

Training Manual 2024 Phytosanitary Measures in Bangladesh



Organized by
Crops Division



Bangladesh Agricultural Research Council

Farmgate, Dhaka-1215, Bangladesh

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Phytosanitary Measures in Bangladesh

December 2024



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Training
on
Phytosanitary Measures in Bangladesh
2nd Batch

Date: 22-24 December 2024

Training Manual 2024

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Bangladesh Agricultural Research Council

New Airport Road, Farmgate, Dhala-1215

Training on “Phytosanitary Measures in Bangladesh”

Training Schedule

Date: 22-24 December 2024

Venue: Conference Room #2, BARC

Organized by: Crops Division, BARC

Inaugural Session

9:15-10:00	Registration Recitation from Holy Qur’an: Mawlana Abul Hasan, Imam, BARC Mosque Welcome Address: Dr. Md. Jamal Uddin, PSO (Crops), BARC Remarks from Chief Guest: Dr. Nazmun Nahar Karim, Executive Chairman (R.C.), BARC Remarks from Chairperson: Dr. Md. Abdus Salam, MD (Crops), BARC
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Technical Session

Day-1: 22.12.2024 (Sunday)

Time	Topic/Session	Resource Person/Speaker
10:00-11:00	Pre-Evaluation and Training Course Introduction (Phytosanitary Measures: Concepts and Importance)	Dr. Md. Jamal Uddin PSO (Crops), BARC
11:00-11:30	Tea Break	
11:30-12:30	Bangladesh Good Agricultural Practices Policy 2020	Dr. Md. Abdus Salam Member Director (Crops), BARC
12:30-13:30	Quarantine Pests (Survey & Identification lists with emerging ones in Bangladesh; Trans-boundary transmission of pests)	Dr. Md. Monirul Islam PSO, Plant Pathology Division BARI, Gazipur
13:30-14:30	Lunch & Prayer	
14:30-15:30	Quarantine Pathogens (Identification lists with importance in Bangladesh; Trans-boundary transmission of plant pathogens)	Prof. Dr. F. M. Aminuzzaman Director (SAURES) SAU, Dhaka
15:30-16:30	International Standards for Phytosanitary Measures (ISPMs)	Dr. Dilruba Sharmin CABI Project Coordinator USDA Sanitary and Phytosanitary Project in Bangladesh CAB International

Day-2: 23.12.2024 (Monday)

Time	Topic/Session	Resource Person/Speaker
09:15-10:00	Role of WTO and IPPC in Phytosanitary Regulations	Dr. Mohammad Ashaduzzaman Bulbul Ex-AD, Training Wing, DAE
10:00-11:00	Modern Technologies in Phytosanitary Management	Prof. Dr. Md. Mahidul Islam Masum Dept. of Plant Pathology, BSMRAU

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Introduction to Phytosanitary Measures: Concepts and Importance

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1. Phytosanitary Measures

Measures to prevent the introduction and spread of pests, diseases, and harmful organisms in plants and plant products.

Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests

Major areas: Inspection, Certification, Quarantine, Pest Risk Analysis

Governed by International Plant Protection Convention (IPPC) and WTO's Sanitary and Phytosanitary (SPS) Agreement.

2. Importance of Phytosanitary Measures

- a) *Protecting agriculture*: Preventing pest outbreaks that can devastate crops.
- b) *Ensuring food security*: Safe and sustainable agricultural practices.
- c) *Facilitating trade*: Complying with international standards to access export markets.
- d) *Environmental protection*: Avoiding the introduction of invasive species.

3. Phytosanitary Principles under Global Context

Key principles

- National authority (NPPO) over resources and standards
- Risk based measures
- Transparency and scientific justification

Global organizations

IPPC: Sets international standards for plant protection.
FAO: Supports implementation and capacity-building.
WTO-SPS Agreement: Harmonizes phytosanitary regulations in trade.

4. Bangladesh Agriculture

Bangladesh, the world's 35th largest economy, relies heavily on agriculture as a foundation of its development, playing a vital role in poverty reduction and food security. Agriculture, forestry, and fisheries collectively accounted for 11.2% of GDP (BBS, 2023), employing over 40% of workforce and serving as a key driver of growth in both manufacturing and services sectors. Approximately 85% of the country's poor population resides in rural areas. Marginal and small-scale farmers, who constitute 92% of all farmers and cultivate 69% of the agricultural land, dominate Bangladesh's predominantly subsistence agricultural system (Agriculture Census, 2019).

Agricultural research and development (R & D) in Bangladesh plays a crucial role in enhancing food security, improving agricultural productivity, and promoting sustainable agricultural practices. Significant advancements in agricultural research have led to the development of high yielding, climate resilient crop varieties, improved livestock productivity, and increased inland fish production. Bangladesh is now a position among the

top 10 global producers of rice (3rd position, after China and India), jute, jackfruit, mango, onion, tea, vegetables, potatoes, fishes and livestock products. These achievements have been driven by increased agricultural funding, policy reforms, technological innovations, and improved access to inputs through price subsidies and production supports.

Rice, wheat, maize, potatoes, pulses, and oilseeds are the major food crops in Bangladesh. Rice is the primary staple food and holds the highest importance, followed by wheat and maize, which rank second and third in significance. Additionally, vegetables play a critical role in agricultural production. There are 316 cropping patterns (CPs), of which five are rice-based, covering 51% of the net cropped area. The most dominant cropping pattern is *Boro-Fallow-T. Aman Rice*, accounting for 27% of the net cropped area.

Table: Production Scenario of Major Crops in Bangladesh

Crops	Production (million ton)						Increased (%) (2000-2023)
	1980	1990	2000	2010	2020	2023	
Rice*	13.66	17.85	24.30	33.54	37.60	39.10	62
Wheat	1.08	1.004	1.61	0.97	1.08	1.17	- 27
Maize	0.001	0.003	1.00	1.018	4.12	6.42	542
Potato	0.98	1.24	3.21	8.32	9.88	10.43	225
Pulses	0.21	0.52	0.36	0.24	0.42	0.88	144
Oil Seeds	0.25	0.446	0.39	0.80	0.99	1.60	310
Vegetables	2.02	1.91	7.6	11.17	19.70	22.54	197

* Milled Rice

Source: MoA, FAO, BBS, MoF (BER), AIS (Veg.)

Major imports: Cotton, edible oil, oil seeds, wheat, sugar, pulses, spices, milk, cream

Major exports: Vegetables, fruits, betel leaves, spices, citrus, cut flower, potato, jute and jute goods, frozen and live fish, tobacco, tea, dry foods

Export regions: Europe (UK, Italy, Germany, France, Switzerland Sweden, Denmark, Spain, Ireland and Russia), Middle East (KSA, UAE, Kuwait, Qatar, Oman, Bahrain), Asia (Malaysia, Singapore, Pakistan, Srilanka, Nepal, Butan, Maldive), North America (only Canada).

Import country demand during exports

Fruits and Vegetables (Europe)

- Products must free from Thrips & Fruit fly
- Follow ISPM-4, ISPM-10 (for fruit fly- ISPM-35 must)
- Growing area must free from quarantine pests and diseases
- NPPO declare the area free from quarantine pest (Or prevalence lower)
- Products free from microbial contamination
- MRL level below the health hazard.
- Products must be free from heavy metal (Hg, Ar, Pb, Cr)
- Products need necessary treatment before export
- Product traceability follow GAP, GHP & GMP
- Products must be certified (DAE)

Betel leaf (Europe and Middle East)

- Production follow by GAP and GHP
- Must be prohibited the entry of poultry, animals & birds in the field
- Intercultural operations: worker, apron, tool, hygiene
- Field far from the residential areas
- Irrigation water apply (underground water)
- Area free from he eavy metal (Hg, Ar, Pb, Cr)
- Control quarantine pests: Samonella, E. coli, white fly, black fly, mite and anthracnose pathogen
- Pesticide residue level (MRL) below the health hazard.

So, agricultural challenges in this regard are pests and diseases affecting crops, restricted faithfulness to international phytosanitary standards, and vulnerability to climate change.

5. Phytosanitary Measures- Importance to Bangladesh

National Agriculture

- Protecting rice and vegetable yields from pests (e. g. fall armyworm)
- Promoting pest resistant varieties

Trade Opportunities

- Accessing global markets (EU and Middle East)
- Overcoming rejection of exports (due to pest contamination)

Environmental Protection

- Preventing introduction of invasive pests through imports

6. Phytosanitary Applications in Bangladesh

Current Practices

- Quarantine Stations at Ports and Borders
- Issuance of Phytosanitary Certificates for Exports
- Pest Surveillance by Department of Agricultural Extension (DAE)

Institution involved:

- Plant Quarantine Wing (PQW), DAE
- NARS Institutes
- Ministry of Agriculture (MoA).

7. Case Studies Related to Phytosanitary

- a) Export of Mangoes to Europe
 - Issue: Rejection due to fruit fly infestation
 - Solution: Adoption of hot water treatment and compliance with EU regulations.
- b) Fall Armyworm Management
 - Integrated pest management (IPM) training for farmers
 - Collaboration (FAO, CIMMYT) for pest monitoring

8. Challenges of Phytosanitary Measures Implementation

- i) Limited resources: Inadequate laboratories and trained manpower
- ii) Awareness gap: Farmers unaware of export standards
- iii) Climate impact: Increased pest prevalence
- iv) Trade barriers: Non-compliance with importing countries' standards

9. Opportunities for Improvement

Capacity Building

- Training for plant health inspectors and extension workers
- Infrastructure development for pest detection and analysis

Policy Reforms

- Strengthening enforcement of quarantine regulations
- Incentives for farmers to adopt pest free practices

Digital Tools

- Leveraging GIS and remote sensing for pest surveillance while using diagnostic tools, digital platforms, and AI for pest detection and management

International Collaboration

- Partnering with organizations like FAO and IPPC for technical support

10. Recommendations

- i) Enhancing education on safe pesticide use and export standards
- ii) Fostering public private partnerships for technology adoption
- iii) Increasing investment in research for pest resistant crop varieties
- iv) Strengthening phytosanitary infrastructure at ports and borders

11. Conclusion

- Phytosanitary measures are vital for our agriculture and trade.
- Effective implementation can safeguard crops, ensure food security, and unlock global trade potential.
- Collaboration among stakeholders is essential for addressing challenges and grabbing opportunities.

12. Good Agricultural Practices (GAP) in Bangladesh

Good Agricultural Practices (GAP) are practices that address environmental, economic and social sustainability for on-farm processes and result in safe and quality food and non-food agricultural products.

GAP mainly focus at two levels-

Farm level: practices in pre-production, production, pre-harvest, harvest and transport to the packhouse

Pack house: practices in post-harvest handling-washing, grading, packing and transport to the customer.

GAP: Focus at Farm Level

Environment hygiene: related to the soil, water, waste disposal etc.

Hygienic production: related to fertigation and pesticide spray schedules, irrigation schedule, planting material, storage and handling of Agro and non agro chemicals etc.

Handling, storage and transportation: related to practices essential to maintain food safety (may also be quality) during handling, storage and transportation

Cleaning, maintenance and personal hygiene: related to cleaning of pack house/storage premises; maintenance of fertigation and pesticide equipment and personal hygiene

GAP: Focus at Pack House

- Design of Pack House
- Control of Operations
- Maintenance & Sanitation
- Personal Hygiene
- Transportation
- Product Information
- Training

Four Pillars of GAP

1. Food safety and quality
2. Economic viability
3. Environmental sustainability
4. Social acceptability

Objectives of GAP implementation

- i) Ensuring sustainable production of safe and nutritious crops,
- ii) Ensuring the environment resilient to crop production and protecting the health, safety and well-being of the workers,
- iii) Following the specific procedures at all levels of the food chain,
- iv) Consumer health protection, and
- v) Increasing the production and export of high-value crops.

Bangladesh GAP Structure

Standard: Bangladesh GAP

Scheme owner: Bangladesh Agricultural Research Council (BARC)

Certification body: Bangladesh Agricultural Certification Body (BACB)

- Department of Agricultural Extension (DAE)- ISO17065:2012

Governing structure: Policy planning, decision making & supervision

- Steering Committee (25)

- Technical Committee (20)

- Certification Committee (14)

Accreditation: Competence of certification body-

- Bangladesh Accreditation Board (BAB)-ISO17011

Bangladesh GAP Standard Module

1. Food Safety Module (FSM)
2. Produce Quality Module (PQM)
3. Environment Management Module (EMM)
4. Workers Health Safety and Welfare Module (WHSM)
5. General Requirements Module (GRM)

Sl. No.	Name of Module	Elements	Practices	Optional
Module-1	Food Safety Module	13	98	7
Module-2	Environment Management Module	14	44	2
Module-3	Workers Health Safety and Welfare Module	8	33	2
Module-4	Produce Quality Module	13	26	2
Module-5	General Requirements Module	21	45	-
Total =		69	246	13

Compliance Criteria

Compliance Criteria	Levels of compliance
Very important (Major Must)	100% compliance of all applicable requirements
Important (Minor Must)	90% compliance of all applicable requirements
General	50% compliance of all applicable requirements

Module 1: Food Safety Module

13 elements, 98 Practices

- Site history and management
- Planting material
- Genetically Modified Organisms
- Fertilizers and soil additives
- Water (Irrigation/Fertigation)
- Chemicals (Plant protection products)
- Harvesting and handling produce
- Traceability and recall
- Training
- Documents & records
- Review of practices
- Others-2

Module 3: Workers Health Safety and Welfare Module

8 elements; 33 Practices

- Chemicals
- Work Environment
- Personal hygiene
- Worker welfare
- Training
- Documents & records
- Review of practices
- Others-2

Module 5: General Requirements Module

21 elements, 45 Practices

Section A: At Farm Level (6)

- Legal aspects
- Visitor requirements
- Redressal of complaints
- Site details
- Record keeping and internal inspection
- Calibration

Section B: Group Requirements (15)

- Legal requirements
- Written contracts
- Producer register
- Structure of organization
- Competency and training to staff
- Quality manual
- Document control
- Complaint handling
- Internal audit
- Non Compliances, corrective actions & sanctions
- Product traceability & segregation
- Withdrawal of certified product
- Common pack house
- Agreement with buyer
- Subcontracting

Module 2: Environment Management Module

14 elements, 44 Practices

- Site history & management
- Planting material
- Soil and substrates
- Fertilizer and soil additives
- Water
- Chemicals (Plant protection products)
- Waste management
- Energy efficiency
- Biodiversity
- Air/noise
- Training
- Documents & records
- Review of Practices
- Others-1

Module 4: Produce Quality Module

13 elements, 26 Practices

- Quality plan
- Planting material
- Fertilizer & soil additives
- Water
- Chemicals
- Harvesting & handling produce
- Storage and transport
- Traceability & recall system
- Training
- Documents & records
- Review of practices
- Others- 2

Challenges of GAP Implementation

- High initial costs
- Lack of ISO certified trained manpower
- Lack of model farms
- Insufficient number of accredited laboratories
- Inadequate transport, cooling and packing facilities
- Lack of internal and external trained auditor (ISO 17065:2012)

Way Forward for GAP Implementation

- Capacity development of GAP dedicated manpower
- Accredited laboratories development
- Awareness building on GAP
- Domestic market facilities need to be assured
- Export market need to be identified
- Mass scale training needs to be organized up to field level
- National monitoring cells need to be developed

13. Related Terminology

International Standard for Phytosanitary Measures (ISPM): An international standard adopted by the Conference of FAO, the Interim Commission on Phytosanitary Measures or the Commission on Phytosanitary Measures, established under the IPPC [CEPM, 1996; revised CEPM, 1999]

International Plant Protection Convention (IPPC): International Plant Protection Convention, as deposited with FAO in Rome in 1951 and as subsequently amended [FAO, 1990]

National plant protection organization (NPPO): Official service established by a government to discharge the functions specified by the IPPC [FAO, 1990; formerly “plant protection organization (national)”]

Phytosanitary Measure (PM): Any legislation, regulation or official procedure having the purpose to prevent the introduction or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests [FAO, 1995; revised IPPC, 1997; ICPM, 2002; revised CPM, 2013]

Sanitary and phytosanitary (SPS) measures: SPS measures are biosecurity measures designed to protect human, animal or plant life or health from:

- the introduction, establishment and spread of pests and diseases
- additives, toxins and contaminants in food and feed.

Bio-Security Measure (BSM): BSM is the implementation of a segregation, hygiene, or management procedure (excluding medically effective feed additives and preventive/curative treatment of animals) that specifically aims at reducing the probability of the introduction, establishment, survival, or spread of any potential pathogen to, within, or from a farm, operation or geographical area.

Plant quarantine (PQ): All activities designed to prevent the introduction or spread of quarantine pests or to ensure their official control [FAO, 1990; revised FAO, 1995; revised CPM, 2013].

Pest: Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products. Note: In the IPPC, plant pest is sometimes used for the term pest [FAO, 1990; revised FAO, 1995; IPPC, 1997; revised CPM, 2012].

Quarantine pest: A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled [FAO, 1990; revised FAO, 1995; IPPC 1997].

Quarantine area: An area within which a quarantine pest is present and is being officially controlled [FAO, 1990; revised FAO, 1995]

Quarantine station: Official station for holding plants or plant products or other regulated articles, including beneficial organisms, in quarantine [FAO, 1990; revised FAO, 1995; formerly “quarantine station or facility”; CPM, 2015].

Phytosanitary certificate (PC): An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements [FAO, 1990; revised CPM, 2012].

International Standards for Phytosanitary Measures (ISPMs)

ISPMs are the standards adopted by the Commission on Phytosanitary Measures (CPM), which is the governing body of the IPPC. The IPPC is the only standard setting organization for plant health. In addition, these standards, guidelines and recommendations are recognized as the basis for phytosanitary measures applied in trade by the Members of the World Trade Organization under the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement). Both contracting and non-contracting parties to the IPPC are encouraged to implement these standards. Standards in themselves are not regulatory instruments but come into force once countries establish requirements within their national legislation. Requests for specific information on import requirements should be addressed to the national plant protection organizations (NPPOs) of the country of import. This page, under the IPPC website is dedicated to the Standards for Phytosanitary Measures (ISPMs). It includes all adopted ISPMs International.

International Plant Protection Convention (IPPC)

IPPC is an international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. International travel and trade are greater than ever before. As people and commodities move around the world, organisms that present risks to plants travel with them.

Organization

- There are over 180 contracting parties to the IPPC.
- Each contracting party has a national plant protection organization (NPPO) and an Official IPPC contact point.
- Nine regional plant protection organizations (RPPOs) work to facilitate the implementation of the IPPC in countries.
- IPPC liaises with relevant international organizations to help build regional and national capacities.
- The Secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).

Sanitary and Phytosanitary Measures

SPS measures are governed by World Trade Organization's (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement), and its Committee on Sanitary and Phytosanitary Measures (the SPS Committee).

The SPS Agreement

The SPS Agreement provides a framework of rules to guide WTO Members in the development, adoption and enforcement of sanitary (human or animal life or health) and phytosanitary (plant life or health) measures which may affect trade.

The SPS Agreement provides WTO Members with the right to implement SPS measures necessary to protect human, animal or plant life or health. Each WTO Member is entitled to maintain a level of protection it considers appropriate to protect human, animal or plant life or health within its territory. This is called the ‘appropriate level of protection’ (ALOP). The right to adopt SPS measures is accompanied by obligations aimed at minimizing the negative impacts SPS measures can have on international trade.

SPS measures must -

- be applied only to the extent necessary to protect human, animal or plant life or health and not be more trade restrictive than necessary
- be based on scientific principles and not maintained without sufficient scientific evidence
- not constitute arbitrary or unjustifiable treatment or a disguised restriction on international trade.

All WTO Members are required to uphold the principles and obligations of the SPS Agreement.

