauliflower (*Brassica oleracea var. botrytis*), cabbage (*Brassica oleracea*) and Broccoli (*Brassica oleracea*) against Black rot (*Xanthomonas campestris pv campestris*) and Black leg (*Leptosphaeria maculans*)
- Brinjal (*Solanum melongena*) – against *Phomopsis vexans*
- Carrot against *Alternaria* and Bacterial Blight

Status of virus diseases in vegetable crops in seed production stations in Mauritius

Monitoring surveys are conducted on the main seed production stations of the agricultural services. The objective of the survey is to determine the status of viruses affecting leguminous, solanaceous, cucurbitaceous and cruciferous crops.

Symptomatic leaf samples and seed samples are collected and screened for viruses using biological indexation and Enzyme Linked Immunosorbant Assay (ELISA).

The main crops surveyed are cucumber, snakegourd, tomato, asparagus bean, French bean, cucumber, pumpkin, lettuce, tomato, chilli, onion, and squash.

The viruses detected, so far, are Zucchini Yellow Mosaic Virus (ZYMV), Cucumber Mosaic Virus (CMV), Papaya Ringspot virus (PRSV), Bean Common Mosaic Virus (BCMV), Potato Virus Y (PVY), Turnip Mosaic Virus (TuMV), Tomato Mosaic Virus (ToMV) and Tobacco Mosaic Virus (TMV).

Introduction of new rice germplasm

In response to the global rising food prices and shortages which contributed to high food inflation in Mauritius, it had become important to foster local production of foodstuffs so as to mitigate the dependency of the country on imported food commodities through in of improved varieties of crops and new crops. In this context, there has been successful introduction of new germplasm of economically important field crops during the year 2009.

Consignment of rice seeds have been imported from China were tested for seed transmitted diseases. The test revealed absence of diseases.

Preparation of Regulations under the Plant Protection Act (2006)

The Plant Protection Act (PPA) was prepared and promulgated in November 2006 in order to replace the Plant Act (1976). Following the promulgation of the Plant Protection Act (2006), Mauritius is currently working on the necessary regulations for enforcement of the Plant Protection Act. The clauses of the Plant Protection Act 2006 are annexed (Appendix III).

Regional Project on Phytosanitary Protection of Crops

Programme Regionale des Protection des Vegetaux (PRPV) Project

The PRPV project started on August 2003, and covers the five-member states of the Indian Ocean (IOC: Comores, Madagascar, Mauritius, Reunion and Seychelles).

The Project has as objective to promote and develop operational, scientific and technical cooperation between the member countries with regard to Phytosanitary protection of crops. The project has been divided into five main components: Plant protection network in the Indian Ocean, Harmonization of legislation, Quality control, applied research, training and advisory. With respect to Quality Control of Planting Material, the objective was to ensure quality of planting material (seed, seedlings, cuttings, etc) in the IOC thus preventing spread of diseases. In this regard, several equipments have been received for upgrading of laboratories in NPPO, AREU and MSIRI.

Seed Policy Harmonisation at SADC level

Mauritius is in line with the Regional SADC standards on seed policies harmonization with regards to quarantine measures. Consultations between Mauritius and SADC are still taking place to harmonise regional seed policies.

WTO Sanitary and Phytosanitary

Establishment of a National SPS Committee

Currently, it appears that there is a lack of systematic approach to the establishment of SPS regulations and their implementation in Mauritius. Duplication of requirements across government ministries and agencies has been noted as a result of a lack of coordination and cooperation across these ministries and agencies. Also, the private sector has the perception that there is a lack of transparency in application of SPS regulations locally. The setting up of a National SPS Committee to address these issues has been proposed:

1. Facilitating inter-ministerial coordination in achieving SPS policy objectives to ensure efficiency and avoid duplication.
2. Coordinating implementation of the SPS Agreement of the WTO at national level:
3. Ensuring compliance with all provisions of the Agreement including the transparency provision:
4. Serving as a forum to:
 - exchange information and discuss on SPS-related measures implemented by the different institutions involved in food safety, plant health and animal health, and having potential trade impacts locally and internationally;
 - consider the views of the private sector on regulations and the regulatory process in the SPS sector with a view to ensuring trade facilitation.

The aim is to ensure that decisions concerning SPS-related regulations and their implementation are made knowledgeably in an open and transparent manner compatible with best international practices and is not harmful to the economy. In this regard, stock will be taken of existing and new SPS regulations, their relevance in the local context examined and policy recommendations made on SPS measures to be adopted locally in order to facilitate trade and achieve national economic objectives.

SADC/FAO Regional Agricultural Policy Framework

A number of initiatives are currently being implemented locally with respect to the implementation of the SPS Agreement:

1. Consolidation of the administrative and legal framework and enactment of new legislations namely the Plant Protection Act, the Genetically Modified Organism Act (GMO) the Dangerous Chemical Control Act and the Food Act.
2. Development of bilateral agreements with a number of countries like India, Pakistan, Madagascar, etc.
3. Setting up or Strengthening of our institutional and technical capacity,
4. Soft infrastructure development
5. Involvement of the SPS Enquiry Point in all decision-making processes relating to SPS matters at the level of the different local institutions and Ministries.
6. Establishment of a National SPS Coordinating Committee chaired by the Permanent Secretary of the Ministry of Agro Industry, and comprised of representative from the Ministry of Health, Ministry of Commerce, Ministry of Foreign Affairs and International Trade, Department of Fisheries, Standard Bureau, Veterinary Services, Chamber of

Agriculture, Chamber of Commerce/industry, Consumer Protection Organisation, Association of our horticultural produce exporters and our Research and Extension Unit.

Plant Variety Protection (Intellectual Property Rights)

Mauritius has prepared the Plant Breeders' Right Bill. Moreover, a letter of request dated 23 March 2004 has been sent to UPOV to advise on conformity with provision of the UPOV International Convention for the Protection of New Varieties of Plants (1991). As stipulated under Article 34(3) of the 1991 Act, "any State which is not a member of the Union and any intergovernmental organization shall, before depositing its instrument of accession, ask the Council to advise it in respect of the conformity of its laws with the provisions of this Convention". However until now Plant Breeders Bill has not been promulgated. Stakeholders in the seed sector feel that the legal framework is very important to establish and implement Plant Breeders' Right in Mauritius. Moreover, information acquisition and infrastructure are issues considered as medium priority to implement the bill followed by adequate equipment and training.

Seed Import/ Export Documentation and Procedures

Seed import and export procedures fall under the NPPO in Mauritius. An import permit is a requirement to import seeds into Mauritius under Part IV Section 19 of the Plant Protection Act 2006. The Import Permit states the phytosanitary requirements that the exporting country should comply to ensure the planting material imported is free from dangerous pests or diseases which are harmful to the agricultural industry in the country. A specimen for application of Import Permit and a specimen of the Phytosanitary certificate are found in Appendix II.

The application for an import permit has to be made at the:

National Plant Protection Office
Ministry of Agro Industry and Fisheries
Réduit

Mauritius
Tel: (230) 464 4874
Fax: (230) 464 4874

The National Plant Protection Office can issue the Import Permit within 3 - 5 working days for seeds that are imported regularly and if the application forms are duly completed. However, for time requests, the NPPO will carry out a pest risk analysis prior to the issue of Import Permit. Therefore, in such cases it takes longer to issue the Import Permit. A Phytosanitary Certificate should accompany the seed consignment imported. This certificate should be issued from the Official Plant Protection organisation of the exporting country.

In cases where pests and/or diseases are detected in seed imported, the consignment is destroyed by incineration at importer's cost.

The essence of the extracts from the forthcoming Seed Bill described in Part IX relates to Import of Seeds. The sub clauses are described below:

Restriction on importation of certain seeds

The Committee may advise the Minister to restrict, limit, make subject to conditions, or prohibit the importation into the Republic of Mauritius any particular variety or class of seed.