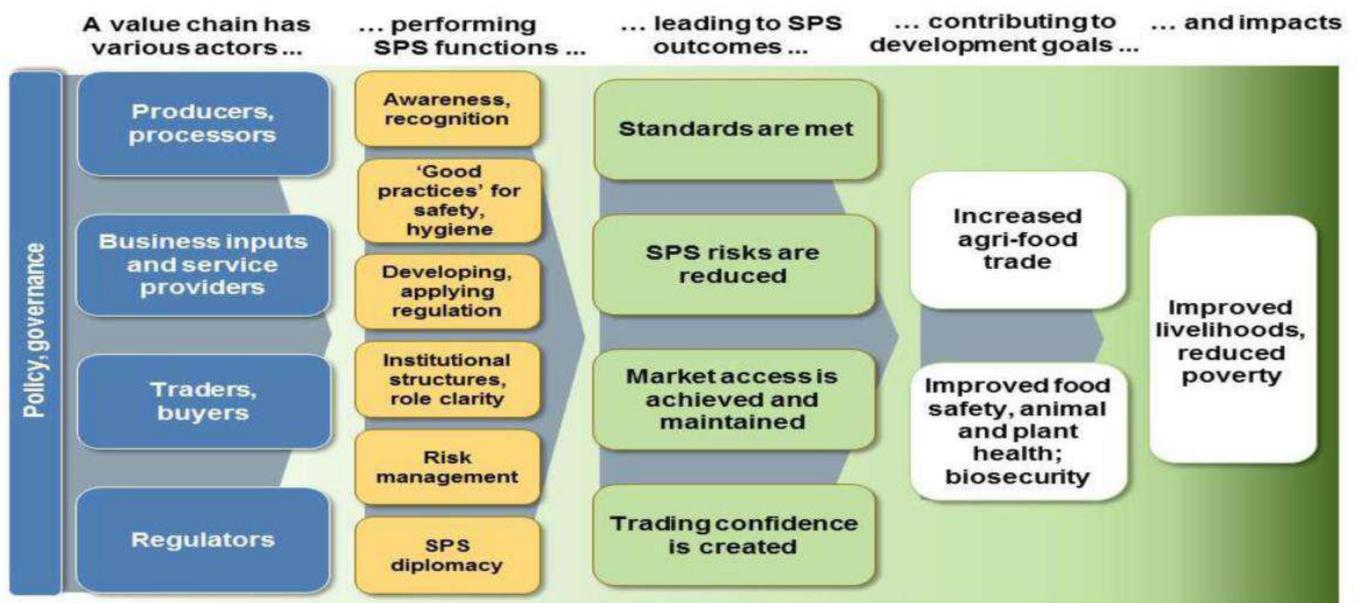


Figure: National SPS system should integrate multiple interconnected components.

Bangladesh Good Agricultural Practices Policy 2020

Ministry of Agriculture

Government of the People's Republic of Bangladesh
December, 2020

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01. Introduction

The agricultural sector of Bangladesh is gradually changing from 'Subsistence Agriculture' to Commercial Agriculture. In view of producing more food as well as increasing crops production for growing population, high yielding and hybrid varieties of crops are being used with excessive chemical fertilizers and pesticides. Sometimes organic fertilizers that contained heavy metals or chemicals harmful to human health are also used. These are also used in the production of agricultural products commercially.

Safe food is becoming increasingly important in terms of human health and economic aspects. Safe food production is urgent because of the competition in the global export market, as well protecting people from food bound illness. Indiscriminate use of pesticides and chemicals, presence of heavy metals, infections of microorganisms etc. from the early stages of production to the various stages of food chain made food unsafe. For these reasons, considering the availability of safe food, it is very important to follow Good Agricultural Practices (GAP) from the beginning of production, harvest and post-harvest processing, such as collection from field, packaging, transportation etc. to ensure safe food. Good Agricultural Practices (GAP) ensure producing safe and quality food as well as to play role to the environmental and social development.

GAP encourages the optimum use of agricultural inputs such as pesticides, chemical fertilizers, water etc. and environment friendly management. The health safety of workers engaged in agricultural activities must be ensured from the inappropriate use of the pesticides and various chemicals. To ensure food safety and quality most of the importers, retailers, hotels/restaurants who are being making foods as well as consumers consider to follow application of GAP as precondition from the production stage. It is very important that the certification organization follows the uniform and accurate procedures in all levels to ensure that there is no bias, thereby increasing the credibility and confidence of the consumer. To achieve this, the Certification Body must be recognized by any neutral authority and need to strictly follow all the rules-regulations to obtain recognition.

Super shop and major suppliers of Europe at first started the activities of GAP in the name of EurepGAP in 1997, which was renamed as Global G.A.P. in 2007. ASEAN GAP was launched in the member countries by the ASEAN Secretariat at the regional level in 2006. GAP scheme was started in the four SAARC countries such as Bangladesh, Bhutan, Maldives and Nepal by Food and Agriculture Organization (FAO) of United Nations for horticultural crops, vegetables and fruits in 2013-14. The implementation of the GAP scheme has resulted in the creation of the National GAP Standards, Scheme owner organization and Certification System in those countries.

Following GAP is essential for export market access along with safe crop production to thrive in the global competition. In Bangladesh due to the implementation of GAP, the agricultural produce will be safe, improved and of good quality, sustainable environment and social acceptance will be increased with income growth and economic momentum; and food and nutrition security will be ensured. The document prepared with this purpose will be named as ‘Bangladesh Good Agricultural Practices Policy-2020’.

02. Definition of Good Agricultural Practices

The GAP is the overall agricultural activities, following which safe and quality food and non-food products become available, environment, economy and social security are well integrated. In GAP such procedures are practiced in the farms in ways that guarantee safe and quality food at production, collection and post-harvest level. This is a set of rules and regulations and technological recommendations that are applied at various levels of overall agricultural production, processing and transportation that improve human health protection, environmental conservation, improve product quality and working environment.

03. Objectives of Implementation of Good Agricultural Practices

- 3.1 Ensuring sustainable production of safe and nutritious crops;
- 3.2 Ensuring environment resilient crop production and protecting the health safety and well-being of the workers;
- 3.3 Following the specific procedures at all levels of the food chain;
- 3.4 Consumer’s health protection; and
- 3.5 Increasing the production and export of quality high-value crops.

04. Important Topics of Exercising Good Agricultural Practices

- 4.1 Healthy Production: Ensure production following balanced application of fertilizers, irrigation, pesticides; optimum use and management of planting materials (seedlings, seeds) and chemicals;
- 4.2 Safe and food quality protection: Crop harvest, post-harvest preservation and transport management;
- 4.3 Environmental Protection: Soil, water and waste management;
- 4.4 Cleanliness: Cleaning of tilling equipments, fertilizers and pesticides application equipments, worker's uniforms, pack houses/storages;
- 4.5 Health of agricultural workers: Personal health protection of farmers and workers;

- 4.6 Recordkeeping and Traceability: Keeping all information at all stages of input use, production, post-harvest management and marketing;
- 4.7 Certification and use of logo: Providing certificates based on the GAP standard and use of 'Bangladesh Good Agricultural Practices' logo in the products;
- 4.8 Training: Regular training to the concerned partners;
- 4.9 Ensuring market: Price setting and ensuring market of quality agricultural products;
- 4.10 Monitoring: Regular monitoring of production and post-harvest management by inspector, auditor and technical observer;
- 4.11 Promotion and dissemination: Motivating for promotion, dissemination and use of GAP through print and electronic media.

05. Importance of Good Agricultural Practices in the Production of Safe crops

With globalization, the global safe food market has been created, besides, the increased diversified consumer's food demand, and food items are regularly being imported and exported from one country to another crossing the geographical boundaries.

There is a risk of infection and spread of germs in the food chain as a result of imports and exports of food items worldwide, which is a major threat to public health.

In this context, strict restrictions are being imposed on import and export of food by different countries providing equal importance on guaranteeing safe food. Safe food related issues in agricultural production/crop are the residues of the applied chemicals, the presence of pollutants, insects, microorganisms causing disease, external infections etc.

Besides, the presence of other materials in food, such as heavy metals or toxic substances. Safe food hazards/ risks can occur at any stage of the food chain, so problems related to safe food at every level of food chain need to be prevented or eliminated.

Following specific practices at all levels of food chain is the basis of GAP. In order to achieve safe food following GAP, every worker with the responsibility to the subject of his/her control must properly record and preserve the detail descriptions of all the activities at every level from the primary i.e. farmer level of food chain. The producer must ensure that the products are risk free and safe as food. In this case, besides the producer, it is the responsibility of everybody in the process of packaging, supply, transport, warehouse storage etc. to keep food safe and of good quality. The crops produced through the implementation of GAP are safe to take as food for health. Because, at all levels of production, food standard, environmental balance, health, security and well being of the workers will be ensured.

06. Components of implementing Good Agricultural Practices

- 6.1 Bangladesh GAP Standards:** As a first step, selection of scheme owner/coordinating organization of Bangladesh GAP and preparation of Bangladesh GAP Standards capable of meeting the needs of producers and consumers through technical committees consisting of subject matter experts;
- 6.2 Compliance Criteria/Index Setting:** Classifying GAP in terms of requirements;
- 6.3 Management Framework:** Preparation of GAP Standards by Scheme Owner and implementation progress monitoring. Setting up of three committees namely Steering, Certification and Technical Committees at policy level to implement GAP in the country;
- 6.4 Certification Body Nomination:** Nomination of GAP Certificate Awarding Body 'Bangladesh Agriculture Certification Body (BACB)'. In this case, finalizing the BACB by the Steering Committee with the approval of the Technical and Certification Committee;
- 6.5 Certification Process:** BACB will conduct all activities to issue GAP certificates to the interested crop producers or producer group following the processes prescribed in the GAP standard. In case of providing certificates, certificates will be provided according to the necessary instructions of scheme owner and as per ISO17065:2012 through evaluation, inspection and verification of activities of producer or producer group in a similar manner;
- 6.6 Bangladesh GAP logo use:** Formulating specific logo setting and usage guidelines by the Scheme owner for Bangladesh GAP; and
- 6.7 Accreditation:** The entire certification process conducted by BACB is recognized and monitored time to time by the independent recognition agency-Bangladesh Accreditation Board (BAB);

07. Structure of Bangladesh GAP Standard

In crop production as criteria of Bangladesh GAP standard aiming to produce safe food, various elements and practices will be detailed under multiple modules including subjects of Food Safety Module; Produce Quality Module; Environment Management Module; Workers Health Safety and Welfare Module.

08. Compliance Criteria

For Conducting Producer's self audit and inspection and verification process by the Accreditation Board including certification agencies the classification of control point of GAP is very important. GAP Standard exercises and control steps that the producer has to follow is the control area which has been categorized in three classes.

Compliance Criteria	Levels of compliance
Very important (Major Must)	GAP involved in crop production that direct the need for 100% compliance in all control areas of practices and if not followed severely impairs the quality and characteristics of food and products because of GAP Compliance Criteria will not be acceptable.
Important (Minor Must)	In this case, it is mandatory to comply 90%.
General	Of course, important but 50% compliance is must based on the product (crop).

09. Bangladesh Good Agricultural Practices (GAP) Implementation Framework and Structure System

9.1 Formation and responsibilities of Scheme owner/Coordinating Organization

Nomination of a suitable institution/organization as a Scheme owner by the government for the implementation of GAP in the country. Steering, Technical and Certification Committee will be set up in coordination with various stakeholders to conduct the activities „of Bangladesh GAP. The steering committee will be at the highest level, that will be conducted with the cooperation of the Certification Committee and the Technical Committee. The Steering Committee will direct the preparation and operation of the country's GAP schemes. The certification and technical committee will be represented by the partners and experts in the relevant subjects (Agronomy, Plant Physiology, Biotechnology, Horticulture, Entomology, Plant Pathology, Soil Science, Environmental Science, Agricultural Economics, Chemistry, Nutrition etc.).

9.2 Roles and Responsibilities of the Scheme owner;

- 9.2.1 Ensure the public awareness and availability of all information related to the GAP in Bangladesh;
- 9.2.2 Create, control and protect adequate documents (Policies and Management Responsibilities) for the management, maintenance and development of Activities.
- 9.2.3 Prepare Bangladesh GAP Certificate Symbol (GAP Certification Mark) or logo and approval and registration by the appropriate authorities;
- 9.2.4 Monitor the progress of preparation and implementation of Bangladesh GAP along with its revision, addition, updating from time to time;
- 9.2.5 Monitor production and certification activities;
- 9.2.6 Organize steering, technical and certification committee meetings regularly for caring out overall activities, development and management;
- 9.2.7 Resolve complaints at any level relating to the product quality and protect confidentiality in case of sensitive complaints;

- 9.2.8 Formation of neutral/independent appeal panel to resolve any appeal regarding the activities/decisions of the certification body in line with the international standards;
- 9.2.9 Take initiatives to increase efficiency and implementation capacity through organizing training and workshops of the certification body (supervisor, auditor, technical observer/technical reviewer), producer and implementing agency;
- 9.2.10 Provide the necessary technical assistance for the formation of quality and efficient certification body at the government and private level and
- 9.2.11 Develop web portals related to the Bangladesh GAP and upload all instructions on the website.

9.3 Privacy Protection

- 9.3.1 The Scheme owner has to protect the privacy of all policy and legally enforceable information during implementation of Bangladesh GAP;
- 9.3.2 The scheme owner has to ensure that there is no information mistake during implementing GAP; and
- 9.3.3 Take necessary action by the officer in charge in order to protect the privacy system of the scheme owner.

9.4 Formation of Committees and Terms of Reference

9.4.1 Steering Committee:

- 1) Secretary, Ministry of Agriculture,
Chairman
- 2) Additional Secretary (PPC), Ministry of Agriculture
Member
- 3) Additional Secretary (Extension), Ministry of Agriculture
Member
- 4) Additional Secretary(Research), Ministry of Agriculture
Member
- 5) Joint Chief (Planning Wing), Ministry of Agriculture
Member
- 6) Chairman, Bangladesh Agricultural Development Corporation
Member

- 7) Director General, Directorate of National Consumer Rights Protection
Member
- 8) Executive Chairman, Bangladesh Agricultural Research Council
Member
- 9) Director General, Department of Agricultural Extension
Member
- 10) Director General, Bangladesh Agricultural Research Institute
Member
- 11) Director General, Bangladesh Rice Research Institute
Member
- 12) Director General, Bangladesh Institute of Nuclear Agriculture
Member
- 13) Director General, Department of Agricultural Marketing
Member
- 14) Director General, Bangladesh Standards and Testing Institution
Member
- 15) Director General, Soil Resource Development Institute
Member
- 16) Executive Director, Bangladesh Institute of Research and Training on Applied
Nutrition
Member
- 17) Chairman, Bangladesh Food Safety Authority
Member
- 18) Vice Chairman, Export promotion Bureau.
Member
- 19) Director General, South Asian Regional Standards Organization (SARSO)
Member
- 20) Representative, Bangladesh Accreditation Board (BAB)
Member
- 21) Managing Director, Hortex Foundation
Member
- 22) President, Bangladesh Fruits, Vegetable and Allied Products Exporters
Association (BFVAPEA)
Member

- 23) President, Consumer Association of Bangladesh (CAB)
Member
- 24) Director, Seed Certification Agency
Member
- 25) Member Director (Crop), Bangladesh Agricultural Research Council
Member-Secretary

9.4.2 Terms of Reference of Steering Committee

- 9.4.2.1 The overall development, change and monitoring of Scheme owner and BACB;
- 9.4.2.2 Taking decisions based on recommendations of the certification and technical committee;
- 9.4.2.3 Final approval of standard and technical guidelines made for Bangladesh GAP;
- 9.4.2.4 Co-opting the experienced person in the relevant field in this committee if necessary and
- 9.4.2.5 Consulting with the concerned committee if necessary.

9.4.3 Certification Committee:

- 1) Director General, Department of Agriculture Extension
convenor
- 2) Director General, Department of Agricultural Marketing
Member
- 3) Joint secretary (Extension), Ministry of Agriculture
Member
- 4) Managing Director, Hortex Foundation
Member
- 5) Director, Plant Protection Wing, Department of Agricultural Extension
Member
- 6) Director, Certification Marks, BSTI
Member
- 7) Director, Seed Certification Agency, Gazipur
Member
- 8) Director, Bangladesh Accreditation Board
Member

- 9) General Manager(Seed), BADC
Member
- 10) Chief Scientific Officer (Crop), BARC
Member
- 11) Chief Scientific Officer (Entomology Division), BARI
Member
- 12) Chief Scientific Officer (Plant Pathology Division), BARI
Member
- 13) Director, Field Service, Department of Agricultural Extension
Member-Secretary

9.4.4 Terms of Reference of Certification Committee

- 9.4.4.1 Modification and recordkeeping of certification process as required;
- 9.4.4.2 Creating instructional information helpful to application of certification;
- 9.4.4.3 Policy formulation, recordkeeping and editions of Bangladesh GAP logo use;
- 9.4.4.4 Resolving any issue related to certification;
- 9.4.4.5 Final approval of the application of public and private organization after verification; and
- 9.4.4.6 Co-opting the experienced person from the relevant field in this committee, if necessary.

9.4.5 Technical Committee:

- 1) Executive Chairman, Bangladesh Agricultural Research Council-
Convenor
- 2) Member Director (crop), Bangladesh Agricultural Research Council -
Member
- 3) Member Director (Fertilizer Management), Bangladesh Agricultural
Development Corporation-
Member
- 4) Director, Plant Protection Wing, Department of Agricultural Extension-
Member
- 5) Director, Plant Quarantine Wing, Department of Agricultural Extension -
Member

- 6) Director, Horticulture Wing, Department of Agricultural Extension - Member
- 7) Director/ Representative, Seed Certification Agency- Member
- 8) Concerned Director, Environment Department of Government- Member
- 9) Director/ Representative, Soil Resource Development Institute - Member
- 10) Director(Research), Bangladesh Agricultural Research Institute- Member
- 11) Director(Research), Bangladesh Rice Research Institute- Member
- 12) Director(Research), Bangladesh Institute of Nuclear Agriculture- Member
- 13) Director/ Representative, Bangladesh Institute of Research and Training on Applied Nutrition- Member
- 14) Director, Certification Marks, Bangladesh Standards and Testing Institution- Member
- 15) Director, Institute of Food Science and Technology (IFST), BCSIR- Member
- 16) Representative, Department of Agricultural Marketing- Member
- 17) Concerned Representative, Hortex Foundation- Member
- 18) Representative, Food Processing Industries- Member
- 19) Director, Field Services Wing, Department of Agricultural Extension - Member-Secretary

9.4.6 Terms of Reference of Technical Committee

- 9.4.6.1 Developing and maintaining required standard and technical guidelines for Bangladesh GAP scheme;
- 9.4.6.2 Providing necessary explanations of paragraphs;
- 9.4.6.3 Setting certification standards and resolving related conflicts;

- 9.4.6.4 Developing Bangladesh GAP logo and accepting registration from the concerned organization;
- 9.4.6.5 Resolving any arisen problems by the certification body and Technical clarification of any matter, if needed; and
- 9.4.6.6 Co-opting the experienced person in the concerned subject in this committee if necessary.

9.5 Use of Bangladesh Good Agricultural Practices (GAP) logo and Bangladesh GAP Number (BGN)

- 9.5.1 Bangladesh GAP logo to be reserved by the Scheme owner;
- 9.5.2 In using Bangladesh GAP logo by the certified producer or producer group must be approved by the Certification body/Scheme owner;
- 9.5.3 Logo should be used in such a way that in product/crop production it becomes evident that the GAP have been followed and
- 9.5.4 Providing GAP certificate to producer or producer group use of Bangladesh GAP Number (BGN) is essential. For BGN, 13-digit descriptive serial number aligned to Global GAP has to be created.

10. Formation and Responsibilities of Certification Body

The Certification body will conduct certification procedure to maintain the quality of farm produce and to evaluate the compliances for reducing infection and pollution. The organization having sufficient manpower and capacity to be nominated as Certification Body (CB).

The Certification Body as an independent organization will provide GAP certificate compatible with requirements of national and international GAP standards to the contract producer/ producer group.

In this case, certification body must be accredited by the recognized authority as per the standards of ISO17065:2012.

The Certification body will monitor and implement the compliances/control points in modules of Bangladesh GAP Standards whether these have been followed properly as per standards.

Activities of Certification Body (CB) are as follows:

- Certification system need to be developed based on the scheme standard and ISO17065:2012;
- Updating related information and transfer to the certified producer or producer group by the Scheme owner.

- Taking effective steps to provide certificates to the producer or producer group interested in receiving Bangladesh GAP certificate;
- Resolving any complaints and appeals regarding implementation of Bangladesh GAP; and
- Determining the strategy of ensuring opportunities to follow GAP for interested producers or producer groups and uploading all information in the website.

11. Accreditation Body

As an independent organization Accreditation body would look after the skill, inspecting and auditing of the certification body of Bangladesh GAP scheme. The accreditation body will follow ISO17011 and work under the rules and regulations of the International Accreditation Forum (IAF). Bangladesh will follow ISO17011 as a signatory to the IAF. In this case, Bangladesh Accreditation Board (BAB) will work as the accreditation body of the Bangladesh GAP scheme.

12. Certification Guidelines

To create trust, Bangladesh GAP certification guidelines will ensure impartiality, eligibility, privacy and transparency, responsiveness and responsibility whose explanations are as follows:

Impartiality - Certification body and its staff will be impartial so that they have confidence in their activities and results. In case of impartiality, biasness due to own interests, kinship, very familiarity, interrupting and contesting are mentionable among the risks.

Qualification - For ensuring confidence in certification the officers/employees need to have adequate qualification.

Privacy and Transparency - The certification body must achieve confidence in the privacy of information in implementing Bangladesh GAP, so that the information is not disclosed any way. The certification body must ensure transparency at all levels of implementation of the Bangladesh GAP.

Openness - Openness is the policy of access or disclosing proper information. The certification body must provide and publish information on evaluation and certification process in appropriate form in due time. The information regarding the status of the product certification to be provided/published timely in correct form. Certification approval, management, increase or decrease scope, suspension, withdrawal or denial so that confidence can be achieved in the solidarity and credibility of the certification.