Conditions for importation of seed

Seeds intended for trade for the purposes of cultivation cannot be imported into the Republic of Mauritius unless

- Such seed is of a listed variety
- Such seed is not restricted seed
- Such seed has been designated certified seed under the laws of the country of its origin
- It is shown to the satisfaction of the NPVSO to have been produced under conditions and to conform to standards equal to, or higher than those prescribed for the production and certification of seed in the Republic of Mauritius
- Such seeds complies with prescribed standards of germination, varietal and physical purity, and seed health, and other requirements prescribed in respect thereof
- Such seed are packed in container which comply with prescribed requirements
- The kind and variety of plants of such seed and the country of its origin, is shown on an invoice or delivery note accompanying such seed at the time of its importation
- Such seed is accompanied by the prescribed documents and certificates

Importation of seeds for year 2009

Vegetable seeds	Volume imported (kg)	Volume imported (units)
Alysiun seeds	0.30	
amaranthus seeds	10.00	
aromatic seeds	2.47	
ashgroud sesds	2.50	
basil seeds	0.50	
bean	26,375.63	
beet	141.00	
beetroot	135.25	
bhendi seeds	25.50	
bittergourd	44.00	
bottlegourd	92.00	
brinjal	5.58	
broccoli	11.00	
bunching onion	20.21	
cabbage	696.91	
carrot	1,324.05	
cauliflower	12.74	
celery	13.00	
chilli	2.21	
chinese cabbage	52.00	
chinese mustard seeds	2.50	
coriander	28,000.00	
courgette	80.91	
cucumber	506.93	16,000
cumin	4,000.00	
eggplant	1.10	
holy basil	0.13	
pepper	14.22	31,000
knol khol seeds	0.03	
lab lab seeds	500.00	
leek	40.70	
lettuce	98.40	595,000
maize seeds	1,000.00	
melon seeds	0.03	
mustard	3,015.00	
okra	60.75	
onion	168.36	
pak choi	247.50	
pansy seeds	0.03	
parsley	59.40	

Source: National Plant Protection Office (September 2010)

pea	19.32	
radish	255.50	
ridgegourd	14.00	
salvia seeds	0.16	
snakegourd	100.00	
soya bean seeds	8.00	
squash	635.66	
thyme seeds	5.00	
tomato	187.70	117,000
watermelon	12.50	
yard long bean	15.30	

Source: National Plant Protection Office (September 2010)

Export of Seeds

Part X of the Draft Seed Bill relates to the Export of Seeds from the Republic of Mauritius. The sub clauses include the following:

A person exporting seeds from the Republic of Mauritius should be in possession of a certificate from the NPVSO authorising such exports. The certificate may be obtained by application to the NPVSO in the prescribed manner. The NPVSO may undertake such inspection of seed intended for export as deemed necessary, take samples as deemed necessary and test, examine or analyse the samples. If the NPVSO is of the opinion that the consignment of seed may not be exported, the export of the seed shall be prohibited.

International Commitments

The various intergovernmental commitments in agriculture to which the Republic of Mauritius is bound or concerned with may be listed as follows:

- International Plant Protection Convention (IPPC), which came into force on 3 April 1952, as revised from time to time and to which the Republic of Mauritius adhered since 11 June 1971. It deals with matters related to plant quarantine, phytosanitary standards, biosafety etc.
- Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization which was established on 1 January 1995, and of which the Republic of Mauritius is a Member since its establishment. It deals with maintenance of standards for phytosanitary measures in accordance with *inter alia* IPPC and also requires that these/such measures should not be the barriers to trade.
- The WTO Agreement on Trade Related Aspects of Intellectual Property Rights
It deals with various forms and mechanism of enforcement and dispute settlement of intellectual property rights (IPR). Plant variety protection, Geographical Indications and Trademarks are of more interest in agriculture among other forms.
- The Convention on Biological Diversity, signed on 5 June 1992 and enforced on 29 December 1993, to which the Republic of Mauritius has ratified on 4 September 1992
It deals with the conservation of biological diversity, sustainable use of its components by a facilitated access to these components and to technologies related to their use, on prior informed consent and on mutually agreed terms, and fair and equitable sharing of benefits arising from their use or that of their products. It also deals with funding for these purposes.
- The Cartagena Protocol on Biosafety, which was adopted as a supplementary agreement to the Convention on Biological Diversity on 29 January 2000 and which the Republic of Mauritius has ratified. It deals with the biosafety related issues and material handling, particularly the living modified organisms.
- The International Treaty on Plant Genetic Resources for Food and Agriculture under the FAO, which was signed at Rome on 3 November 2001. It deals with multilateral access and benefit sharing of the plant genetic resources for food and agriculture in accordance with the form and manner as provided by the treaty.

- UPOV – actions has been initiated at high level to join UPOV.

Cooperation with Other Countries

MOU on Economic Cooperation between Mauritius and South Africa

- In the context of enhancing economic cooperation between Mauritius and South Africa, technical assistance was sought from South Africa in a number of disciplines related to Plant Protection.
- A number of Memorandum of Understanding (MOU) as well as Bilateral Agreements have been prepared and agreed upon, to facilitate trade. These include Memorandum of Understanding on Phytosanitary Co-operation with Madagascar and COMESA Agricultural Marketing Promotion and Regional Integration Project (AMPRIIP).

CONCLUSION

This baseline study provides an overview of the seed sector in Mauritius, reviewing national seed production as well as procedures and criteria for seed imports into the country. The stakeholders involved in the seed sector and their activities have been covered in the study. The major constraints for a seed sector that responds to the current demands of the agricultural community lie in the fact that the legislations are still not in place in Mauritius. However efforts are being made by the Government of Mauritius to ensure that appropriate legislation be enforced for a viable seed sector. This implies that Mauritius is fully receptive to harmonise the seed regulations and policies of regional groupings such as that being proposed by the COMESA.

Appendix I

Draft clauses of THE SEED BILL 2009

A BILL

To provide for the regulation and control of the production , trade, importation and exportation of seed through

- (i) the registration of plant varieties, seed dealers, seed producers and premises undertaking production, processing, storage, packaging ,labelling and trade of seed; and
- (ii) for the testing ,inspection and certification of seed,
- (iii) to promote quality seed for the purposes of cultivation in the Republic of Mauritius, and for matters connected therewith,

CLAUSES

PART 1-PRELIMINARY

- 1. Short title
- 2. Scope of the Act
- 3. Interpretation

PART 11- ADMINISTRATION

- 4. National Plant Varieties and Seeds Office
- 5. National Plant varieties and Seeds Committee

PART III - VARIETY REGISTRATION

- 6. National Variety List
- 7. Conditions for registration
- 8. Applications for registration
- 9. Consideration and examination of applications
- 10. Registration of variety
- 11. Rejection of application
- 12. Cancellation of registration
- 13. Maintenance of listed varieties
- 14. Change of a variety name

PART-IV REGISTRATION OF SEED DEALERS

PART V-SEED TESTING

- 15 Official seed testing laboratory
- 16 Designation of official seed analysts
- 17 Delivery of samples for official tests

PART VI SEED INSPECTION

18 Designation of Official Seed Inspectors

19 Powers of Inspectors

20 Warrant required to enter dwelling –house

21 Use of force

22 Assistance to seed inspectors

23 obstruction of inspectors

24 False statement

25 Seizure

PART VII SALE OF SEED

26 Sale of seed

PART VIII SEED CERTIFICATION

27 Establishment of SEED certification schemes

28 Registration of seed producers

29 Register of seed producers

30 Cancellation of registration of seed producer

31 Certification of seeds

32 Production of certified seed from approved seed

33 Certificate to be produced on sale of certified seed by registered seed producer

PART IX IMPORT OF SEED

34 Restriction of importation of certain seeds

35 Conditions for importation of seed

36 Required test of imported seed

PART X EXPORT OF SEED

37 export of seeds

PART XI MISCELLANEOUS

38 Preservation of documents

39 Secrecy

40 Publication or distribution of false or misleading advertisements

41 Appeal against decision or action of NPVSO

PART XII REGULATIONS

Appendix II

Application for Import Permit for Plants/plant parts/produce of plant origin



PQ Form N°

REPUBLIC OF MAURITIUS

MINISTRY OF AGRO INDUSTRY AND FISHERIES

APPLICATION FOR AN IMPORT PERMIT FOR PLANTS/PLANT PARTS/ PRODUCTS OF PLANT ORIGIN

(Regulation under Section 32 of the Plant Protection Act 2006)