Right to information- Certification body have to provide the information related to the evaluation and certification of the product subject to their request while contracted with a producer, producer group or organization.

Response to complaints and appeals- Complaints and appeals means protection against mistakes, drop out or illogical behaviour in evaluation of the certification body's client and others' compliance. The confidence in compliance evaluation is preserved when the process of complaint and appeal is properly resolved.

Responsibility—The applying producer and producer group need to fulfill the requirements of certification, which is not concerned with the certification body. The certification body undertakes decision based on the supporting documents. It is easier to approve by the Certification Committee if compliance is met up duly based on the evidence of the review.

13. Bangladesh GAP Certification Process

13.1 Application for Bangladesh Good Agricultural Practices certification

- 13.1.1 Individual producer or producer group (two or more) may be the applicant;
- 13.1.2 The same requirements will be in effect for the individual producer and producer group;
- 13.1.3 The producer must evaluate GAP procedures according to ISO17065:2012 through self-assessment for at least three months before submitting the application;
- 13.1.4 Application has to be made in the prescribed form so that there is a clear understanding of the producer or the producer group. In the form there have to be the name, address, contact details, proof of legal credential and detail information about the farm of applicant producer or producer group. Besides, information about the products such as production sites, annual production, types of cultivation, poly house/net house/green house or field production, crop details (varieties, planting time, use of various inputs etc.), statement and dates of internal inspection have to be mentioned;
- 13.1.5 Application form and necessary information have to be uploaded on the website of Certification Body;
- 13.1.6 The applicant has to fulfil a pledge to inform whether it has been certified under this scheme or by any other certification body and in that case, the previous report will have to be provided to the new Certification Body. Certification Body may consider to verify the information provided by the previous certification body; and
- 13.1.7 Through further declaration the applicant has to provide its management information. Besides, any minutes or GAP certificate revoked or approved in any policy or law by any other certification body has to be mentioned.

13.2 Certification Review

- 13.2.1 Any shortcoming if observed during review, the applicant has to inform the certification body as earliest possible;
- 13.2.2 The application will be registered if all the information provided are acceptable and a receipt with an unique identification number will be issued;
- 13.2.3 Application for certification cannot be registered within one year in favour of any producer if already being rejected for misuse of Bangladesh GAP Logo or punished by a court or for violation of the terms of the previous certification body;
- 13.2.4 Review will ensure that all requirements for the evaluation are fulfilled and the applicant has the skills and competence to follow certification process. If the Certification Body's process is found defective or insufficient, it must be mentioned in the review as observation; and
- 13.2.5 All records of review have to be preserved.

13.3 Certification Agreement/Undertaking

Certification agreement between registered applicant (producer/producer group) and certification body shall be signed wherein certain conditions and rules-regulations are mentioned, which are to be complied by the producer or producer group. The applicant must submit a farm management plan along with the certification agreement. Until the producer is using the Bangladesh GAP logo, the applicant has to be committed for continued implementation of the standard farm management plan specified by the certification authority so that compliance criteria is maintained. The certification agreement format will be uploaded in the website.

14. Audit

The planning and arrangements of auditing shall be such that the audit is effective, pertinent and reliable. Auditing shall be conducted using established methods and strategies. The certification of crop produces shall be audited by competent organization. For such activities objectives, neutrality and systematic procedures are essential. Before auditing, it is necessary to have a clear understanding on its opportunities, goals and standards and shall be agreed with it. The audit team members and the programme manager need to be careful having integrity as professionals towards their work aptitudes and rules- regulations. There shall be such relationship between the audit team and the producer/producer group so that confidentiality is maintained.

15. Followed Standard

- 15.1 In case of organic and chemical fertilizer uses fertilizer recommendation guide published by the BARC and in case of pesticides uses, approved registered pesticides need to be applied in appropriate doses. Besides, fertilizer dosages will be acceptable on the basis of upazila/union soil guidelines published by the Soil Resource Development Institute or soil testing method. In addition, fertilizer and pesticide dosages will also be acceptable as per recommendation of different Research Institutes, Agricultural/Technical Universities;
- 15.2 Dosages use of other chemicals like Plant Growth Regulator (PGR) shall be recommended as per fertilizer recommendation guide published by BARC or recommended by the Research Institutes, Agricultural/Technical Universities and
- 15.3 Prevalent laws and policies in the country shall be followed in case of approved GMO crops.

16. Sample Testing

The food products shall be examined from the accredited/approved laboratory for determining the presence of fertilizers, pesticide residues, heavy metals, harmful microorganism.

17. Documentation

For management and development of the Bangladesh GAP, the Scheme Owner shall have to prepare, control and preserve various matters such as sufficient publication of various GAP modules in Bengali and English version, various organizational structures for implementation of the national GAP certification and accreditation procedures, key actions to recognize the GAP of the Accreditation Board etc. The documentation shall specify the management and responsibilities of the Scheme Owner.

18. Human Resource Development

Skilled human resources are essential for Appropriate technology innovation, institutional skills and entrepreneurship development. In achieving professional skills implementation of suitable training and education package based programmes will speed up activities of Bangladesh GAP. The following activities shall be conducted for human resources development:

18.1 Training Partners

- 18.1.] The competency of concerned in development and implementation of Bangladesh GAP including producers, extensionist, agricultural researchers, extension and marketing staff has to be increased through training.

18.2 Coverage of Training

- 18.2.1 Providing training on Bangladesh GAP policy and modules;
- 18.2.2 Offering training on successful application of new innovation and on all areas including research in Bangladesh GAP;
- 18.2.3 Organizing seasonal/crop-based training and providing group based training to the farmers;
- 18.2.4 Providing training in areas of management on safe food production, soil, fertilizer and water, integrated pest, postharvest and marketing, etc.
- 18.2.5 Provide special priority on women and youth training to draw their attention on Bangladesh GAP activities and
- 18.2.6 Include Bangladesh GAP in the internal training of all concerned organization, agency, departments.

18.3 Education

- 18.3.1 Include GAP courses at graduate and post-graduate levels of the Agricultural/Technical Universities and
- 18.3.2 Include GAP in training of NATA and agricultural diploma courses.

19. Technology Transfer

- 19.1 Expanding extension skills with an aim to resolve the identified problems and accelerate technology transfer process through organizing regular workshops, seminars, views exchanges and training by the NARS institutes and the agricultural/technical universities with participation of researchers, extension and marketing staffs.
- 19.2 For quick extension of the novel technologies, the inventing organization will initially take special activities and the technology will be improved by evaluating its usefulness and
- 19.3 Researchers and extension workers shall jointly undertake and implement research plans for innovating effective technology transfer methods.

20. Priority of Bengali Language

After accomplishment of Bangladesh Good Agricultural practices Policy-2020, the government shall be able to publish a reliable text in English through government gazette notification. If there is any confusion/inconsistency between Bangla and English text, the policy compiled in Bangla shall sustain.

Quarantine Pests

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Quarantine pests are important threats to ensure phytosanitary measures in Bangladesh. Biological diversity of Bangladesh is more vulnerable to the invasion of new pests. The emerging pests may be invasive or existed in Bangladesh without notice and now appearing as prominent. Farmers are facing problems because most of these pests are difficult to control without chemical pesticides. The spread of quarantine pests is now recognized as one of the major treats to the plant biosecurity or regulatory plant health, biodiversity and economic well being of Bangladesh.

Plant biosecurity or regulatory plant health means plant products are free of pathogens, insects and weeds. This is a requirement for a healthy human individual, a national economy and international trade. So plant products at farm level production, post-harvest handling and consumption should be free from contamination of pathogens, insects and weeds. Plant products at marketing level should be free from mycotoxins, endotoxins, undue preservatives like formalin, and residues of ripening agents like Calcium Carbide/ethrel which make them unsafe for human health. It brings a loss in market value of the farm produce. Plant products carrying inherent pathogenic infections show up symptoms upon inspection test pose a threat to exporting the same to international market. It causes a trade loss. To maintain plant biosecurity at all stages, manpower skilled in phytosanitary measures employed in sufficient number is necessary. We have a very strong network of extension activities, education and research program for plant health management. Outcome of these activities appear not satisfactory. Development of advanced plant biosecurity courses for producing more skilled graduates and their integrated employment at the designated areas might bring better results in plant biosecurity management and guarantee.

Plant Biosecurity is a set of measures designed to protect a crop, crops or a sub-group of crops from emergency plant pests at international, national, regional and individual farm levels.

Plant biosecurity is a growing field of activity for many professionals involved in agriculture, horticulture, the environment and international and domestic trade. This growth is driven by the need to maintain agricultural and environmental integrity in a world where, due to ever increasing levels of trade and human movement, exotic plant-affecting organisms pose major and ongoing threats.

Plant biosecurity is about managing risks in the trade of plant commodities and protecting plant production resources.

Plant biosecurity hazards include pests and diseases, pesticide residues, mycotoxins and weed contaminants (Photograph 1). Hazards become risks when they realistically threaten

production resources or are unacceptable as contaminants in a commodity. The magnitude of the risk is the product of the likelihood and the consequence of it occurring. Trade may be possible if the risks are managed effectively, and that is the business of biosecurity.



Photo.1: Pathogenic infection on jujube (left) and insect infested eggplant (right).

The biosecurity pathway consists of all the steps from growing the commodity, through harvesting, storing, processing, and transporting (Figure 1.). Contamination can occur at varying and multiple points through the pathway. Whether or not contamination occurs depends on the nature of the hazard, environmental effects on the hazard and the crop, the farming system and how the commodity is handled between harvest and delivery.

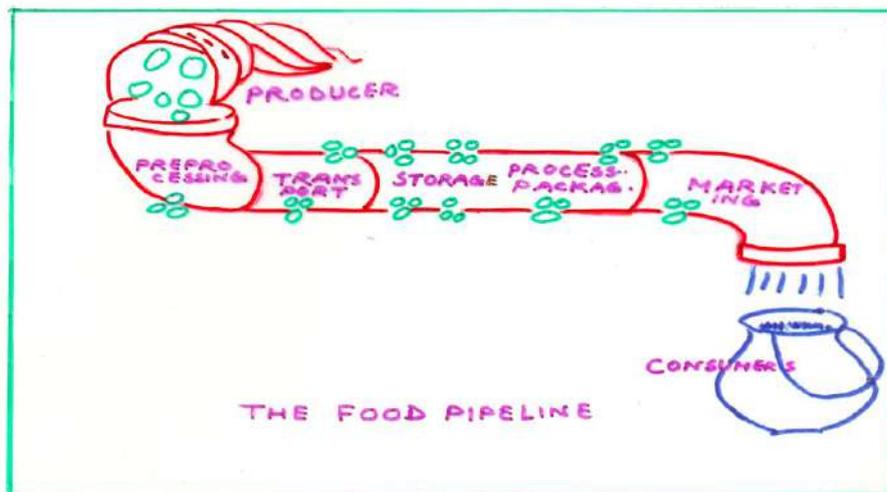


Figure 1. Plant Product Handling chain

Biosecurity risks are regulated partly by international trade treaties and policies that affect what can be regulated and how it may be done, partly by governments that enact laws and regulations to implement their biosecurity policies and partly by the private sector through market standards.

It is easily seen that this is a complex system, requiring specialist expertise to understand the full system and manage the risks with an optimal combination of risk mitigation measures. We need to link science, business and policy into systems.

Biosecurity has emerged as a major global issue. Harmful plant pests and diseases can impact on food safety, trade, market access, market development and, ultimately, the profitability and sustainability of plant industries.

Plant pests and diseases which seriously impact on agricultural industry in other countries upon entry into Bangladesh would harm the quality of home plant products. If Bangladesh fails to produce safe plant products, entry into international markets (especially vegetables and fruits) won't be possible. So, the country faces a trade loss of Tk 19 crore per annum e.g. citrus canker (*Xanthomonas axonopodis*), and Citrus thrips (*Thrips palmi*) (Photo. 2)(Exporters Association, 2010).



Photo. 2: Canker infected Citrus fruit.

Farm produce must be safe and healthy for food security and a healthy nation. Contaminated plant products at different levels-retailers, whole sale, storage and transport directly affect food security. Presence of mycotoxins and use of formalin and ripening agents (Calcium carbide, Ethereal) in vegetables and fruits in recent time in Bangladesh indicates the safety level of our plant products (Photo.3). The on-going supply of agricultural products to the domestic market, and the commerce associated with the entire supply chain are also at risk. It also indicates how fragile the relation between the plant industry in Bangladesh and the relevant Government bodies.



Photo. 3: Road side spray of chemical agent for quick ripening of immature Bananas and Mangoes (Courtesy: The daily Protom Alo 02 July 2011).

The consumption of fresh vegetables has increased dramatically over the last two decades not only in domestic markets as well as global trade in fresh vegetables. It is confirmed by some health agencies and different consumers that food borne illness are associated

with fresh fruits and vegetables about the safe and safety of this products for human consumption. This has led to development of various guidelines for cultivation of fruits vegetables and also commodity standard for consumers by Codex Alimentarius Commission. Same guidelines have been originated from European Union under the EUREPGAP now it is known as GLOBALGAP. GLOBALGAP is an internationally used management system for Good Agricultural Practices (GAP) for fresh fruits and vegetables trade globally. At present this system has become quite popular and acceptable as a standard system in the international market (Segre, 2005). UK has imposed regulation that plant health certificate must be given that prior to three months of harvesting the field was free from thrips, *Thrips palmi* and other pests and diseases (DAE, 2009).

The occurrence of 1200 diseases, 1000 insects and 350 weeds have been reported in more than 300 crops grown in Bangladesh (Meah and Khan, 1997; Karim and Kabir, 1995). Loss of approx. Tk 7000 crores is incurred annually for crop damage by diseases and it is approx. Tk 8000 crores for insect damage. This accounting is for the conservative estimation of 20% crop loss in the field. However, an average of 13.0% crop produce loss is occurred in the farmer's field despite the adoption of traditional weed control (Karim, 2011). The saving of the loss could provide food for two months for the entire Bangladesh population (Meah, 2008). Pathogenic infections and insect bites leave damaged tissues making them ugly often accompanied by mycotoxins in the harvested food crops making the food unhealthy and unsafe for human consumption (Photos 4 & 5).



Photo 4. Pathogenic infection caused plant products ugly and unfit for human consumption.



Photo 5. Insect damage deteriorated quality of plant products.

Growers apply pesticides (fungicides, insecticides) mainly insecticides indiscriminately to protect their crops from pest attack. Report of 150 time spray of insecticide for controlling shoot & fruit borer (SFB) of eggplant is available (Das et al., 2000). This operation leaves toxic residues inside of the fruit making eggplant and similar other vegetables unsafe and unhealthy for human consumption. Ill-motivated business of pesticide dealers is partly accountable for this hazardous task. This operation is also accountable for environment pollution, excessive use of pesticides and increased import cost (Figure 2).

Scientific knowledge of plant biosecurity and skilled personnel in this area are prerequisite to diminish the economic, social and environmental impact of harmful plant pests and diseases.

Therefore, plant biosecurity should be ensured right from production, harvesting, transport, marketing to all levels of pre-border, border and post-border activities as a continuum. The efforts will also assist in minimising the impact of possible plant-based bioterrorism.

Plant quarantine

A legal restriction of the movement of agricultural commodities.

Purpose: Exclusion, prevention or delay in establishment of plant pests in the area where they are not present previously.

International quarantine: Legislation to prevent the introduction of new pests from foreign countries.

Domestic quarantine: Legislation to prevent the spread of already established pests and diseases, and weeds from one part of the country to another.

Trans-boundary Pests: A Trans-boundary pest is a pest that crosses at least one political border, either a border within a nation or an international boundary.

Transboundary plant pest and diseases (TPPDs) are migratory pests and diseases that pose a significant threat to food security, trade, and livelihoods of people in the affected countries, and generate huge losses of crops and pastures.

Quarantine pest

Pest present in other country but not inside the country.

Pest distributed in defined area but absent in other part/area of the country.

List of quarantine pests

List of some invaded insect pests in Bangladesh (2009-2023)

Sl. No.	Invaded Insect Pest Name	Scientific Name	Host Name	First Recorded in Bangladesh
1.	The papaya mealybug	<i>Paracoccus marginatus</i> Williams and Granara de Willink	Papaya	2009
2.	Tomato leaf miner	<i>Phthorimaea absoluta</i>	Tomato	2016
3.	Fall Armyworm	<i>Spodoptera frugiperda</i>	Maize	November 2018
4.	Rugose spiralling whitefly	<i>Aleurodicus rugioperculatus</i>	Coconut	RARS, BARI, Jashore, May, 2019
5.	The Litchi bug (Thunberg)	<i>Tessarotoma javanica</i>	Litchi	2020

List of recent new records of some insect pests- not clear whether they are invasive or existed in Bangladesh

Sl. No.	Invaded Insect Pest Name	Scientific Name	Host Name	First Recorded in Bangladesh
1.	Bagworm	<i>Mahasena corbetti</i> Tams	Areca nut	May 2018
2.	Guava shoot borer	<i>Microcolona technographa</i> Meyrick	Guava	2020
3.	Asian mango flower beetle	<i>Protaetia fusca</i> (Herbst)	Brinjal	2020
4.	Coconut spike moth	<i>Tirathaba rufivena</i>	Betel nut	2020
5.	Litchi Looper	<i>Thalassodes pilaria</i> Gueenee	Litchi	March 2020

Quarantine Pathogens

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Plant quarantine

A legal restriction of the movement of agricultural commodities.

Purpose: Exclusion, prevention or delay in establishment of plant diseases in the area where they are not present previously.

International quarantine: Legislation to prevent the introduction of new pathogens from foreign countries.

Domestic quarantine: Legislation to prevent the spread of already established pathogens and diseases, and weeds from one part of the country to another.

Quarantine pathogen

Pathogen present in other country but not inside the country.

Pathogen distributed in defined area but absent in other part/area of the country.

Table 1. List of quarantine pathogens in different crops

Crop	Fungi	Bacteria	Virus	Nematode	Total
1. Wheat	6	-	1	1	8
2. Maize	6	1	4	5	16
3. Pulse	4	2	7	-	13
4. Groundnut	1	-	4	-	5
5. Sesame	1	1	1	1	4
6. Cotton	1	-	1	-	2
7. Citrus	4	3	3	-	10
8. Onion garlic	6	2	3	1	12
9. Potato	5	1	4	5	15
10. Eggplant	1	-	2	2	5
11. Carrot	3	1	1	3	8
12. Cucurbit	1	2	2	1	6
13. Mukhikachu	2	-	1	-	3
14. Mango	5	1	-	-	6
15. Guava	2	1	-	-	3
16. Watermelon	-	1	-	-	1
Total	48	16	34	19	117

List of Quarantine Pathogens

Wheat [Total: 08 (Fungi: 06, Nematode: 01, Virus: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Tilletia indica</i> Mitra	Karnal bunt
2.	<i>Puccinia graminis tritici</i> (race ug99)	Stem rust
3.	<i>Tilletia laevis</i> Kühn	Common bunts
4.	<i>Tilletia tritici</i> (Bjerk.) Wint	Common bunts
5.	<i>Claviceps purpurea</i> (Fr.) Tullis	Ergot
6.	<i>Phaeosphaeria nodorum</i> (Müll.) Hedjar.	Glume blotch
7.	<i>Anguina tritici</i> (Steinbuch)	Seed gall
8.	Barley Stripe Mosaic Virus	Barley Stripe Mosaic disease

Maize [Total: 16 (Fungi: 06, Virus: 04, Bacteria: 01, Nematode: 05)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Peronosclerospora sorghi</i>	Downy mildew
2.	<i>Sclerospora graminicola</i>	Downy mildew
3.	<i>Phymatotrichopsis omnivore</i>	Texas root rot
4.	<i>Cercospora zea-maydis</i>	Gray leaf spot
5.	<i>Pantoea stewartii</i> subsp. <i>stewartii</i>	Stewart's wilt of sweet corn
6.	<i>Ustilaginoidea virens</i>	False smut of maize
7.	High Plains virus	Leaf yellowing and purple margin
8.	Wheat streak mosaic rymovirus (WSMV)	(maize, wheat)
9.	Maize dwarf mosaic potyvirus	Mosaic yellow streak dwarf
10.	Maize chlorotic mottle machlomovirus	Chlorotic mottle and stunting
11.	<i>Clavibacter michiganensis</i> subsp. <i>nebraskensis</i>	Goss's bacterial wilt of maize
12.	<i>Heterodera zea</i>	Maize cyst nematode
13.	<i>Dolichodorus heterocephalus</i>	Awl nematode
14.	<i>Pratylenchus scribneri</i>	Root lesion nematode

Sl. No.	Quarantine pathogens	Diseases
15.	<i>Longidorus breviannulatus</i>	Needle nematode
16.	<i>Hoplolaimus columbus</i>	Lance nematode

Pulse [Total: 13 (Fungi: 04, Bacteria: 02, Virus: 07)]

Sl.No.	Quarantine pathogens	Diseases
1.	<i>Ascochyta lentis</i>	Ascochyta blight (Lentil)
2.	<i>Phytophthora medicaginis</i>	Phytophthora root rot (Chickpea)
3.	<i>Septoria vignae</i> Henn.	Septoria leaf spot (Cowpea)
4.	<i>Curtobacterium flaccumfaciens</i> pv. <i>flaccumfaciens</i>	Tan spot (Cowpea, Mungbean)
5.	<i>Pseudomonas savastanoi</i> pv. <i>phaseolicola</i>	Halo blight (Mungbean)
6.	<i>Xanthomonas campestris</i> pv. <i>cassiae</i>	Bacterial blight (Chickpea)
7.	Alfalfa mosaic virus	Alfalfa mosaic (Lentil, Chickpea)
8.	Beet western yellows virus	Beet western yellows (Lentil, Chickpea)
9.	Pea seed-borne mosaic virus	Pea seed-borne mosaic (Lentil, Chickpea)
10.	Faba bean necrotic yellows virus (FBNYV)	Faba bean necrotic yellows (Lentil)
11.	Peanut stunt cucumo virus	Mosaic and malformation (Cowpea)
12.	Tomato spotted wilt virus	Tomato spotted wilt (Cowpea)
13.	Cowpea severe mosaic virus	Cowpea severe mosaic (Cowpea)

Groundnut [Total: 05 (Fungi: 01, Virus: 04)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Aspergillus flavus</i>	Yellow mold
2.	Peanut bud necrosis virus	Peanut bud necrosis
3.	Peanut stripe virus (PStV)	Peanut stripe
4.	Indian Peanut clump virus (IPCV)	Indian Peanut clump
5.	Peanut mottle virus (PeMoV)	Peanut mottle

Sesame [Total: 04 (Fungi: 01, Bacteria: 01, Virus: 01, Nematode: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Chalara elegans</i>	Black root rot
2.	Candidatus Phytoplasma asteris	Yellow disease phytoplasmas
3.	<i>Heterodera cajani</i> Koshy	Pigeon pea cyst nematode
4.	Peanut mottle virus	Peanut mottle

Cotton [Total: 02 (Fungi: 01, Virus: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Verticillium dahliae</i>	Wilt
2.	Cotton leaf curl virus	Cotton leaf curl

Citrus [Total: 10 (Fungi: 04, Bacteria: 02, Virus: 03, Spiroplasma: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Candidatus liberibacter africanus</i> (African form)	African greening of citrus
2.	<i>Xylella fastidiosa</i> subsp. <i>pauca</i>	Citrus variegated chlorosis
3.	<i>Phoma tracheiphila</i>	Mal Secco
4.	<i>Pseudocercospora angolensis</i>	Pseudocercospora spot
5.	<i>Phyllosticta citricarpa</i> Teleomorph: <i>Guignardia citricarpa</i>	Black spot
6.	<i>Mycospharella citri</i>	Greasy spot
7.	Indian citrus ringspot virus	Indian citrus ringspot
8.	Citrus leprosis virus	Leprosis
9.	Citrus exocortis viroid	Citrus exocortis
10.	<i>Spiroplasma citri</i>	Citrus Stubborn

Onion and Garlic [Total: 12 (Fungi: 06, Bacteria: 02, Virus: 03, Nematode: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Botryotinia porri</i>	Neck rot of onion
2.	<i>Botryotinia squamosa</i> Vienn.-Bourg. <i>Botryotinia allii</i>	Leaf blight of onion, neck rot of onion
3.	<i>Stromatinia cepivora</i>	White rot
4.	<i>Urocystis cepulae</i>	Onion smut
5.	<i>Peronospora destructor</i> (Berk.)	Downy mildew of onion
6.	<i>Pyrenochaeta terrestris</i>	Pink root rot
7.	Candidatus Phytoplasma asteris	Yellow disease phytoplasma
8.	<i>Rhizobium radiobacter</i>	Crown gall
9.	Tomato black ring virus	Ring spot of beet
10.	Iris yellow spot virus	Iris yellow spot
11.	Onion yellow dwarf virus	Onion yellow dwarf
12.	<i>Trichodorus</i> sp.	Stubby root nematodes

Potato [Total: 15 (Fungi: 05, Nematode: 05, Virus: 04, Bacteria: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Phoma exigua</i> var. <i>foveata</i>	Potato gangrene
2.	<i>Fusarium sulphureum</i>	Potato basal canker
3.	<i>Phytophthora drechsleri</i>	Potato root rot
4.	<i>Phytophthora megasperma</i>	Phytophthora blight
5.	<i>Polyscytalum pustulans</i>	Skin spot of potato
6.	<i>Globodera rostochiensis</i>	Potato golden cyst
7.	<i>Globodera pallida</i>	Potato pale cyst
8.	<i>Meloidogyne</i> spp.	Root-knot
9.	<i>Trichodorus obtusus</i>	Stubby root
10.	<i>Ditylenchus dipsaci</i>	Potato tuber nematode
11.	Potato virus A (PVA)	Mosaic

Sl. No.	Quarantine pathogens	Diseases
12.	Potato virus E (PVE)	Mosaic
13.	Potato Yellow dwarf virus (PYDV)	Dwarfing and apical yellowing
14.	Alfalfa Mosaic Virus (AMV)	Necrosis and yellow mosaic
15.	<i>Clavibacter michiganensis</i> subsp. <i>michiganensis</i>	Potato ring rot

Eggplant [Total: 05 (Fungus: 01, Virus: 02, Nematode: 02)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Phytophthora megasperma</i>	Phytophthora root rot
2.	<i>Tobacco ringspot nepovirus</i>	Tobacco ringspot
3.	<i>Pepper veinal mottle virus</i>	Pepper Vein Mottle
4.	<i>Globodera rostochiensis</i>	Golden cyst
5.	<i>Globodera pallida</i>	Pale cyst

Carrot [Total: 08 (Fungi: 03, Bacteria: 01, Virus: 01, Nematode: 03)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Aecidium foeniculi</i>	Rust
2.	<i>Uromyces graminis</i>	Rust
3.	<i>Uromyces lineolatus</i> subsp. <i>nercticus</i>	Rust
4.	<i>Carrot red leaf virus (CaRLV)</i>	Carrot red leaf virus
5.	<i>Agrobacterium tumefaciens</i>	Crown gall
6.	<i>Heterodera</i>	Cyst
7.	<i>Globodera</i>	Cyst
8.	<i>Punctodera</i>	Cyst

Cucurbit [Total: 06 (Fungi: 01, Bacteria: 02, Virus: 02, Nematode: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Phytophthora megasperma</i>	Phytophthora root rot
2.	<i>Erwinia tracheiphila</i>	Cucurbit bacterial wilt
3.	<i>Acidovorax citrulli</i>	Bacterial fruit blotch
4.	Cucumber yellow stunting disorder virus	Cucumber yellow stunting disorder
5.	Zucchini yellow mosaic virus	Zucchini yellow mosaic
6.	<i>Belonolaimus longicaudatus</i>	Sting nematode

Mukhikachu [Total: 03 (Fungi: 02, Virus: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Botryodiplodia theobromae</i>	Spongy Black Rot
2.	<i>Ceratocystis fimbriata</i>	Black Rot
3.	Two Bacilliform viruses	Alomae and Bobone (stunted and yellowing young leaf)

Watermelon [Total: 01 (Bacteria: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Acidovorax citrulli</i>	Fruit blotch

Mango [Total: 06 (Fungi: 05, Bacteria: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Phomopsis mangiferae</i>	Stem-end-rot
2.	<i>Cytosphaera mangiferae</i>	Twig canker
3.	<i>Actinodochium jenkinsii</i>	Mango black spot
4.	<i>Hendersonia creberrima</i>	Mango fruit rot
5.	<i>Macrophoma mangiferae</i>	Leaf & stem blight
6.	<i>Xanthomonas campestris</i> pv. <i>mangiferaeindicae</i>	Bacterial black spot

Guava [Total: 04 (Fungi: 02, Bacteria: 01, Algae: 01)]

Sl. No.	Quarantine pathogens	Diseases
1.	<i>Monilinia fructigena</i>	Brown rot
2.	<i>Puccinia psidii</i>	Guava rust
3.	<i>Erwinia psidii</i>	Bacteriosis
4.	<i>Cephaleuros virescens</i>	Algal leaf and fruit spot

Trans-boundary Diseases: A Trans-boundary disease is a disease that crosses at least one political border, either a border within a nation or an international boundary.

Transboundary plant pest and diseases (TPPDs) are migratory pests and diseases that pose a significant threat to food security, trade, and livelihoods of people in the affected countries, and generate huge losses of crops and pastures.

Bangladesh Boundaries

North: India (West Bengal and Meghalaya)

West: India (West Bengal)

East: India (Tripura and Asam)

South: Bay of Bengal

Bangladesh import commodity: Through 20 different ports

Hazrat Shahjalal International airport

Tamabil landport, Sylhet

Jakiganj landport, Sylhet

Betuli, Juri, Moulavibazar

Chattagram Sea port

Technaf landport, Chattagram

Akhaura landport, Bramonbaria

Bibirbazar landport, Cumilla

Mongla Sea port, Bagerhat

Vomra landport, Satkhira

Benapole landport, Jashore

Dorshona landport, Chuadanga

Sonamosjid land port, Chapainowabganj

Burimari landport, Lalmonirhat

Hili landport, Hakimpur, Dinajpur

Banglabandha landport, Tetulia, Panchagore

Imported commodity

Cereals: Rice, wheat, maize

Fruits, dry fruits

Onions, pulse and oilseeds

Seedlings

Most of the quarantine pathogen present in India and neighboring country like China.

Climate change and impact on crop diseases

- Last 100 years global temperature increased by 0.74° C.
- In 2095 temperature will be increased by 3.4° C
- These changes affect the reproduction, spread, and severity of many plant pathogens thus posing a threat to our food security.

CO₂ increases on earth

- 280 ppm in 1750
- 379 ppm in 2005
- 400 ppm in 2013
- 425.76 ppm in 2024
- 1250 ppm in 2095

December 20, 2024 (425.76 ppm)

December 20, 2023 (422.09 ppm) ((0.87% change in one year)

Increase in disease incidence and severity

- Late blight of potato: *Phytophthora infestans*
- Stem rust of wheat: *Puccinia graminis tritici*
- Blast of rice: *Magnaporthe oryzae oryza*
- Blast of wheat: *Magnaporthe oryzae triticum*
- Sheath blight of rice: *Rhizoctonia solani*
- Temperature increase in Panjab by 1°C, 2°C and 3°C would reduce the grain yield of rice by 5.4%, 7.4% and 25.1% respectively.

Effect of increased CO₂ concentration on pathogens

- Increased photosynthesis, increased carbohydrates thus increased plant biomass: promotes the growth of biotrophic fungus rust.
- Increased plant biomass and plant density modify the microclimate and affect the risk of pathogen infection.
- Increased leaf surface wetness duration that regulates temperature and makes infection by foliar pathogen.
- Increased CO₂ concentration change accelerates plant pathogen evolution which can affect virulence.
- In major cases disease severity is increased by increased CO₂ concentration.

Effect of increased temperature on pathogens

- Affect growth, development and pathogenicity of infectious agent.
- Increased aggressiveness of stripe rust isolates *Puccinia striiformis*.
- Shift in the geographical distribution of the pathogens.
- Favour different dormant pathogens which could induce an epidemic.
- Increased temperature with sufficient moisture may increase evapotranspiration resulting humid microclimate may lead to increase disease incidence and severity. eg. Common bunt (*Tilletia caries*) and Karnal bunt (*Tilletia indica*) in wheat.
- In India dry root rot of chickpea (*Rhizoctonia bataticola*) and
- Phytophthora blight of pigeon pea (*Phytophthora drechsleri* f. sp. *cajani*) has emerged drastically.
- Increase bacterial diseases such as *Ralstonia solanacearum*, *Acidovorax avenae*.
- Increase viral and vector borne diseases.
- Climate substantially influences the development and distribution of vectors.

Bangladesh is highly vulnerable to transboundary transmission of crop diseases and pathogens due to extensive border

Recommendations

- Strengthening surveillance systems and services. and phytosanitary structures.
- Providing technical and scientific support to the institutions responsible for developing action plans.
- Developing capacity-building programs at various levels like diagnosis, control, monitoring, etc.
- Minimizing the risk of spreading plant pathogens through trade and travel by appropriate quarantine measures.
- Triggering higher compliance with International Phytosanitary Standards.
- Farmers training to protect the environment through IPM.
- Strengthening monitoring and early warning systems to protect plants.
- Regional cooperation for the management of transboundary diseases by sharing information and research.
- Strengthening the existing safeguarding mechanisms during imports of commodities.
- Follow Good Agricultural Practices (GAP) to cultivate crops.

International Standards for Phytosanitary Measures (ISPMs)

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Outline

- International Plant Protection Convention (IPPC) and Phytosanitary Systems
- International Standards on Phytosanitary Measures (ISPMs) – Framework for Phytosanitary Systems

IPPC Vision and Mission

- Vision: Protecting global plant resources from pests.
- Mission: To secure cooperation among nations in protecting global plant resources from the spread and introduction of pests of plants, in order to preserve food security, biodiversity and to facilitate trade.

IPPC Standards

- General standards related to phytosanitary principles and provide guidance to NPPOs (e.g. on inspection and sampling of commodities).
- Standards on pest management, including guidance on surveillance, determination of pest status, pest reporting, pest eradication programmes and phytosanitary treatments.
- Standards on pest risk analysis and pest risk management.
- Trade-related standards, including phytosanitary certification and international movement of certain commodities, for example “seeds”.

Phytosanitary systems

The core phytosanitary systems under IPPC:

- Import regulation
- Export certification
- Surveillance
- Pest risk analysis
- Pest eradication
- Pest free areas

ISPMs - Framework for phytosanitary systems and operations (adopted during 1993- Nov 2023)

- 46 adopted ISPMs (ISPM 30 being revoked)
- 33 diagnostic protocols
- 45 phytosanitary treatments
- Commission on Phytosanitary Measures (CPM) Recommendations

Conceptual: ISPM 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16,17,18, 19, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31, 32, 34, 35, 36

Reference: ISPM 5

Umbrella standards: ISPM 27 and 28

Specific: ISPM 15 and 33

ISPM 5 - Glossary of phytosanitary terms

This reference standard is a listing of terms and definitions with specific meaning for phytosanitary systems worldwide. It has been developed to provide a harmonized internationally agreed vocabulary associated with the implementation of the International Plant Protection Convention (IPPC) and International Standards for Phytosanitary Measures (ISPMs).

Basic IPPC principles for phytosanitary systems

- Sovereignty
- Necessity
- Managed risk
- Minimal impact
- Transparency
- Harmonization
- Non-discrimination
- Technical justification
- Cooperation
- Equivalence of phytosanitary measures
- Modification

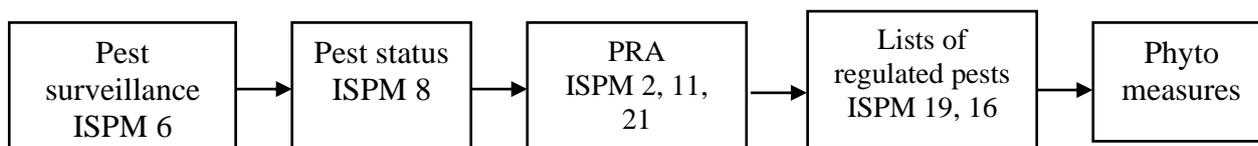
ISPM 20 - Guidelines for a phytosanitary import regulatory system

Scope: This standard describes the structure and operation of a phytosanitary import regulatory system and the rights, obligations and responsibilities which should be considered in establishing, operating and revising the system.

Phytosanitary import regulatory system – involved ISPMs

Phytosanitary measures in exporting countries ISPM 7, 14, 23, 31	Special imports ISPM 3	Designation of pest free areas and areas of low pest prevalence ISPM 4,8,10, 22, 26,29
Recognition of equivalency ISPM 24	Non-compliance and emergency actions ISPM 13	Pest reporting ISPM 17

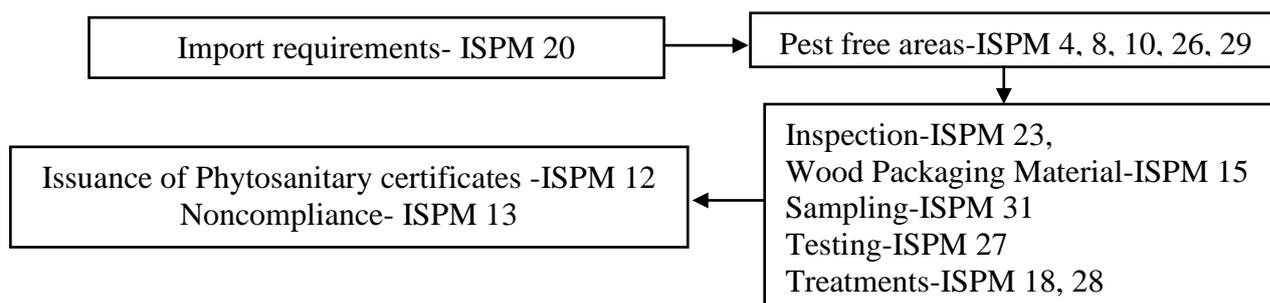
Phytosanitary import regulatory system



ISPM7 - Phytosanitary certification system

Scope: This standard contains requirements and describes components of a phytosanitary certification system to be established by national plant protection organizations (NPPOs). Requirements and guidelines for the preparation and issuance of phytosanitary certificates (phytosanitary certificates for export and phytosanitary certificates for re-export) are described in ISPM 12 (Phytosanitary certificates).

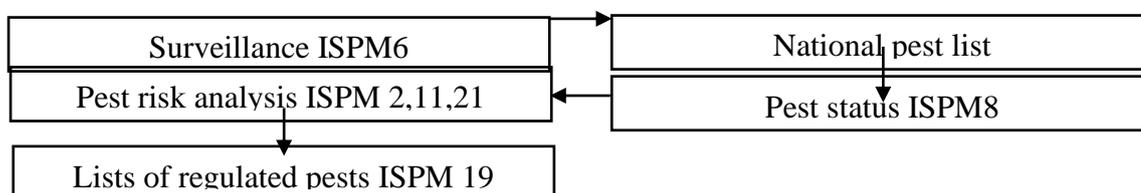
Components of Phytosanitary Certification System



ISPM 6 - Guidelines for surveillance

Scope: This standard describes the components of survey and monitoring systems for the purpose of pest detection and the supply of information for use in pest risk analyses, the establishment of pest free areas and, where appropriate, the preparation of pest lists.

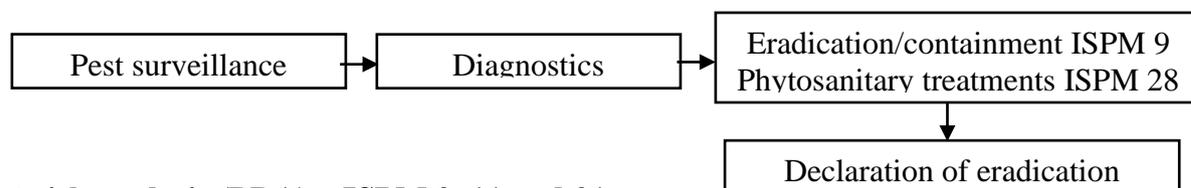
Pest surveillance and lists of regulated pests



ISPM 9 - Guidelines for pest eradication programmes

Scope: This standard describes the components of a pest eradication programme which can lead to the establishment or re-establishment of pest absence in an area.

Pest eradication programmes – steps and ISPMs involved

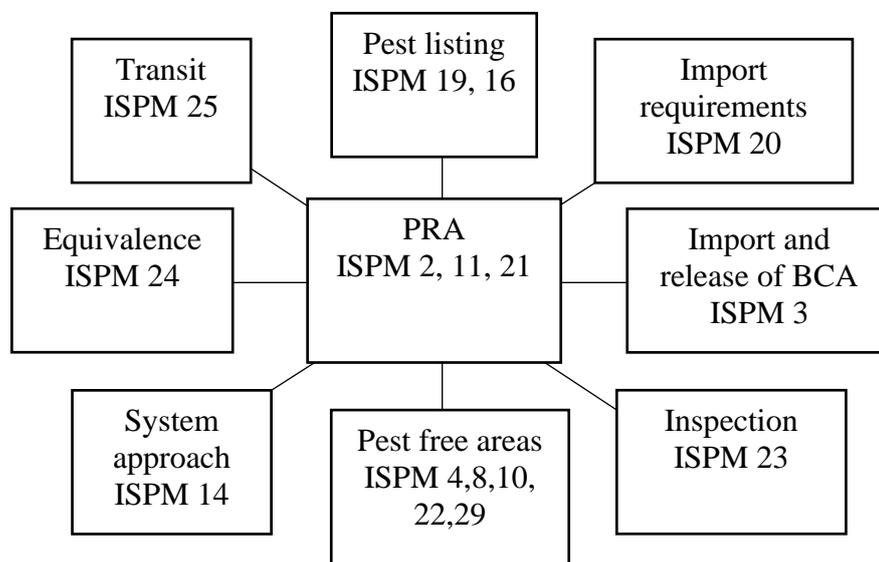


Pest risk analysis (PRA) – ISPM 2, 11 and 21

- ✓ **ISPM2** -Framework for PRA- Scope: This standard provides a framework that describes the pest risk analysis (PRA) process within the scope of the IPPC. It introduces the three stages of pest risk analysis – initiation, pest risk assessment and pest risk management. The standard focuses on the initiation stage. Generic issues of information gathering, documentation, risk communication, uncertainty and consistency are addressed.
- ✓ **ISPM11**- PRA for quarantine pests - Scope: The standard provides details for the conduct of pest risk analysis (PRA) to determine if pests are quarantine pests. It describes the integrated processes to be used for risk assessment as well as the selection of risk management options.
- ✓ **ISPM21**- PRA for regulated non quarantine pests - Scope: This standard provides guidelines for conducting pest risk analysis for regulated non-quarantine pests. It

describes the integrated processes to be used for risk assessment and the selection of risk management options to achieve a pest tolerance level.