To Principal Research & Development Officer
National Plant Protection Office ,Réduit

Tel./Fax: 464-4874

E-mail: moa-pathology@mail.gov.mu

Official use ONLY
S/N:
Approved by:
Permit No:

I, the undersigned, hereby apply for an Import Permit as per details below

Name of importer/company

Address of importer/company

Tel. No. Fax. No. E-mail:

Mode of importation : Sea freight [] Air freight [] Courier /Post [] Accompanied []

.....

Name/Address of exporter Country

.....

Plant Import permit No:

Phytosanitary Certificate No:

List of commodities to be imported:

Common name	Botanical name	Quantity	Origin(if any)

Purpose of importation: Sale Private use Manufacture/processing

Research Re-export Others (specify)

Place to collect the Permit: Port Louis Office (Mer Rouge) Redit Office

Tel. No.: 242-8284

Tel No.: 464-4874;

454-1091 (Ext. 2819)

Date: Name & Signature of applicant

1. Name and address of exporter	<div style="text-align: center;">  REPUBLIC OF MAURITIUS MINISTRY OF AGRO INDUSTRY & FISHERIES Phytosanitary Certificate [number] </div>		
3. Declared name and address of consignee	4. Plant Protection Organisation of Mauritius to Plant Protection Organisation(s) of 5. Place of Origin		
6. Declared means of conveyance		Reg. No.	Prod. Code.
7. Declared point of entry			
8. Distinguishing marks: number and description of packages; name of produce, botanical name of plants.	9. Quantity declared.		
10. This is to certify that the plants or plant products described above - have been inspected according to appropriate procedures, and - are considered to be free from quarantine pests, and practically free from other injurious pests; and that they - are considered to conform with the current phytosanitary regulations of the importing country.			
11. Additional declaration			
DISINFESTATION AND/OR DISINFECTION TREATMENT	18. Place of issue Date: Name and signature of authorised officer: Stamp of Organisation		

Appendix III

THE PLANT PROTECTION BILL

(No. IV of 2006)

Explanatory Memorandum

The objects of the Bill shall be -

- (a) (i) to prevent the introduction and to control the spread of
plant pests;
- (ii) to establish phytosanitary measures in conformity with International standards
for the purpose of exporting and importing plants;
- (b) to set up a National Plant Protection Office as a division of the Ministry of Agro
Industry and Fisheries which shall be the authority responsible for the enforcement
of this Act.

A. BOOLELL

Minister of Agro Industry & Fisheries

14 April 2006

THE PLANT PROTECTION BILL

(No. IV of 2006)