PRA - justification of phytosanitary measures



Pest Free Areas

- ✓ ISPMs 4, 10 and 22: Describe the requirements for the establishment and use of pest free areas (PFAs), pest free places of production (PFPP) and pest free production sites (PFPS), areas of low pest prevalence (ALPP) as a risk management option for phytosanitary certification of plants and plant products and other regulated articles exported from the PFAs, PFPPs, PFPSs and ALPPs or to support the scientific justification for phytosanitary measures taken by an importing country.
- ✓ ISPMs 29 - Recognition of pest free areas and areas of low pest prevalence: This standard provides guidance and describes a procedure for the bilateral recognition of pest free areas and areas of low pest prevalence. This standard does not include specified timelines for the recognition procedure. This standard also provides some considerations regarding pest free places of production and pest free pro

Role of WTO and IPPC in Phytosanitary Regulations

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World Trade Organization (WTO) is an intergovernmental organization.

Functioning: 1 January 1995.

Purpose: Reduction of tariffs and other barriers to trade.

Headquarter: Geneva, Switzerland.

Membership: 166 members; 162 member states, the EU, Hong Kong, Macao and Taiwan.

Core activities of WTO

- Administers and sets rules for trade.
- Standard setting, implementation and capacity development.
- Deal with rules of trade between nations.
- Operates a global system of trade rules.
- Acts as a forum for trade negotiations.
- Handling trade disputes between its members.
- Boosted trade.
- Governance, communication and partnerships.
- Provides technical assistance.
- Co-operation with other international organizations.

WTO's role in phytosanitary regulations includes:

- (i) Development, adoption and enforcement of sanitary and phytosanitary measures that may affect international trade.
- (ii) Establishing panels to review phytosanitary based trade disputes.
- (iii) Recognizing IPPC standards as international benchmarks for trade in plant commodities.
- (iv) Promoting the establishment, recognition and application of common SPS measures.

International Plant Protection Convention (IPPC)

IPPC is an intergovernmental treaty that sets International Standards for Phytosanitary Measures (ISPMs) to protect pests of plants and plant products by preventing their international spread and introduction into endangered areas.

Functioning: Signed in 6 December 1951 (Effective in 3 April 1952).

Purpose: Aims to secure coordinated, effective action to prevent and to control the introduction and spread of pests of plants and plant product.

Headquarter: Rome, Italy.

Membership: 183 contracting members states (180 United Nations member states, Cook Island, Niue and EU)

The convention is recognized by the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) as the only international standard setting body for plant health. IPPC promulgates International Standards for Phytosanitary Measures (ISPMs).

The IPPC goals/aims to the contracting member states includes:

- i. Recognizing the necessity for international cooperation to protect pests of plants and plant products by preventing their international spread and introduction into endangered areas.
- ii. Recognizing that phytosanitary measures should be technically justified, transparent and should not be applied in such a way as to constitute either a means of arbitrary or unjustified discrimination or a disguised restriction on international trade.
- iii. Facilitating safe trade. Conform to the principles and provisions of transparency, non-discrimination and avoidance of disguised restrictions on international trade.
- iv. Develops, adopts and promote the application of harmonized phytosanitary measures (eg. ISPMs of IPPC) as the tool to safeguard global food security, facilitate safe trade and protect the environment.
- v. Settlement of disputes
- vi. International cooperation

IPPC has developed a strategic framework through the Commission on Phytosanitary Measures with intends to -

- (i) Protect farmers from economically devastating pest and disease outbreaks.
- (ii) Protect environment from the loss of species diversity.
- (iii) Protect ecosystems from the loss of viability and function as a result of pest invasions.
- (iv) Protect industries and consumers from the costs of pests control or eradication.
- (v) Facilitate trade through international standards that regulate the safe movements of plants and plant products.
- (vi) Protect livelihoods and food security by preventing the entry and spread of a new pests of plants into a country.

ARTICLE IV of IPPC stated the General provisions to the organizational arrangements for National Plant Protection:

1. Each contracting party shall make provision for an official National Plant Protection Organization (NPPO)
2. The responsibilities of NPPO shall include:
 - (i) the issuance of certificates relating to phytosanitary regulations of importing contracting party for consignment of plants, plant products and other regulated articles;
 - (ii) the surveillance of growing plants including areas under cultivation with the object of reporting occurrence, outbreak and spread of pests;
 - (iii) the inspection of consignments of plants and plant products moving in international traffic to preventing the introduction and spread of pests;
 - (iv) the disinfection or disinfection of consignments of plants and plant products moving in international traffic, to meet phytosanitary requirements;
 - (v) the protection of endangered areas and the designation, maintenance and surveillance of pest free areas (PFA) and Areas of low pest prevalence (ALPP);
 - (vi) the Pest Risk Analysis (PRA);
 - (vii) to ensure phytosanitary security of consignments after certification;
 - (viii) training and development.
3. Each contracting party shall make provision for:
 - (i) The distribution of information within the territory of the contracting party regarding regulated pests and means of their prevention and control;
 - (ii) Research and investigation in the field of plant protection;
 - (iii) The issuance of phytosanitary regulations.
4. Each contracting party shall submit a description of its official NPPO and changes in such organization to the Secretary. A contracting party shall provide a description of its organizational arrangements for plant protection to another contracting party upon request.

ARTICLE V of IPPC stated the provisions of Phytosanitary Certification (PC):

Each contracting party shall make arrangements for the issuance of PC in conformity with the following:

- (i) Inspection and other related activities leading to issuance of PC shall be carried out only by or under the authority of official NPPO. The issuance of PC shall be carried out by public officers who are technically qualified and duly authorized by the official NPPO to act on its behalf and under its control with such knowledge and information available to those officers that the authorities of importing contracting party may accept the PC with confidence as dependable documents.

- (ii) PC or their electronic equivalent shall be worded in the models set out in the Annex to this Convention.
- (iii) Uncertified alterations or erasures shall invalidate the certificates.

ARTICLE VII of IPPC stated the Requirements in relation to imports:

With the aim of preventing the introduction or spread of regulated pests into their territories, contracting parties shall have sovereign authority to regulate, in accordance with the applicable international agreements, the entry of plants and plant products and other regulated articles may:

- (i) Prescribe and adopt phytosanitary measures in eg. Inspection, prohibition and treatment;
- (ii) Refuse entry or detain or require treatment, destruction or removal from the territory of the contracting party of consignments thereof that do not comply with the phytosanitary measures prescribed or adopted;
- (iii) Prohibit or restrict the movement of regulated pests into their territories;
- (iv) Publish and transmit phytosanitary requirements, restrictions and prohibitions;
- (v) Points of entry shall be specified;
- (vi) Notify the instances of non-compliance;
- (vii) Establish and update lists of regulated pests using scientific names and make such list available to the Secretary and on request to the other contracting parties.

The IPPC and WTO works together through their collaboration to -

- (i) Harmonize international Plant Health Standards.
- (ii) Adopted transparency.
- (iii) Facilitate market access through commodity-specific plant health standards
- (iv) Prevent the introduction and spread of pests through international trade.
- (v) Promote safe trade practices.
- (vi) Protect global plant health and food security.
- (vii) Prevent phytosanitary risks and ensures the food security through strategic partnerships and knowledge exchange.
- (viii) Use IPPC standards, guidelines or recommendations to help evaluate phytosanitary based trade issues and disputes.
- (ix) Consult with IPPC Secretariat to obtain technical information or identity of technical experts.
- (x) Establishing global phytosanitary research co-ordination.

References

1. International Plant Protection Convention, FAO of UN, Rome, 1999.
2. WTO Agreement on the Application of Sanitary and Phytosanitary Measures.

Modern Technologies in Phytosanitary Management

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Introduction

The global population is perpetually rising; hence, food availability will emerge as a significant worry for the future. Furthermore, certain techniques and products, including pesticides and fertilizers, have been demonstrated to be detrimental to both the environment and human health, and are considered significant contributors to biodiversity loss. The challenge is to increase crop production to feed a growing population while maximizing resource use efficiency, lowering the damage due to pests and diseases, and strengthening production systems.

Although Bangladesh is an agricultural country, it still has to import a lot of seeds and other plant and plant products. Annually, on average, 130 lakh tonnes of plants and plant products are imported for which Plant Quarantine Inspection is required (Ullah, 2018). Certain dates are chosen to guarantee phytosanitary procedures for plant quarantine treatment. Likewise, some commodities of plant and plant products are exported to various nations of the world. Bangladesh's overall export of products and services surged from US\$ 29,963.66 million in 2012-13 to US\$ 60,971.26 million in 2021-22, following a decade of export expansion. In recent years, Sanitary and Phytosanitary (SPS) measures and Technical Barriers to Trade (TBT) have gained prominence in international trade. The modern means of transportation and processing of imports and exports favored the quick and large movements of plant and plant products themselves by increasing the risk of plant pests introduction. Detection of plant pathogens at the early stage is immeasurably crucial for pursuing the appropriate control strategies to avoid a major economic yield loss in the field as well as to prevent the introduction and/or spread of quarantine pests. Traditional techniques for diagnosing plant pests depend on the analysis of visual symptoms and/or the isolation, culturing, and laboratory identification of the pests, which can be laborious and impractical when rapid results are necessary. Modern technologies for diagnostic tools, digital platforms, and AI for pest detection and management can be employed in phytosanitary measurement through integrated use. AI, especially through deep learning techniques, is demonstrating immense potential to enable rapid, accurate, and automated detection and diagnosis of plant diseases from images. This promises to facilitate earlier interventions and specific real-time treatments. Continued progress in AI is expected to further augment disease diagnostic capabilities in phytopathology in the coming years.

Phytosanitary (plant health) measures

The term “phytosanitary measure” means any legislation, regulation, or official procedure having the purpose of preventing the introduction and/or spread of quarantine pests, or limiting the economic impact of regulated non-quarantine pests. All countries implement regulations to ensure food safety for consumers and to prevent the dissemination of pests or diseases among animals and plants. Plant Quarantine regulatory measures are taken at the national level (Domestic Quarantine) as well as international level (Foreign Quarantine). The enforcement of the quarantine measures is supported by legal enactments, called quarantine laws. It acts as an important tool in excluding pests from the crop. As a signatory of the WTO’s Agreement on Sanitary and Phyto Sanitary (SPS) measures, Bangladesh aims to administer SPS measures to protect the life and health of humans, animals, and plants. Plant quarantine is essentially a preventive action, the front line of protection against the spread of plant pests damaging crops.

Plant Quarantine in Bangladesh

Bangladesh is dedicated to enhancing Plant Quarantine Services and fostering regional collaboration with other member nations in the domain of Plant Quarantine. “Plant Quarantine” means the effort to prevent entry, establishment or spread of a foreign pest in the country through legal restriction on the movement of plant and plant products. The existing plant quarantine legislation known as “Destructive Insects and Pests Rules, 1966 (Plant Quarantine) was framed as per provisions delineated under Sub-section (I) of Section-3, Section-5 of the Destructive Insect and Pests Act, 1914 (II of 1914). Plant Quarantine Act, 2011 has been approved by the Parliament in March, 2011. Phytosanitary requirements, restrictions and prohibitions described in the “Destructive Insects and Pests Rules” are set to updating. Bangladesh became a signatory to the International Plant Protection Convention (IPPC) of FAO in 1974.

Categorization of pests

IPPC Article 2 contains three essential terms for the categorization of pests: quarantine pest, regulated non-quarantine pest, and regulated pest. The quarantine pest is a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and subject to official control, which is regulated in international trade. Regulated non-quarantine pest is a non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party whereas “Regulated pest” includes a quarantine pest or a regulated non-quarantine pest. Consequently, a phytosanitary certificate (PC) is required when traders intend to export agricultural commodities or goods. The Phytosanitary Certificate (PC) is an official document issued by the exporting nation, providing detailed information regarding a consignment to quarantine pests or regulated non-quarantine pests, following the implementation of phytosanitary measures such as inspections, tests, surveillance, or treatments associated with these pests.

Main activities of plant quarantine

- Tracing, identification, and control of quarantine pests.
- Pest risk analysis, evaluation, and determination of quarantine conditions for imported and transit plant shipments.
- Inspection, sampling, testing, and undertaking quarantine regulations on imported and transit agricultural shipments.
- Supervision and undertaking post-entry quarantine regulations on plants which are subject to the regulations.
- Inspection, sampling, testing and issuing phytosanitary certificate for exporting plant consignments.

Inspection procedures followed in a quarantine station

Inspection method

Sampling of seed is usually carried out as per the provisions of ISTA Rules and Regulations. Whereas in case of bulk import of vegetative planting material such as cuttings/saplings/ bud woods/bulbs/tubers etc., at least a minimum of 0.1% of propagules are sampled variety and examined to ensure free from exotic pests or pathogens. In case of quarantine pests suspected, 100 per cent inspection is carried out for critical assessment of the risk.

Detailed laboratory testing

- Visual inspection: The samples of seed/ propagating plant material are examined with the help of an illuminated magnifier to record live insect infestation, contamination by soil and weed seeds, nematode galls, sclerotia, smut/bunt balls, etc. Sometimes inspections are carried out under a UV lamp to facilitate detection of specific seed-borne inspection by characteristic fluorescence.
- X-ray test for detecting hidden insect infestation such as bruchids and weevils that bore into seed.
- Washing test to detect surface-borne oospores of downy mildew/smut spores/ bunt spores etc. and nematode cysts. Seed samples of onion, clover, and lucerne are soaked to detect stem and bulb nematodes and also root washings are examined for ectoparasitic nematodes.
- Sedimentation test - Stem eelworm (*Ditylenchus dipsaci*) (Baerman Funnel Test)
- Incubation tests such as blotter test or agar plate test are carried out for detecting seed-borne pathogens such as fungi. Fluorescent pseudomonas agar is used for selective detection of seed-borne fungi/ bacteria (Blotter/agar test). .
- Grow-out test coupled with indicator inoculation tests for detecting seed-borne bacteria/viruses/downy mildews.

Besides this, special diagnostic tests such as Electron Microscopy is used.

Traditional method for diagnostic of plant diseases

Laboratory analysis gives comprehensive insights into the particular pests or pathogens affecting crops. Common traditional laboratory methods include microscopy, culturing techniques, and Immunological techniques.

The traditional technique for pathogen detection, including viruses, bacteria, and fungi, is based on observing symptoms or culture-based methods. The method relies on the cultivation and isolation of microorganisms on a selective or semi-selective growth medium, which allows the growth of the target pathogen while inhibiting (or reducing) the growth of background microflora. Subsequently, the identity of the isolates that grow on the (semi-)selective growth medium needs to be confirmed by morphological, microscopical, biochemical, molecular, or immunological assays. The method is also very time-consuming, and a conclusive result can take anywhere from days up to weeks, due to the time needed for the organisms to grow and for performing the series of assays to confirm their identity. However, instead of cultivation on selective media, detection of viral pathogens can be achieved by detection of visible symptoms on indicator or prey plants.

Regulatory agencies such as the European and Mediterranean Plant Protection Organization (EPPO) describe a set of standardized cultivation-based protocols for the detection of a multitude of important plant pathogens (e.g., *Xanthomonas* spp., *Pseudomonas* spp., *Fusarium* spp., etc.). However, the EPPO procedures often advise to perform an additional DNA-based test, such as a conventional or real-time PCR assay, to confirm the identity of the pathogen

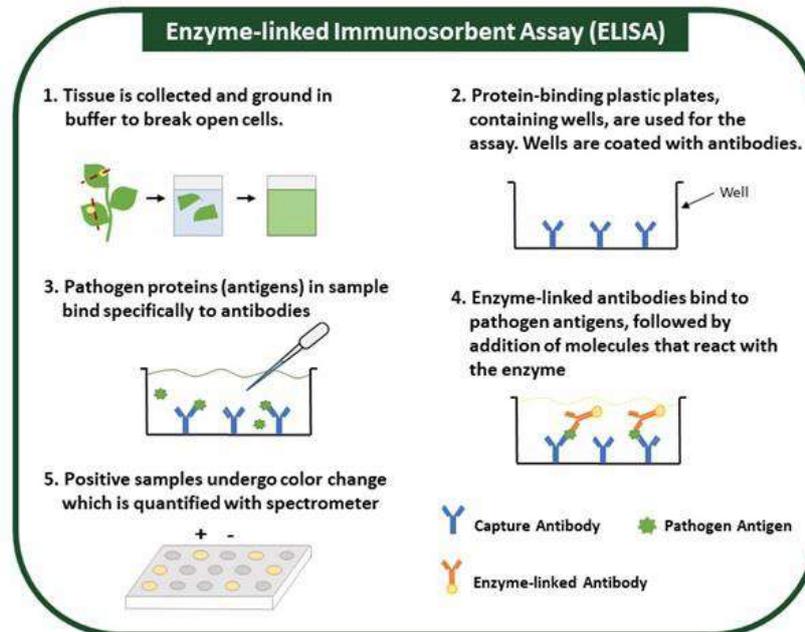
Serological assay

Serological diagnostic techniques based on specific mono or polyclonal antibodies produced from pre-defined antigens search for the presence of a certain pathogen within an infected tissue sample. Some advanced and widely used techniques for diagnosing plants for pathogen infection include enzyme-linked immunosorbent assay (ELISA), and lateral flow immunoassays (LFIA). However, there are some challenges associated with these techniques. These processes are expensive, the production of monoclonal antibodies used in these methods is costly, and low specificity has also been reported.

Enzyme linked immunosorbent assay (ELISA)

Viral, bacterial, and fungal target epitopes (antigens) are made to bind specifically to antibodies conjugated with enzymes. The interaction between the substrate and the immobilized enzyme will lead to a change in color, which will help in detecting pathogens. A positive result, or presence of a pathogen in a sample, is indicated by a color change that can be quantified with a spectrometer. Antibodies used in ELISA are highly specific and can accurately differentiate between similar pathogens. A tissue print-ELISA, as well as lateral flow devices, have been developed for on-site disease detection of plants. Though ELISA is inexpensive and suitable for numerous samples, it may be time-intensive. The presence of a pathogen is usually indicated by a color change, which

is simple to interpret but can be subtle and may require specialized equipment and personnel trained to interpret results. Low sensitivity of bacteria may affect the test result. This method is only useful for confirmation of disease after visual symptoms. It cannot be used to detect before symptoms are seen.

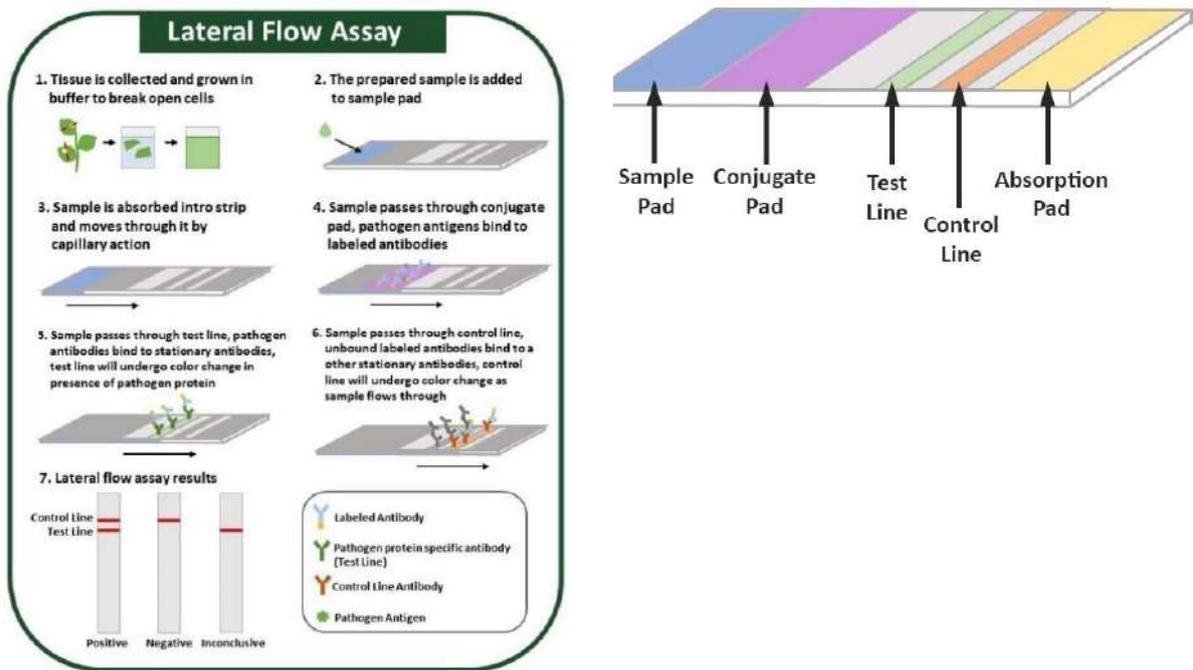


Source: Colorado State University Extension

Figure 1. Enzyme-linked Immunosorbent Assay (ELISA)

Lateral flow assay (LFA)

This method uses antibodies to identify specific pathogen proteins (antigens). Sample, prepared by grinding plant tissue in an extraction buffer, is absorbed into the test strip at the sample pad and passes through each section, the conjugate pad, the test line, and the control line, finally ending at the absorption pad. The test strip is usually made of a nitrocellulose membrane. As they continue to move along the test strip, pathogen antigens will bind to a second antibody at the test line, resulting in a positive test line (Figure 2). However, this method is more costly than ELISA and cannot easily be altered to accommodate multiple samples. Nevertheless, the assay is simple, and gives results under 30 minutes. Results can be interpreted visually on the test strip, and all steps can be performed at room temperature and this assay can be performed in the field. To date, LFA devices are available in the market to detect several plant pathogens such as *Phytophthora* spp., *Ralstonia solanacearum* and potato virus Y.



Source: Colorado State University Extension

Figure 2: Structure of lateral flow assay test strip.

Advanced Laboratory Techniques – Molecular Diagnostics

For even more precise identification, molecular diagnostics use advanced genetic tools to detect pests and pathogens at the DNA or RNA level. These methods provide unparalleled accuracy and sensitivity, making them essential in modern crop protection.

Nucleic acid-based assays

A growing number of laboratories are now using DNA-based molecular techniques to detect and identify pathogens to reduce laborious and time-consuming tasks. Among them, techniques based on the polymerase chain reaction (PCR) are the most popular, for example, conventional PCR, real-time PCR, reverse transcription (RT)-PCR, PCR-ELISA, nested PCR, multiplex PCR and isothermal PCR. The advantage of these methods is that they are faster, very specific, and cost-effective. However, they also possess certain limitations, such as in most cases trained personnel and specific equipment is required.

Now, in recent years isothermal amplification of DNA-based technologies has emerged that can overcome the limitations of PCR-based techniques. It includes recombinase polymerase amplification (RPA), and loop-mediated isothermal amplification (LAMP).

Polymerase Chain Reaction (PCR)

PCR based technique has been the most popular molecular diagnosis method in recent times. It's a technique used to amplify the DNA of the organisms in millions or billions of copies for their study. Sequencing of dedicated genetic markers, also referred to as DNA barcoding, is also frequently used for taxonomic identification by comparing the DNA

sequence of the genetic marker to previously identified sequences of known species. PCR utilizes an enzyme to amplify specific regions of pathogen genomes, which allows a pathogen in the sample to be identified (Figure 3). PCR uses pathogen-genome-specific primer DNA and a polymerase enzyme to amplify pathogen DNA fragments. Amplified DNA fragments can be visualized with an agarose gel, where banding patterns can indicate pathogen presence in sample, while samples that do not have the pathogen will not.

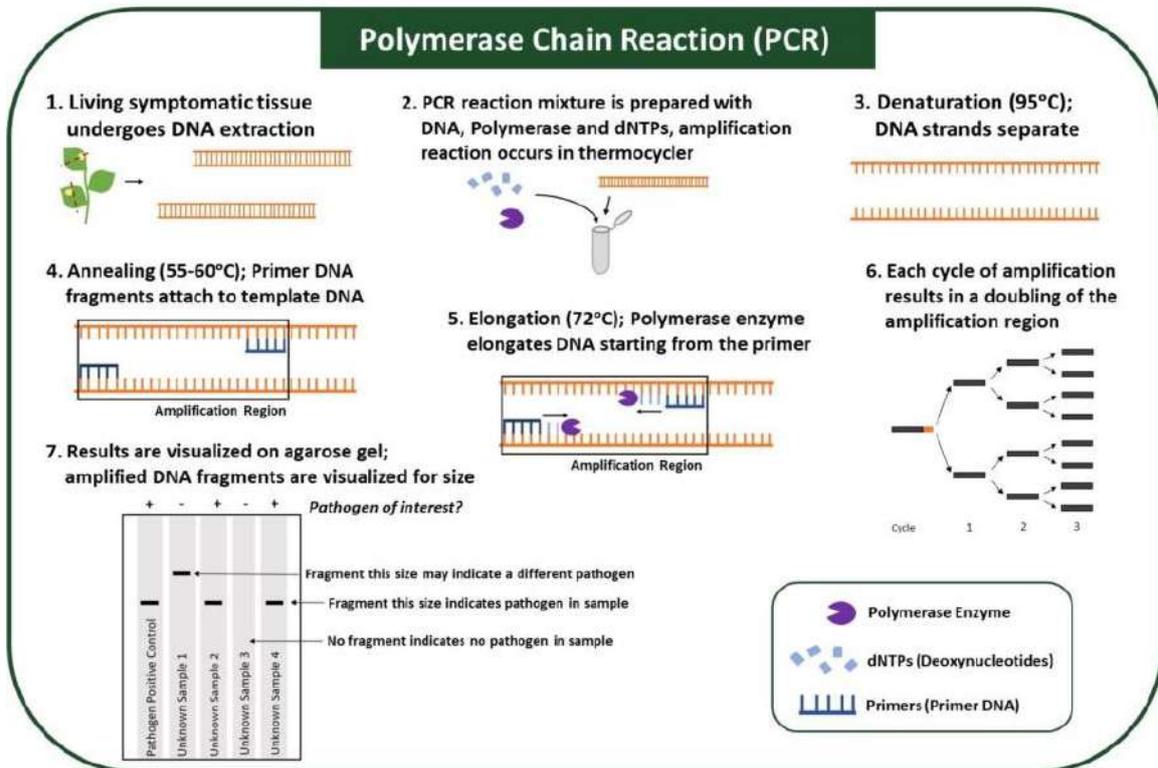


Figure 3. Polymerase Chain Reaction (PCR)

Due to the high sensitivity of the technique and primers can be designed for any pathogen whose genomic sequences are known, PCR can identify various pathogens, from fungi, bacteria to viruses. A variant of PCR, multiplex PCR can be used to simultaneously detect different DNA or RNA by running a single reaction. Whereas, Real-Time PCR can be used for on-site diagnosis of plant diseases based on bacteria, fungal, or viral nucleic acids. Unlike conventional PCR, RT-PCR allows pathogen quantification and monitoring of the reaction while in progress.

Next generation sequencing (NGS)

NGS is a high-throughput method by which pathogens are identified based on their DNA (genomic) or RNA sequences. After sequencing, the generated DNA or RNA sequences can be aligned to known sequences available in public databases. This technique requires high-quality DNA or RNA extraction. Pathogen identification can be made through direct comparison to known sequences and is especially helpful for viruses, which can recombine quickly and be difficult to identify confidently. Sequencing allows for a

comprehensive view of all pathogens in any given sample. For taxonomic identification of bacteria, the 16S rRNA and *rpoB* genes are frequently used, while for fungi and oomycetes, the internal transcribed spacer (ITS) region is a common marker for identification.

Current promising techniques for in-field detection

Several efforts have been made to make molecular diagnosis processes easier, creating portable devices or simplified technologies that can be used without expertise in molecular biology or pathology to diagnose a disease directly in the field.

Portable PCR device

Portable devices like the Palm PCR, developed by the Ahram Biosystems Company in Korea, have helped to overcome barriers like the absence of an electrical supply. Despite these advantages, portable PCR devices still face challenges such as sample preparation, DNA extraction, accurate temperature control systems, and sample evaporation in open devices.

LFA based on immunodetection and immunoprinting kits

Lateral flow assays (LFA) based on immunodetection and immunoprinting kits are considered among the first grower-friendly pathogen monitoring methods. To date, LFA devices are available in the market for the detection of several plant pathogens such as *Phytophthora* spp., *Ralstonia solanacearum* and potato virus Y. A CRISPR-based lateral flow assay kit can detect wheat blast disease within 30 min in infected plants.

Loop-mediated isothermal amplification(LAMP)

LAMP is a PCR-based technique that works with a *Bacillus subtilis* polymerase, known as Bst polymerase. This enzyme has a strand displacement activity that allows the amplification of a template under isothermal conditions, without the usual denaturation step that most polymerases require. This is a particularly large advantage for LAMP based diagnosis, as a thermocycler is not required and the reaction can be done in a simple heat block or water bath able to maintain a temperature of 60-65 °C, lowering the complexity and costs of the required equipment. The fast results and the high specificity of the technique have made LAMP a widely used technique for pathogen detection. In-field diagnosis of plant pathogens using LAMP, real-time LAMP and RT-LAMP have been reported in recent years, considerably reducing diagnosis analysis time. Now, commercial kits based on LAMP, are available and have been validated for the detection of common food safety pathogens and a fast in-field real-time LAMP for the detection of phytoplasmas in grapevine.

Recombinase polymerase amplification

Recombinase polymerase amplification (RPA) works at a constant temperature (usually 37-42 °C), making it suitable for in-field applications, as it does not require the global melting of the template and further steps usually done by a thermocycler. The

recombinase enzyme forms complexes with the primers that ‘scan’ the target sequence, displacing the template strand which is subsequently stabilized by the single-stranded DNA-binding proteins, avoiding the displacement of the primer. Finally, the strand displacement polymerase starts the amplification of the target sequence. However, there are only a few reports of its application for plant pathogen detection, including fungi, bacteria and viruses. RPA has also been used for multiplex detection of plant pathogens when combining the technology with surface-enhanced Raman scattering (SERS) labelled nanotags. In-field detection with the technique was demonstrated for *Botrytis cinerea*, *Pseudomonas syringae* and *Fusarium oxysporum* in tomato samples using a portable Raman after following a simple sampling protocol.

Portable nanopore sequencing

In contrast to all other current DNA sequencing methods, nanopore-based sequencing does not involve sequencing-by-synthesis. Instead, nanopore-based sequencing relies on variations in electrical currents that result from the translocation of individual DNA molecules through artificial nanopores that perforate a membrane. As the name implies, the genomic DNA passes through a nanopore, or small opening in a membrane that is approximately 1 nm in diameter. The diameter is so small that it only permits one single strand of DNA to pass through at a time. As the single-stranded DNA transits the pore, a detector records how the current changes from the channel. Every base has a slightly different structure, and therefore each base blocks the current differently.

Recent innovative technologies in disease detection and diagnosis

MALDI-TOF MS

MALDI-TOF MS has recently been introduced in microbiology laboratories as a rapid, accurate, and cost-effective method for identifying microorganisms. The application of this approach to detect plant pathogens causing fungal, bacterial, and phytoplasma infections has been shown. For instance, MALDI-TOF MS identified the pathogenesis-related proteins from the infected tomato plant by *Fusarium oxysporum* f.sp. *radicis-lycopersici* and *Ralstonia solanacearum*. It was also applied to facilitate the identification of *Pantoea stewartii* subsp. *stewartii* that causes Stewart's wilt in sweet corn.

Smartphone-based fingerprinting of leaf volatiles

This device pumps air into a chamber where a detector containing a paper strip embedded with an array of chemical reagents reacts with a specific chemical group. It can distinguish uninfected from infected leaf samples in 15 min. The device detects and classifies 10 plant VOCs at parts-per-million concentrations. However, the uneven distribution of plant pathogens can cause false-negative results. As it has been a great challenge to eliminate the cross-sensitivity of various VOCs for sensors, they optimized this device proposing a virtual sensor array (VSA) which has successfully been applied to detect VOC biomarkers identifying the emissions from healthy plants and infected plants with an accuracy of 89%.

Aerial photography

Aerial photography can detect objects on land over a larger area. Panchromatic color and especially infrared aerial photography could be used to detect rusts and viral diseases of small grains and certain diseases of citrus. The key to distinguishing diseased and healthy parts of a crop is to use appropriate film or filter combinations. The main film types used are panchromatic, infrared, normal color, and color infrared. These techniques are based on different principles and basically identify symptoms of infected plants (*i.e.* necrosis, change in leaf color, and leaf chlorosis). Their use for disease diagnosis should be accompanied by a field inspection to confirm the presence of an associated target pathogen in the symptomatic plant. Moreover, based on different sensors, remote sensing techniques vary significantly. These techniques assist in the detection and diagnosis of various major diseases. For example, RGB camera, hyperspectral imaging, fluorescence spectroscopy, thermography, and multi-temporal-based remote sensing techniques are used chiefly on diseases that significantly impact the agriculture economy.

RGB camera

RGB camera is one of the most used sensors because of its lightweight, low cost, ease of operation, simple data processing and low work environment requirements. RGB camera can acquire grayscale or color images, which enables to detect diseased plant tissues with modifications in color, texture, and other spectral information. RGB camera has been used for the identification and detection of cotton bacterial angular and *Ascochyta* blight, grapefruit citrus canker, and 10 rice diseases etc.

Hyperspectral imaging

Hyperspectral imaging combines conventional imaging with spectroscopic techniques that use reflectance data collected over a broad spectrum to reconstruct a spatial image of the analyzed matrix. This technique is relatively expensive, has long data acquisition times, and the resulting data is complex for automated interpretation. Thus, these limitations still limit its use in field conditions. The hyperspectral imaging was successfully used under laboratory and field conditions to detect the presence of target spots caused by *Corynespora cassicola* and bacterial spots caused by *Xanthomonas perforans*. These studies applied a large range of statistical methods for image analysis such as linear regression, principal component analysis (PCA), spectral angle mapper (SAM) classification, and support vector machine (SVM) classification with very high accuracy of disease detection.

Artificial intelligence (AI)

Artificial intelligence (AI) is transforming approaches in phytopathology, catalyzing innovations in understanding, managing, and mitigating plant diseases. Artificial intelligence (AI) enables rapid and precise disease detection and diagnosis, overcoming the limitations of techniques reliant on visual inspection.

Recent studies have continued to demonstrate AI's potential in plant disease detection and diagnosis. For instance, a convolutional neural network model was developed for potato late blight detection method using deep learning, with high accuracy and fast inference speed, using a dataset of potato leaf disease images in single and complex backgrounds. In the same line of work, the non-destructive classification of paddy rice leaf diseases using deep learning algorithms such as EfficientNet-b0 was focused and identified whether the rice paddy leaf is normal or infected with various diseases including bacterial leaf blight (BLB), bacterial leaf streaks (BLS), bacterial panicle blight (BPB), heart, downy mildew, hispa, or rice tungro disease (RTD). Similarly, many authors employed machine learning to diagnose the devastating wheat blast fungus with 95% accuracy from lesion images.

Nano-biopesticides

Nano-biopesticides could be the future of phytosanitary treatments in alternative to synthetic pesticides, since it has been proven that a better performance is shown when bio-pesticides are encapsulated protecting them from environmental conditions, improving their efficacy and release control. The very small particle sizes and high surface areas of nano-pesticides, however, may result in some unintended (eco)toxicological effects because of how they interact with the target and non-target.

Challenging in implementing modern technology for phytosanitary measurement

- Budget obstacles
- Expenses of operations
- Infrastructure limitations
- Limited technical expertise
- Qualification for training

Pest Risk Analysis (PRA): Process and Implementation

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Background

Pest risk analysis provides the rationale for phytosanitary measures for a specified PRA area. It evaluates scientific evidence to determine whether an organism is a pest. If so, the analysis evaluates the probability of introduction and spread of the pest and the magnitude of potential economic consequences in a defined area, using biological or other scientific and economic evidence. If the risk is deemed unacceptable, the Subsequently, pest risk management options may be used to establish phytosanitary regulations.

For some organisms, it is known beforehand that they are pests, but for others, the question of whether or not they are pests should initially be resolved.

The pest risk posed by the introduction of organisms associated with a particular pathway, such as a commodity, should also be considered in a PRA. The commodity itself may not pose a pest risk but may harbor organisms that are pests. Lists of such organisms are compiled during the initiation stage. Specific organisms may then be analyzed individually, or in groups where individual species share common biological characteristics.

Less commonly, the commodity itself may pose a pest risk. When deliberately introduced and established in intended habitats in new areas, organisms imported as commodities (such as plants for planting, biological control agents and other beneficial organisms, and living modified organisms (LMOs) may pose a risk of accidentally spreading to unintended habitats causing injury to plants or plant products. Such risks may also be analyzed using the PRA process. The PRA process is applied to pests of cultivated plants and wild flora, in accordance with the scope of the IPPC. It does not cover the analysis of risks beyond the scope of the IPPC.

Provisions of other international agreements may address risk assessment (e.g., the Convention on Biological Diversity and the Cartagena Protocol on Biosafety to that convention).

Country context

Agriculture is the main source of food and nutrition for the people and a source of employment for the rural population. The contribution to GDP by agriculture is about 14 - 22% of which crops, fisheries, livestock and forestry account for 8.53, 3.19, 2.29 and 1.50%, respectively (BBS, 2018). About one third of annual income and the 15% of total annual exports items come from agriculture. At present, agriculture sector is significantly driven by private entrepreneurship. The role of private sector is considered to accelerate the process of transformation from already existing semi-subsistence farming to commercialization of agriculture. In this regard, it has been mentioned that productivity

gains, diversification, value addition and agro-processing commensurate with nation environmental protection and climate change adaptation strategies will be required to achieve.

The country's food production has increased from 11.0 million tons in 1971 about 33.83 million tons in 2019 (DAE 2019). The country is, at present, self-sufficiency in cereal production. Beside this, Bangladesh has to import a huge quantity (about 1 corer MT.) of plant and plant products every year. So, there is a huge possibility of entering the destructive pest with the agricultural commodities which may be a quarantine pest in our country. On the other hand, in accordance with the WTO Sanitary and Phytosanitary Agreement the IPPC aims to protect plants while limiting interference with international trade, A key principle of the IPPC is that contracting parties (signatories) provide technical justification' to support phytosanitary decision-making affecting trade. The IPPC recognizes pest risk analysis as the appropriate format for such technical justification. The responsibility for conducting pest risk analysis sits within government, specifically within a country's National Plant Protection Organization (NPPO) and comes as an obligation when countries become contracting parties to the IPPC (IPPC Article IV, 2a). So, to safeguard our agriculture from entering IAS by imported commodities and maintain and develop market access by fulfilling the requirement of the importing countries conducting PRA is essential.

Rationale for the PRA

Pest Risk Analysis provides the rationale for phytosanitary measures for a specified PRA area. It evaluates scientific evidence to determine whether an organism is pest. If so, the analysis evaluates the probability of introduction and spread of the pest and the magnitude of potential economic consequences in a defined area, using biological or other scientific and economic evidence. If the risk is deemed unacceptable, the analysis may continue by suggestion management options that can reduce the risk to an acceptable level. Subsequently, pest risk management options may be used to establish phytosanitary regulations. For some organisms, it is known beforehand that they are pests, but for others, the question of whether or not they are pests should initially be resolved.

The pest risks posed by the introduction of organisms associated with a particular pathway such as a commodity, should also be considered in a PRA. The commodity itself may not pose a pest risk but may harbor organisms that are pests. Lists of such organisms are compiled during the initiation stage. Specific organisms will then be analyzed individually, or in groups where individual species share common biological characteristics.

Pest Risk Analysis (PRA)

The process of evaluating biological or other scientific and economic evidence to determine whether an organism is a pest, whether it should be regulated, and the strength of any phytosanitary measures to be taken against it [FAO, 1995; revised IPPC, 1997; ISPM No. 2, 2007

Reasons for PRA study

- To evaluate and manage risk from specific pests and internationally traded commodities;
- To identify and assess risks to agricultural and horticultural crops, forestry and the environment from plant pests.
- To create lists of regulated pests
- Identify the quarantine pests of crops
- Assess probability of entry, establishment, spread and consequences - economic, environment and health.
- Overcome unnecessary barrier on international trade,
- To assist in identifying appropriate management options.

Pest risk assessment for quarantine and regulated non-quarantine pest

Pest risk assessment (for quarantine pests): Evaluation of the probability of the introduction and spread of a pest and the magnitude of the associated potential economic consequences [FAO, 1995; revised ISPM o. 11, 200 1; ISPM No. 2, 2007].