ARRANGEMENT OF CLAUSES

Clause

PART I - PRELIMINARY

1. SHORT TITLE

2. INTERPRETATION

3. APPLICATION OF THIS ACT

PART II – NATIONAL PLANT PROTECTION OFFICE

4. NATIONAL PLANT PROTECTION OFFICE

5. FUNCTIONS AND POWERS OF NATIONAL PLANT PROTECTION OFFICE

6. IDENTITY CARD

7. DISPLAY OF IDENTITY CARD

8. SURRENDER OF IDENTITY CARD

PART III—CONTAINMENT AND ERADICATION OF PESTS

9. DUTY ON OWNER OF PREMISES

10. PEST QUARANTINE AREA

11. REVOCATION OF QUARANTINE AREAS

12. CONTROL MEASURES FOR QUARANTINE AREAS

13. DECLARATION OF PEST FREE AREAS

14. DECLARATION OF AREAS OF LOW-PEST PREVALENCE

15. PEST SURVEILLANCE PROGRAMME

16. SPECIFIC PEST INFESTATION

17. IMMINENT RISK OF INFESTATION ON PREMISES NOT UNDER QUARANTINE

PART IV – IMPORT AND EXPORT

18. PHYTOSANITARY MEASURES FOR IMPORTS

19. IMPORT REQUIREMENTS

20. INSPECTIONS

21. DUTY OF NOTIFICATION OF ARRIVAL

22. EXPORT PHYTOSANITARY CERTIFICATION

23. RE-EXPORT PHYTOSANITARY CERTIFICATION

24. TRANSIT CONSIGNMENT

25. AUTHORITIES TO ASSIST AND CO-OPERATE

PART V – ENFORCEMENT

26. POWERS OF OFFICERS

27. REASONS FOR SEIZURE

28. APPEAL

29. OFFENCES

30. PENALTIES

31. LIMITATION OF LIABILITY

PART VI – MISCELLANEOUS

32. REGULATIONS

33. REPEAL AND SAVINGS

34. COMMENCEMENT

Appendix IV

THE PLANT BREEDER'S RIGHT BILL

(No. of 2003)

Explanatory Memorandum

The object of this Bill is to -

- (1) To provide for the protection of plant breeder's right on new varieties in the Republic of Mauritius;
- (2) More specifically to provide for
 - (i) the legal framework and the mechanism to protect the rights of plant breeders,
 - (ii) the economic and the personal non-economic relations arising out of the creation, use and legal protection of plant varieties,
 - (iii) to encourage the development of new varieties of plants; and
 - (iv) to give effect to the proper implementation of governmental policies and enforcement provisions necessary therefore.