Pest risk assessment (for regulated non-quarantine pests): Evaluation of the probability that a pest in plants for planting affects the intended use of those plants with an economically unacceptable impact [ICPM, 2005].

Pest risk management for quarantine and regulated non-quarantine pest

Pest risk management (for quarantine pests): Evaluation and selection of options to reduce the risk of introduction and spread of a pest [FAO, 1995; revised ISPM No. 11, 2001]

Pest risk management (for regulated non-quarantine pests): Evaluation and selection of options to reduce the risk that a pest in plants for planting causes an economically unacceptable impact on the intended use of those plants [ICPM, 2005].

Phytosanitary measure

Any legislation, regulation or official procedure having the purpose to prevent the introduction and/or spread of quarantine pests, or to limit the economic impact of regulated non-quarantine pests [FAO, 1995; revised IPPC, 1997; ISPM, 2002 risk as high, medium, low and minimum and determine of an organism as a pest; create list of regulated pests for the purpose of import regulation; recommend appropriate pest risk management and assessment options and getting approval from the concerned authority. The consulting Firm is required to identify the pests, pathway/s, evaluate their risk, endangered areas, and risk management options etc.

The Specific Objectives of the recruitment of a Pest Risk Analysis Consulting Firm are (according to ISPM 11 in the framework of ISPM-2.):

- Listing of major and minor pests mentioning plant parts affected (creating pest list)
- Listing of regulated pests (Quarantine and Non-Quarantine Pests)
- Identification and categorization of pests likely to be associated with a pathway
- Determination of pests up to species level
- Identification of potentials for entry, establishment and spread of regulated pests
- identification of probability of survival during transport or storage & transfer of hosts
- Nature of damage
- Identification of probability of pest surviving existing pest management procedures
- Identification of availability of suitable hosts, alternate hosts and vectors in the PRA areas
- Identification of potential economic and environmental impacts
- Assessment of potential loss by the pests
- Analysis of uncertainties
- Identification of management options/system approach for control of regulated pests
- Preparation of report on risk analysis of the pests following the relevant ISPMs
- Identification of host plants and more damaging host plant species if any
- Identification of Risk management options
- To detect pest, it is recommended to follow relevant ISPMs where procedures are being described, and
- Perform pest risk analysis and other responsibilities assigned by PD.

Undertaking of Pest Risk Analysis (PRA)

Expert should follow a systematic process of pest risk analysis framed as per ISPM No. 2 (Framework for pest risk analysis), ISPM 11 (Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms), and ISPM 21 (Pest risk analysis for regulated non quarantine pests). As per the 3 stages (1) Initiation, (2) Pest Risk Assessment, (3) Pest Risk Management the consultants will evaluate the commodity and regulated articles and detection of pest for initiation stages. The main elements of PRA documentation are furnished as follows:

A. PRA STAGE 1: INITIATION

Initiation is the identification of organisms and pathways that may be considered for pest risk assessment in relation to the identified PRA area. A PRA process may be triggered in the following situations (initiation points, section 1.1): (a) a request is made to consider a pathway that may require phytosanitary measures; (b) a pest is identified that may justify

phytosanitary measures, (c) a decision is made to review or revise phytosanitary measures or policies, (d) a request is made to determine whether an organism is a pest.

The initiation stage involves three steps:

- Initiation point (Stage 1.1)
- Determination of an organism as a pest (Stage 1.2)
- Specified the PRA area (Stage 1.3)

When the PRA process has been triggered by a request to consider a pathway, the above steps are preceded by assembling a list of organisms of possible regulatory concern because they are likely to be associated with a pathway. At this stage, information is necessary to identify the organism and its potential economic impact, which includes environmental impact. Other useful information on the organism may include its geographical distribution, host plants, habitats and association with commodities (or, for RNQP candidates, association with plants for planting). For pathways, information about the commodity, including modes of transport, and its intended end use, is essential.

Stage 1.1 Initiation point

Stage 1.1.1 Documenting the initiating event and scope

Information gathering is an essential element of all stages of PRA. It is important at the initiation stage in order to clarify the identity of the pest(s), its/their present distribution and association with host plants, commodities etc. Other information will be gathered as required to reach necessary decisions as the PRA continues. To initiate any PRA of a pest and/or commodity need to review the relevant documents such as relevant legislations, phytosanitary guidelines (ISPMs), commodity production and export related documents, records of interception of pest(s) at any point of entry, status of pest at home and abroad, etc. Accordingly, the NPPO need a new or revised PRA that may arise from situations such as when

- a national review of phytosanitary regulations, requirements or operations is undertaken;
- an official control program (e.g., a certification program encompassing phytosanitary elements) is developed to avoid unacceptable economic impact of specified RNQPs in plants for planting;
- a new system, process or procedure is introduced or new information made available that could influence a previous decision (e.g., results of monitoring; a new treatment or withdrawal of a treatment; new diagnostic methods);
- an international dispute on phytosanitary measures arises;
- the phytosanitary situation in a country changes or political boundaries change.

In these situations, pests will already be identified and this fact should be recorded in preparation for PRA Stage 2. For existing trade, no new measures should be applied until the revision or new PRA has been completed, unless this is warranted by new or unexpected phytosanitary situations which may necessitate emergency measures.

Stage 1.1.2 Defining/identifying the pathway

The need for a new or revised PRA for a specific pathway may arise in situations such as when

- import is proposed of a commonly not previously imported or a commodity from a new area of origin there is an intention to import for selection and/or scientific research a plant species or cultivar not yet introduced that could potentially be a host of pests
- a pathway other than commodity import is identified (natural spread, packing material, mail, garbage, compost, passenger, baggage, etc.)
- a change in susceptibility of a plant to a pest is identified
- a change in virulence/aggressiveness or host range of a pest.

These are situations where the commodity itself is not a pest. When the commodity itself may be a pest, it should also be considered under section 1.1.4. A list of organisms likely to be associated with the pathway should be assembled, including organisms that have not yet been clearly identified as pests. When a PRA is carried out for a commodity for which trade already exists, records yet been clearly identified as pests. When a PRA is carried out for a commodity for which trade already exists, records of actual pest interceptions should be used as the basis for the listing of associated pests.

Stage 1.1.3 Identification of the pests

The need for a new or revised PRA on a specific recognized pest may arise in situations such as when

- an infestation or an outbreak of a new pest is discovered
- a new pest is identified by scientific research
- a pest is reported to be more injurious than previously known
- an organism is identified as a vector for other recognized pests
- there is a change in the status or incidence of a pest in the PRA area
- a new pest is intercepted on an imported commodity
- a pest is repeatedly intercepted at import
- a pest is proposed to be imported for research or other purpose.

In these situations, the fact that the organism is known to be a pest can be recorded in preparation for PRA Stage 2.

Stage 1.1.4 Identification of an organism not previously known to be a pest

An organism may be considered for PRA in situations such as when

- a proposal is made to import a new plant species or variety for cropping, amenity or environmental purposes
- a proposal is made to import or release a biological control agent or other beneficial organism
- an organism is found which has not yet been fully named or described or is difficult to identify
- a proposal is made to import an organism for research, analysis or other purpose

- a proposal is made to import or release an LMO.

In these situations, it would be necessary to determine if the organism is a pest and thus subject to PRA Stage 2. Section 1.2 provides further guidance in this matter.

Stage 1.2 Determination of an organism as a pest

Pre-selection or screening are terms sometimes used to cover the early step of determining whether an organism is a pest or not.

The taxonomic identity of the organism should be specified because any biological and other information used should be relevant to the organism in question. If the organism has not yet been fully named or described, then, to be determined as a pest, it should at least have been shown to be identifiable, consistently to produce injury to plants or plant products (e.g., symptoms, reduced growth rate, yield loss or any other damage) and to be transmissible or able to disperse.

The taxonomic level for organisms considered in PRA is usually the species. The use of a higher or lower taxonomic level should be supported by a scientifically sound rationale. In cases where levels below the species level are being analyzed, the rationale for this distinction should include evidence of reported significant variation in factors such as virulence, pesticide resistance, environmental adaptability, host range or its role as a vector.

Stage 1.2.1 Identifying Plants as pests

Plants have deliberately been spread among countries and continents for millennia, and new species or varieties of plants for cropping, amenity or environmental purposes are continually imported.

The primary indicator that a plant species may become a pest in the PRA area is the existence of reports that the plant species has been recorded as a pest elsewhere. Some intrinsic attributes that may indicate that a plant species could be a pest include: (a) adaptability to a wide range of ecological conditions, (b) strong competitiveness in plant stands, (c) high rate of propagation, (d) ability to build up a persistent soil-seed bank, (e) high mobility of propagules, (f) allelopathy, (g) parasitic capacity and (h) capacity to hybridize.

Stage 1.2.2 Defining the Biological control agents and other beneficial organisms

However, it should be noted that plants without such attributes may nevertheless become pests and that long time lags have often been observed between the introduction of a new plant species and evidence that the plant is a pest. Biological control agents and other beneficial organisms are intended to be beneficial to plants. Thus, when performing a PRA, the main concern is to look for potential injury to non-target organisms. Other concerns may include: (a) presence of other species as contaminants of cultures of beneficial organisms, the culture thereby acting as a pathway for pests, (b) reliability of containment facilities when such are required.

Stage 1.2.3 Identifying organisms which will not be described

Organisms that have not yet been fully named or described or are difficult to identify (e.g., damaged specimen or unidentifiable life stages) may be detected in imported consignments or during surveillance, in which case a decision as to whether phytosanitary action is justified and recommendations for phytosanitary measures may need to be made.

Stage 1.2.4 Defining living modified organisms

LMOs are organisms that possess a novel combination of genetic material, obtained through the use of modern biotechnology and are designed to express one or more new or altered traits.

Stage 1.2.5 Import organisms in any cases

When a request is made to import an organism that may be a pest for use in scientific research, education, industry or other purposes, the identity of the organism should be clearly defined. Information on the organism or closely related organisms may be assessed to identify indicators that it may be a pest. For organisms determined to be pests, pest risk assessment may be carried out.

Stage 1.3 Specified the PRA area

The area to which the PRA refers has to be clearly defined. It may be the whole or part of a country or several countries. Whereas information may be gathered from a wider geographical area, the analysis of establishment, spread and economic impact should relate only to the defined PRA area.

Stage 1.3.1 Outline the previous Pest Risk Analysis

Before performing a new PRA, a check should be made to determine if the organism, pest or pathway has ever been subjected to a previous PRA. The validity of any existing analysis should be verified because circumstances and information may have changed. Its relevance to the PRA area should be confirmed.

Stage 1.3.2 Outline the summary of the initiation

At the end of PRA Stage 1, pests and pathways of concern will have been identified and the PRA area defined. Relevant information will have been collected and pests identified as candidates for further assessment, either individually or in association with a pathway. Organisms determined not to be pests and pathways not carrying pests need not be further assessed. The decision and rationale should be recorded and communicated, as appropriate.

Where an organism has been determined to be a pest the process may continue to PRA Stage 2. Where a list of pests has been identified for a pathway, pests may be assessed as groups.

B. PRA STAGE 2: PEST RISK ASSESSMENT

The process for pest risk assessment can be broadly divided into three inter relate steps : (a) Identification of previous Risk Assessment , Current status of importations, and Pertinent Pest Intercept ions (if available) , (b) Pest categorization, (c) Identification of Potential Quarantine, (d) Pests, (e) Identification of Quarantine Pests likely to follow the Pathway , (D Assessment of Consequences of Introduction, (g) Assessment of Introduction Potential, (g) Assessment of uncertainty for elements, (h) Conclusion/phytosanitary Measures.

Stage 2.1 Identification of previous Risk Assessment, Current status of Importations, and Pertinent Pest Interceptions (if available)

Identify previous pest risk assessments from the same country/region and the same, or related commodity. If there is an existing risk assessment that adequately assesses the risks in question, the risk assessment stops. Describe appropriate current importations, e.g., same commodity from other countries, other commodities from the country in question. Report pertinent pest interceptions at Bangladesh ports of entry.

Stage 2.2 Pest categorization

At the outset, it may not be clear which pest(s) identified in Stage 1 require a PRA. The categorization process examines for each pest whether the criteria in the definition for a quarantine pest are satisfied. In the evaluation of a pathway associated with a commodity, a number of individual PRAs may be necessary for the various pests potentially associated with the pathway. The opportunity to eliminate an organism or organisms from consideration before in-depth examination is undertaken is a valuable characteristic of the categorization process. An advantage of pest categorization is that it can be done with relatively little information, however information should be sufficient to adequately carry out the categorization

Stage 2.2.1 Elements of categorization

The categorization of a pest as a quarantine pest includes the following primary elements

- identify of the pest
- presence or absence of the PRA area
- regulatory status
- potential for establishment and spread in the PRA area, and
- potential for economic consequences (including environmental consequences) in the PRA area

Stage 2.3 Identification of Potential Quarantine

Stage 2.3.1 Identity of pest

The identity of the pest should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the

causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible.

Stage 2.3.1.1 Presence or absence in PRA area

- The pest should be absent from all or a defined part of the PRA area.

Stage 2.3.1.2 Regulatory status

- If the pest is present but not widely distributed in the PRA area, it should be under official control or expected to be under official control in the near future.
- However, it is recognized that ISPM No. 5 Glossary of phytosanitary terms, Supplement No. 1 on official control, in particular Section 5.7, applies.

Stage 2.3.1.3 Potential for establishment and spread in PRA area

Evidence should be available to support the conclusion that the pest could become established or spread in the PRA area. The PRA area should have ecological/climatic conditions including those in protected conditions suitable for the establishment and spread of the pest and where relevant, host species (or near relatives), alternate hosts and vectors should be present in the PRA area.

Stage 2.3.1.4 Potential for economic consequences in PRA area

There should be clear indications that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area.

Stage 2.3.2 Identification of Quarantine pests likely to follow the pathway

Quarantine pests identified as likely to be associated with the potential. export commodity is subjected to steps 5-7. The biology and pest potential for these pests is documented as completely as possible. It must be reasonable to assume these quarantine pests will:

- be present in the exporting country;
- be associated with the commodity at the time of harvest; and
- remain with the commodity in viable form during harvesting, packing and shipping procedures.

C. PRA STAGE 3: PEST RISK MANAGEMENT

The conclusions from pest risk assessment are used to decide whether risk management is required and the strength of measures to be used. Since zero-risk is not a reasonable option, the guiding principle for risk management should be to manage risk to achieve the required degree of safety that can be justified and is feasible within the limits of available options and resources. Pest risk management (in the analytical sense) is the process of identifying ways to react to a perceived risk, evaluating the efficacy of these actions, and identifying the most appropriate options. The uncertainty noted in the assessments of economic consequences and probability of introduction should also be considered and included in the selection of a pest management option.

Stage 3.1 Risk management in pest risk analysis

Involves identifying and evaluating options for reducing, avoiding and eliminating pest risk after we have decided that the risk is unacceptably high and in may be possible to mitigate. Information required on: (a) Possible mitigations, (b) Efficacy, (c) Feasibility and (d) Impact

Pest Risk Management measures can be implemented- (a) at origin or in the exporting country, (b) at the point of entry, (c) within the importing country or invaded area.

The principle of "managed risk" (ISPM No. 1: Principles of plant quarantine as related to

Stage 3.2 Identification and selection of appropriate risk management options

Appropriate measures should be chosen based on their effectiveness in reducing the probability of introduction of the pest. The choice should be based on the following considerations, which include several of the principles of plant quarantine as related to international trade (ISPM No. 1).

Stage 3.3 Risk management notes

For each particular analysis, the entire process from initiation to pest risk management should be sufficiently documented so that the sources of information and rationale for management decisions can be clearly demonstrated. However, a PRA does not necessarily need to be long and complex. A short and concise PRA may be sufficient provided justifiable conclusions can be reached after completing only a limited number of steps in the PRA process. The main elements to be documented are:

- (a) purpose of the PRA,
- (b) identity of the organism,
- (c) PRA area,
- (d) biological attributes of the organism and evidence of ability to cause injury,
- (e) for quarantine pests: pest, pathways, endangered area,
- (f) for RNQPs: pest, host, plants and/or parts or class of plants under consideration, sources of infestation, intended use of the plants,
- (g) sources of information,
- (h) nature and degree of uncertainty and measures envisaged to compensate for uncertainty,
- (i) for pathway-initiated analysis: commodity description and categorized pest list,
- (j) evidence of economic impact, which includes environmental impact,
- (k) conclusions of pest risk assessment (probabilities and consequences),
- (l) decisions and justifications to stop the PRA process,
- (m) pest risk management: phytosanitary measures identified, evaluated and recommended,
- (n) date of completion and the NPPO responsible for the analysis, including if appropriate names of authors, contributors and reviewers.

Other aspects to be documented may include:

- (a) particular need for monitoring the efficacy of proposed phytosanitary measures,
- (b) hazards identified outside the scope of the IPPC and to be communicated to other authorities.

The stages of Pest Risk Analysis Framework have been presented through the flow chart at a glance:

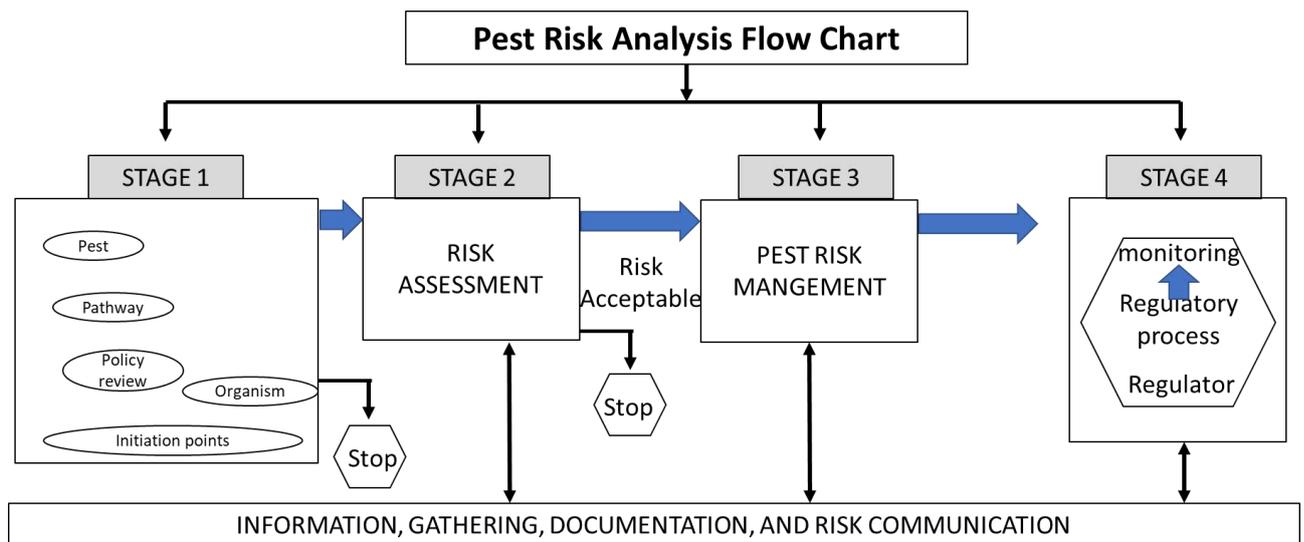


Figure: Pest Risk Analysis flow-chart

Managing Invasive Alien Pests: Challenges in Bangladesh

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Background

Invasive species are organisms, usually transported by humans that successfully establish, and then thrive, in new environments. Invasive alien species are a threat to biodiversity, food security, health and economic development of a country. These species are causing enormous damage to biodiversity and the valuable natural agricultural systems. Over recent decades, there has been growing acknowledgment among scientists and policymakers regarding the substantial ecological and economic consequences of invasive alien species (IAS) on a global scale (Early *et al.*, 2016). IAS is identified as a major threat to native ecosystems, habitats, and species (Mukul *et al.*, 2006; Guido and Pillar, 2017), with globalization contributing to their introduction into new regions and environmental changes, including global warming, aiding their establishment worldwide (Early *et al.*, 2016). Human-mediated transport across biogeographic barriers has further facilitated the introduction and establishment of IAS in novel regions (Dawson *et al.*, 2017).

IAS are characterized by rapid growth, efficient dispersal capabilities, a prolific reproductive output, and tolerance to a wide range of environmental conditions, giving them a competitive edge over native or local species (Hellmann *et al.*, 2008). The ease of transport and adaptability of IAS pose significant challenges to ecosystems and biodiversity, underscoring the need for comprehensive strategies to address their impact on global environments.