THE PLANT GENETIC RESOURCES AND PLANT BREEDER'S RIGHT BILL **(No. of 2003)**

ARRANGEMENT OF CLAUSES

Clause

PRELIMINARY

1. SHORT TITLE

2. INTERPRETATION

ADMINISTRATION

3. ADMINISTRATION OF PLANT BREEDER'S RIGHT

4. EXAMINATION OF REGISTER

THE BREEDER'S RIGHT

5. CRITERIA FOR PROTECTION

6. NOVELTY

7. DISTINCTNESS

8. UNIFORMITY

9. STABILITY

10. PROTECTION OF KNOWN VARIETIES

ENTITLEMENT TO PROTECTION

11. LIST OF GENERA AND SPECIES TO WHICH THIS ACT APPLIES

12. RIGHT TO APPLY FOR PROTECTION

13. PERSONS ENTITLED TO FILE APPLICATIONS

ASSIGNMENT AND TRANSFER OF THE APPLICATION OR OF THE BREEDER'S RIGHT

14. JOINT APPLICANTS AND JOINT HOLDERS OF RIGHTS

15. ASSIGNMENT AND TRANSFER

SCOPE AND DURATION OF THE BREEDER'S RIGHT

16. SCOPE OF THE BREEDER'S RIGHT

17. EXCEPTIONS TO THE BREEDER'S RIGHT

18. EXHAUSTION OF THE BREEDER'S RIGHT

19. MAINTENANCE OF THE PROTECTED VARIETY

20. PERIOD OF PROTECTION

TERMINATION, NULLITY AND CANCELLATION

21. TERMINATION OF PROTECTION

22. NULLITY

23. CANCELLATION

APPLICATIONS

24. APPLICATION

25. PRIORITY

26. DOCUMENTS AND MATERIAL TO BE FURNISHED FOR PRIORITY

27. FEES

VARIETY DENOMINATION

28. APPLICATION AND PROCEDURE FOR VARIETY DENOMINATION

29. USE OF THE VARIETY DENOMINATION

30. PRIOR RIGHTS OF THIRD PARTIES

31. CANCELLATION OF A REGISTERED VARIETY DENOMINATION

EXAMINATION OF THE APPLICATION

32. EXAMINATION OF THE APPLICATION

33. EXAMINATION OF NOVELTY, DISTINCTNESS, ETC.

34. GRANT AND REFUSAL OF THE BREEDER'S RIGHT

35. PROVISIONAL PROTECTION

OPPOSITION

36. OPPOSITION

APPEALS AND ENFORCEMENT PROCEEDINGS

37. APPEALS

38. CIVIL PROCEEDINGS

39. NON-COMPLIANCE OR MISUSE OF VARIETY DENOMINATION

LICENCES

40. LICENSE CONTRACTS

41. COMPULSORY LICENSES

42. REGULATIONS

MISCELLANEOUS

43. POWERS OF THE MINISTER TO MAKE REGULATIONS

44. OFFENCE

45. TRANSITIONAL PROVISIONS

46. COMMENCEMENT

Appendix V

Schedule I

LIST OF QUARANTINE PESTS

INSECTS AND MITES

ORDER: COLEOPTERA

Family: Cerambycidae

Anoplophora glabripennis

Phoracantha recurva

Family: Cucurliionidae

Myllocerus undatus

Rhynchophorus ferrugineus

Family: Melolonthidae

Hoplochelus marginalis

Family: Scolytidae

Hylurgus ligniperda

ORDER : DIPTERA

Family: Tephritidae

Anastrepha fraterculus

Anastrepha grandis

Anastrepha interrupta

Anastrepha ludens

Anastrepha mombinpraeoptans

Anastrepha obliqua

Anastrepha serpentina

Anastrepha striata

Anastrepha suspensa

Bactrocera correcta

Bactrocera cucumis

Bactrocera dorsalis

Bactrocera dorsalis complex

Bactrocera invadens

Bactrocera tryoni

Ceratitis cosyra

Ceratitis malagassa

Rhagoletis pomonella

Rgagoletis cerasi

Family: Agromyzidae

Liriomyza bryoniae

Liriomyza sativae

ORDER: HEMIPTERA

Family: Aleyrodidae

Aleurocanthus woglumi

Aleurocanthus zizyphi

Aleurodicus dugesii

Aleyrodes protella

Trialeurodes ricini

Family: Coccidae

Ceroplastes ceriferus

Family: Diaspididae

Aulacaspis yasumatsui

Quadraspidiotus perniciosus

Unaspis yanonensis

Family: Pseudococcidae

Maconellicoccus hirsutus

Planococcus minor

ORDER: LEPIDOPTERA

Family: Castniidae

Paysandisia archon

Family: Noctuidae

Chrysodeixis eriosoma

Family: Tortricidae

Cacoecimorpha pronubana

ORDER: THYSANOPTERA

Family: Thripidae

Danothrips trifasciatus

Pezothrips kellyanus

Scirtothrips dorsalis

ORDER: ACARINA

Family: Tetranychidae

Eotetranychus lewisi

Eotetranychus orientalis

Fungi

Cronartium spp

Deuterophoma tracheiphila

Exobasidium vexans
Fusarium oxysporum f.sp cubense
Mycosphaerella fijiensis
Peronophythora litchii
Peronosclerospora maydis
Peronosclerospora philippinensis
Peronosclerospora sacchari
Peronosclerospora sorghi
Peronospora hyoscyami fsp tabacina
Phytophthora fragariae pv fragariae
Synchytrium endobioticum

Bacteria and Phytoplasmas

Acidovorax anthurii
Agrobacterium tumefaciens
Banana Blood Disease
Candidatus liberobacter africanum
Candidatus liberobacter asiaticum
Citrus Psorosis
Clavibacter michiganensis ssp michiganensis
Clavibacter michiganensis ssp sepedonicus
Cucurtobacterium flaccumfasciens pv flaccumfasciens
Erwinia stewardii
Erwinia tracheiphila
Pseudomonas syringae pv lacrymans
Ralstonia solanacearum race 2 (Moko)
Ralstonia solanacearum Race 3
Spiroplasma citri
Xanthomonas axonopodis pv citri
Xanthomonas axonopodis pv diffenbachiae
Xanthomonas axonopodis pv passiflorae
Xanthomonas campestris pv fragariae
Xanthomonas pv musacearum
Cassava witches broom
Coconut Lethal yellowing
Papaya bunchy top
Phytomonas sp (heart rot palm trees)
Potato stolbur
Strawberry lethal decline phytoplasma
Sweet potato little leaf phytoplasma
Sweet potato littleleaf

Virus and Viroids

Andean potato latent virus
Andean potato mottle virus
Avocado sun blotch viroid
Banana Bunchy Top virus
Bean golden mosaic virus
Bract mosaic virus
Cassava african mosaic virus
Cassava brown streak virus

Cassava common mosaic virus
Chilli veinal mottle virus
Citrus cachexia viroid
Citrus Exocortis viroid
Citrus infectious variegation
Citrus leaf rugose virus
Citrus psorosis
Citrus Tatter leaf virus
Citrus Tristeza virus
Citrus vein enation virus
Citrus yellow mosaic virus
Coconut cadang cadang viroid
Coconut foliar decay virus
Cowpea aphid borne mosaic virus
Cowpea mild mottle virus
Cucumber green mottle virus
Dasheen Mosaic virus
Impatiens necrotic spot virus
Lettuce infectious Yellows virus
Papaya ringspot virus P
Pepper mild mottle virus
Pineapple bacilliform virus
Pineapple wilt virus
Potato spindle tuber viroid
Potato virus T
Squash leaf curl virus
Squash mosaic virus
Strawberry crinkle virus
Strawberry latent ringspot virus
Strawberry mild mottle virus
Strawberry mild yellow edge virus
Strawberry vein banding virus
Sugarcane fiji disease
Sweet potato feathery mottle virus
Sweet potato yellow dwarf virus
Tobacco ringspot virus
Tomato black ring virus
Tomato bushy stunt virus
Tomato ringspot virus
Tomato spotted wilt virus
Tomato yellow leaf curl virus

Nematodes

Aphelenchoides besseyi
Bursaphelenchus xilophilus
Ditylenchus dipsaci
Globodera pallida
Globodera rostochiensis
Heterodera schactii
Pratylenchus goodeyi
Radopholus citri

Radopholus similis
Rhadinaphelenchus cocophilus
Tylenchulus semipenetrans

List of Regulated Non Quarantine Pests

Fungi

Phytophthora colocassiae
Alternaria dauci
Colletotrichum acutatum
Colletotrichum capsici
Mycosphaerella citri
Mycosphaerella eumusae
Mycosphaerella musicola
Phytophthora capsici
Spongospora subterranea f.sp subterranea
Stenocarpella macrospora
Stenocarpella maydis
Urocystis cepulae
Cercospora kikuchii

Bacteria and Phytoplasmas

Xanthomonas axonopodis pv citri
X. campestris pv vesicatoria
X. campestris mangiferae indicae
Candidatus liberobacter asiaticum
Candidatus liberobacter africanum
Pseudomonas savastanoi pv phaseolicola
Xanthomonas axonopodis pv phaseoli
Xanthomonas axonopodis pv vitians
Xylella fastidiosa
Pseudomonas syringae pv tomato
Xanthomonas campestris pv campestris
Agrobacterium tumefaciens

Virus and Viroids

Banana streak virus
Bean common mosaic virus
Bean yellow mosaic virus
Beet curly top virus
Carnation etch ring virus
Carnation necrotic fleck virus
Carnation ringspot virus
Carnation streak virus
Chrysanthemum stunt viroid
Citrus greening bacterium
Citrus Tristeza virus
Cowpea mild mottle virus
Cymbidium mosaic virus
Erwinia chrysanthemi

Grapevine fan leaf nepovirus
Lettuce mosaic virus
Odontoglossum ringspot virus
Orchid fleck virus
Pea nut clump virus
Pea nut mottle virus
Pea nut rosette virus
Pea nut stripe virus
Pea seedborne mosaic virus
Pelargonium leaf curl virus
Pepper mild mottle virus
Raspberry Ringspot virus
Tobacco necrosis virus
Tobacco streak virus
Vanilla mosaic potyvirus

INSECTS

Order: Gelechiidae

Phthorimaea operculella