Agriculture stands as the paramount economic sector, serving as the lifeblood of Bangladesh (Hossain and Chen, 2022). It constitutes the primary source of livelihood in rural areas, accommodating around 80 percent of the population. Roughly two-thirds of the labor force finds employment in agriculture. The agricultural sector emerges as the predominant contributor to GDP, with the crop sub-sector commanding a substantial 47.23% of total production. Complementary to this, the fisheries, livestock, and forestry sub-sectors account for 21.87%, 16.41%, and 14.50%, respectively (BBS, 2022). The enhancement of crop variety production hinges on pivotal factors such as inputs and sound crop management practices. Notably, good crop management practices, including the effective control of pests and diseases, play a crucial role. Bangladesh grapples with a diverse array of pests attacking its growing crops, leading to the indiscriminate use of various pesticides available in the market (Alam *et al.*, 2018).

The rich biodiversity of Bangladesh faces vulnerability to the invasion of new insects. The problem of invasive insect pests in Bangladesh is on the rise, attributed to factors such as climate changes, increased international trade, heightened human movement across continents, inadequate quarantine measures, and modernization in agriculture

leading to alterations in cropping patterns and agro-ecosystems. Invasive insect pest species possess the capability to rapidly establish and spread in new areas, resulting in significant crop losses and posing a threat to food security. The precise count of invasive insect pests recorded in Bangladesh and the monetary values of the losses caused by them remain inadequately documented. Two recent instances of invasive insect pests causing alarm among farmers include the fall armyworm, first observed on maize crops in Bangladesh in November 2018 (Ullah *et al.*, 2023), and the rugose spiraling whitefly, initially detected in coconuts in May 2019 (Swarnaa *et al.*, 2023). Both these insect pests exhibit a broad host range and have the potential to cause substantial yield losses. Fortunately, coordinated efforts and a proactive approach from the Ministry of Agriculture have helped maintain control over infestations, resulting in minimal crop losses caused by these pests.

Review of Invasive Species in Bangladesh

The rapid review focused on resources on the crop protection sector in Bangladesh with key criteria on ‘insect pests’, ‘invasive insect species’, ‘invasive alien insects’, and ‘invasive insects in Bangladesh’. Through the rapid review we identified the status of forest resources in the country, the prevailing pests and invasive species, and national policies and legislature governing invasive insect pest management. We also identify case studies that provide insights of successful management of invasive insect pests. These cover not only Bangladesh, but also cases from other countries, upon which lessons are drawn for Bangladesh. The documents that informed the rapid review among others are: The Bangladesh National Conservation Strategy (2017), the Plant Quarantine Act (2011), National Agricultural Technology Project- Phase II (Pest Management Plan (PMP) (2014), the National Integrated Pest Management Policies (2002 and 2022), The National Biodiversity Strategy and Action Plan (2016 to 2021), The Eight Five Year Plan (July 2020 - June 2025), An assessment report of the Invasive Species System in Bangladesh (March 2022).

Overview of prevailing insect pests and invasives species

Invasive insect pest species pose significant threats to the sustainability of Bangladesh's crop production. Invasive alien species are organisms that are introduced to new areas with human assistance, causing environmental harm (Hossain and Pasha, 2001). These invasive species encompass a wide spectrum, including microbes, plants, insects, vertebrates, and other organisms. The driving force behind the proliferation of invasive alien species is globalization, which has fostered increased trade, transportation, travel, and tourism. These activities have inadvertently facilitated the introduction and spread of non-native species in areas where they do not naturally occur. Invasive species have the capacity to outcompete native organisms for resources, disrupt ecosystems, and escalate their population size in their new environments. The following table showcases some key invasive insect species that have been introduced to Bangladesh and are affecting its crops.

Table 1: Key invasive insect species introduced in Bangladesh.

Species	Common Name	Reporting Year
<i>Aceria guerreronis</i>	Coconut eriophyid mite	2004
<i>Paracoccus marginatus</i>	Papaya mealybug	2009
<i>Tuta absoluta</i>	Tomato leaf miner	2016
<i>Thyridopteryx ephemeraeformis</i>	Bagworm*	2017
<i>Spodoptera frugiperda</i>	Fall armyworm	2018
<i>Aleurodicus rugioperculatus</i>	Rugose spiraling whitefly	2019
<i>Conogethes punctiferalis</i>	Guava shoot borer*	2020
<i>Tirathaba rufivena</i>	Coconut spike moth*	2020
<i>Perixera illepidaria</i>	Litchi looper*	2020
<i>Tessaratomia javanica</i>	Litchi stink bug*	2020
<i>Protaetia fusca</i>	Asian mango flower beetle*	2021

* not clear whether they invaded from other country to our country or existed here without notice

These alien invasive species adversely impact the forest sector from economic, ecological, and environmental perspectives. On an economic front, pests and invasive species impose substantial costs on the forest sector. These costs include lost revenues, expenses for control measures, and diminished conservation values and ecosystem services. Insect pests and diseases inflict damage on trees at all stages of growth, affecting the capacity of both natural and planted forests to achieve their management objectives. Researchers point to the most direct economic impact of pests and invasives in the forest sector as being linked to reduced production efficiency and loss. The implications of these threats are especially pronounced in industries such as hardwood products and maple syrup, with infestations directly influencing the quantities of forestry products demanded and supplied. Consequently, these impacts reverberate through national and global prices and markets.

Key invasive species system actors/organizations

There are a number of actors within the invasive species system in Bangladesh, with various roles and responsibilities. Their main involvement is summarized in the paragraphs below.

Department of Agricultural Extension (DAE) and National Plant Protection Organization (NPPO)

The National Plant Protection Organization (NPPO) in Bangladesh operates under the umbrella of the DAE and comprises two key entities: the Plant Quarantine Wing (PQW) and the Plant Protection Wing (PPW). These wings function in accordance with the Plant Quarantine Act of 2011.

Plant Quarantine Wing (PQW)

The Plant Quarantine Wing (PQW) holds a significant role as a signatory to the World Trade Organization, committing Bangladesh to uphold international trade standards and adhere to global norms for phytosanitary measures.

Plant Protection Wing (PPW)

The Plant Protection Wing (PPW) serves as the primary authority for chemical pesticide registration in the country, issuing and renewing registration certificates and licenses for various chemical pesticides and public health products.

Agricultural Information Service (AIS)

The Agricultural Information Service (AIS), a governmental organization under the Ministry of Agriculture, holds the mandate to deliver contemporary agricultural information and technologies directly to farmers at the grassroots level through mass media.

Bangladesh Agricultural Research Institute (BARI)

BARI, operating under the Ministry of Agriculture, maintains a close collaboration with the Department of Agricultural Extension (DAE) and the National Plant Protection Organization (NPPO), holding a distinct mandate in managing invasive alien species (IAS).

Bangladesh Rice Research Institute (BRRI)

Rice, the staple food of Bangladesh, is a focal point of research and development conducted by BRRI, a key organization in the National Agricultural Research System. Currently, BRRI focuses on working with rice insect pests and parasites, advocating for the judicious use of insecticides and promoting Integrated Pest Management (IPM) practices among farmers.

Bangladesh Wheat and Maize Research Institute (BWMRI)

BWMRI is mandated to engage in research and training for wheat and maize, with a focus on providing and disseminating technical information at the farmer level. As a newly established research institute, there may be some overlaps and gaps in BWMRI's activities compared to those of other organizations. BWMRI serves as the member secretary of the National Task Force (NTF) on the Fall Armyworm (FAW), facilitating coordination and communication in addressing this significant agricultural challenge.

National Task Force (NTF) for FAW

As previously mentioned, the National Task Force (NTF) for the Fall Armyworm (FAW) was established in response to the pest's detection in Bangladesh in November 2018. Executed by the Ministry of Agriculture and coordinated by the Department of Agricultural Extension (DAE), the NTF operates with BWMRI serving as the member secretary. Key members include BARC, BARI, BRRI, CIMMYT, the United States Agency for International Development (USAID), and CABI.

International Maize and Wheat Improvement Centre (CIMMYT)

The international organization, CIMMYT has a mandate to work with maize and as such it tackles associated problems, including IAS such as FAW. The organization also works with USAID and FAO on projects relating to forecast-driven early warning systems and sex pheromones.

Food and Agriculture Organization of the United Nations (FAO)

The UN organization FAO has a Priority Area 1, “Reduce poverty and enhance food security and nutrition (access and utilization)” and Priority Area 3, “Improve market linkages, value addition and the quality and the safety of the food system”. Considering these priorities, FAO engaged to combat against invasive species, i.e., FAW in Bangladesh with an implementing agency Department of Agricultural Extension, Ministry of Agriculture. The activities against FAW conducted by FAO in Bangladesh made a notable contribution to the development of awareness and capacity-building of different stakeholders in FAW management.

Centre for Agriculture and Bioscience International (CABI)

A new CABI-led study is recommending that a coordinating body is established to help improve weaknesses in Bangladesh’s Invasive Alien Species (IAS) system to facilitate engagement between all actors involved in IAS management – from trade to human health.

The findings, published in ‘CABI Working Paper 28: An assessment of the invasive species system in Bangladesh,’ reveal that the current invasive species system in Bangladesh has some strengths but that challenges to the system remain.

USAID Feed The Future Bangladesh Integrated Pest Management Activity (IPMA)

The Feed the Future Bangladesh Integrated Pest Management Activity (IPMA), a USAID-funded associate award under Virginia Tech’s IPM Innovation Lab, develops suites of agricultural strategies — called IPM packages — that farmers can choose from based on their needs, conditions and preferences, and that address problems faced by farmers from the time of planting seeds to harvest.

Bangladesh Agricultural University (BAU), SAU, SyAU, HSTU, PSTU etc.

As an academic Institution, BAU included several courses on Entomology including Invasive Pest Management for the post-graduate degree. It helps to the students to enrich their knowledge on the invasive species identification, their biology, ecology and appropriate management options. BAU also engaged in research against different invasive species, like coconut mite, FAW, rugose spiraling whitefly, giant mealy bug etc.

Policy changes and direction shifts in Bangladesh as regards to Pest Management system

In 2022, the Ministry of Agriculture initiated a landmark change by introducing the National Integrated Pest Management (IPM) Policy, replacing the existing one formulated

in 2002. This decisive step was prompted by the necessity to align with the latest global best practices in pest management.

Case studies and success stories

The following case studies and success stories illustrate effective pest management practices and strategies from both Bangladesh and other regions grappling with similar challenges.

Case Study 1: Tomato leaf miner, *Tuta absoluta* (Lepidoptera: Gelechiidae)

In May of 2016, tomato leaf miner, *Tuta absoluta* (Lepidoptera: Gelechiidae), was detected on *Solanum lycopersicum* (tomato) plants and in traps in Bangladesh. This is the first report of *T. absoluta* in Bangladesh (Hossain et al., 2016).

Tuta absoluta is an economically important pest of tomato and other solanaceous plants. Native to South America, *T. absoluta* has also been reported from parts of Central America, Europe, Africa, the Middle East, India, and Nepal. It is not known to occur in the United States.

Case Study 2: Fall Armyworm (FAW), *Spodoptera frugiperda* (Lepidoptera: Noctuidae)

Fall armyworm (FAW), *Spodoptera frugiperda*, is a major pest of maize that was first detected in Bangladesh in 2018 and rapidly spread throughout the maize-growing areas (Ullah et al., 2023).

Case Study 3: Coconut Eriophyid Mite, *Aceria guerreronis* (Acari: Eriophyidae)

The eriophyid mite, *A. guerreronis*, was initially identified on coconuts in Guerrero State, Mexico, in 1965. Since then, it has been reported in various coconut-growing regions across the Americas, West Africa, the Caribbean Islands, and the Asia-Pacific. In the Asia-Pacific region, it was first observed in Sri Lanka in 1997 and later in India's Ernakulam district in 1998. The mite has now spread to all coconut-growing regions in India, causing widespread damage. Its presence has also been noted in Bangladesh, Nepal, the Maldives, and other Southeast Asian countries.

Case Study 4: Rugose spiraling whitefly, *Aleurodicus rugioperculatus* (Hemiptera: Aleyrodidae)

Rugose spiraling whitefly (RSW), *Aleurodicus rugioperculatus* Martin, a native pest of coconut in Central America, has recently been introduced to South-East Asia. The pest was first observed infesting coconut leaves at Regional Agricultural Research Station (RARS), BARI, Jashore during May, 2019 (Dutta et al., 2019).

Challenges with invasive insect pest management systems

Invasive insect pest management systems in Bangladesh face numerous challenges that affect crop production and food security. Identifying and detecting new invasive pests is difficult due to limited expertise, which delays timely responses to emerging threats.

Insufficient data on pest distribution, biology, and behavior hinders the development of effective management strategies, as comprehensive databases are often lacking. The interconnectedness of global trade facilitates the rapid spread of pests, while inadequate biosecurity measures increase the risk of unintentional introductions.

Climate change adds complexity, altering pest dynamics through shifts in temperature and precipitation patterns, which favor the spread of invasive species and make their impacts harder to predict. Over-reliance on chemical pesticides has led to resistance in pest populations, reducing the long-term effectiveness of these control measures. Farmers and agricultural practitioners often lack awareness or training in integrated pest management (IPM), making the promotion of sustainable practices a challenge that requires ongoing education.

Limited funding for research and development restricts efforts to understand invasive pests' biology and ecology and develop innovative solutions. Socioeconomic factors further compound the issue, as invasive pests reduce crop yields and farmer incomes, limiting their ability to invest in effective management practices. The fragmented nature of pest management efforts, involving multiple stakeholders such as government agencies, research institutions, and farmers, often results in a lack of coordination, weakening the overall response.

Regulatory gaps exacerbate the problem, as inadequate laws governing the import and movement of plant materials contribute to the introduction of invasive pests. Biological control efforts also face hurdles, particularly in identifying effective natural enemies for newly introduced species. Addressing these interconnected challenges demands a collaborative approach involving research, education, policy development, and community engagement. Developing resilient and sustainable management systems is essential to protect crop production and ensure food security in Bangladesh.

The way forward

Addressing the challenges of invasive insect pests in Bangladesh requires a coordinated and holistic strategy. Strengthening surveillance and early detection is critical, including training programs for extension workers and farmers to identify pests and establishing robust surveillance systems that leverage technology and collaboration with international organizations. Resources should be allocated for research on the biology, behavior, and ecological impacts of invasive pests, and centralized databases should be developed to facilitate informed decision-making.

Adaptive pest management strategies must account for climate change impacts on pest dynamics, with investments in research to understand shifts in pest behavior and distribution. Promoting integrated pest management (IPM) through farmer education, workshops, and financial incentives can encourage sustainable practices. Reducing pesticide dependency is also essential, emphasizing judicious use through training and introducing environmentally friendly alternatives, alongside resistance management strategies to maintain pesticide efficacy.

Enhanced biosecurity measures are needed to regulate plant material imports and prevent pest introductions. Collaborative efforts with neighboring countries and international organizations can strengthen these measures. Capacity building for researchers, extension workers, and farmers is vital to ensure they stay updated on modern pest management techniques, supported by partnerships between research institutions, universities, and extension services for effective knowledge transfer.

Community engagement plays a key role, with initiatives to involve local populations in pest monitoring and control, integrating traditional practices with modern methods. Policy development should incentivize sustainable pest management and enforce regulations to prevent the introduction and spread of invasive pests. Increased funding for research and development is crucial, with public-private partnerships supporting innovative solutions and technologies.

International collaboration is equally important, allowing Bangladesh to benefit from shared knowledge and best practices through partnerships with global organizations and participation in regional initiatives. By adopting these strategies, Bangladesh can build a resilient system to manage invasive pests, ensuring agricultural productivity and food security for the future.

References

- Alam, S. N.; Sarkar, M. A.; Pandey, P.R. and Bokhtiar, S. M. (Eds) 2018. SAARC Regional Training on Integrated Pest Management, 171p.
- BBS, 2022. Yearbook of agricultural statistics-2021. 33rd series, Bangladesh bureau of statistics (BBS). statistics and informatics division (SID), ministry of planning. Government of the people's republic of Bangladesh. Dhaka, Bangladesh. Pp. 03-664
- Dawson, W., Moser, D., van Kleunen, M., Kreft, H., Pergl, J., Pyšek, P., Weigelt, P., Winter, M., Lenzner, B., Blackburn, T.M., Dyer, E.E., Cassey, P., Scrivens, S.L., Economo, E.P., Guénard, B., Capinha, C., Seebens, H., García-Díaz, P., Nentwig, W., García-Berthou, E., Casal, C., Mandrak, N.E., Fuller, P., Meyer, C., Ess, F. 2017. Global hotspots and correlates of alien species richness across taxonomic groups. *Nature Ecology & Evolution*, 1: 0186.
- Dutta N. K., Sarker, D., Begum, K., Sarkar, M.A., Islam, M.I., Rahman M. M. 2019. First record of the invasive rugose spiraling whitefly, *Aleurodicus rugioperculatus* martin (Hemiptera: Aleyrodidae) in Bangladesh with its host range and status as coconut pest. *Bangladesh J. Entomol.* 29(2): 73-83.
- Early, R., Bradley, B.A., Dukes, J.S., Lawler, J.J., Olden, J.D., Blumenthal, D.M., Gonzalez, P., Grosholz, E.D., Ibanez, I., Miller, L.P., Sorte, C.J.B., Tatem, A.J. 2016. Global threats from invasive alien species in the twenty-first century and national response capacities. *Nature Communications*. 7: 12485.
- Guido, A., Pillar, V.D. 2017. Invasive plant removal: assessing community impact and recovery from invasion. *Journal of Applied Ecology*. 54: 1230-1237.
- Hellmann, J.J., Byers, J.E., Bierwagen, B.G., Dukes, J. S. 2008. Five potential consequences of climate change for invasive species, *Conservation Biology*. 22(3): 534–543

- Hossain, M.A., Chen, S. 2022. The decoupling study of agricultural energy-driven CO₂ emissions from agricultural sector development. *International Journal of Environmental Science and Technology*, 19(5): 4509–4524. <https://doi.org/10.1007/s13762-021-03346-7>
- Hossain, M.K., Pasha, M.K. 2001. Alien Invasive Plants in Bangladesh and their Impacts on the Ecosystem. In: *Assessment and Management of Alien Species that Threatened Ecosystem, Habitats and Species*. Secretariat of the Convention on Biological Diversity, CBD Technical Paper No. 21, Montreal, Canada, pp.73–75.
- Hossain MS, Mian MY, Muniappan R. 2016. First Record of *Tuta absoluta* (Lepidoptera: Gelechiidae) from Bangladesh. *J Agri Urban Ent.* 32: 101-105. <https://doi.org/10.3954/1523-5475-32.1.101>
- Ministry of Agriculture. 2002. *National Integrated Pest Management Policy*. <http://fpmu.gov.bd>. Accessed 25 Nov 2023.
- MoA. 2018. *National Agriculture Policy*. https://bangladeshbiosafety.org/wp-content/uploads/2021/03/National-Agriculture-Policy_2018_English.pdf. Accessed 25 Nov 2023.
- MoAW. 1989. *Destructive insects and pests rules*. <https://faolex.fao.org/docs/pdf/bgd22886.pdf>. Accessed 25 Nov Oct 2023.
- Mukul, S.A., Uddin, M.B., Tito, M.R. 2006. Study on the status and various uses of invasive alien plant species in and around Satchari National Park, Sylhet, Bangladesh. *Tigerpaper*, 33: 28-32.
- Sun, J.H., Lu, M., Gillette, N.E., Wingfield, M.J. 2013. Red turpentine beetle: innocuous native becomes invasive tree killer in China. *Annu Rev Entomol.* 58:293–311. doi: 10.1146/annurev-ento-120811-153624
- Swarna, I.J., Sheheli, S., Finch, E.A., Khan, M.A.M. 2023. Invasion of Rugose spiraling whitefly (Hemiptera: Aleyrodidae) across Bangladesh coastal region causes widespread damage to coconut plants. *J Econ Entomol.* 13;116(3):864-871. doi: 10.1093/jee/toad049.
- Ullah, M.S., Sharmin, D., Tumpa, T.A., Rashed, M.T.N.N., Mondal, P., Akram, M.W., Ahmad, M., Gotoh, T., Malvika, C. 2023. Invasion, distribution, monitoring and farmers perception of fall armyworm (*Spodoptera frugiperda*) and farm-level management practices in Bangladesh. *Insects.* 14(4): 343. <https://doi.org/10.3390/insects14040343>

Phytosanitary Regulation in Bangladesh

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উদ্ভিদ সংগনিরোধ আইন-২০১১

- ৫ এপ্রিল, ২০১১ সালো আইনটি মহামান্য রাষ্ট্রপতির সম্মতি লাভ করে।
- ২০১১ সনের ৫ নং আইন
- অধ্যায়: ৬ টি
- ধারা: ৪১ টি

উদ্ভিদ সংগনিরোধ বিধিমালা-২০১৮

- আইনের ব্যাখ্যাই হচ্ছে বিধিমালা
- ২৪ এপ্রিল, ২০১৮ সালে প্রজ্ঞাপন জারি হয়।
- ১০ মে, ২০১৮ সালে গেজেট আকারে প্রকাশিত হয়।
- বিধি-২০ টি
- তফশিল-৬টি
- আমদানি, রপ্তানি, ছাড়পত্র ইত্যাদি সংক্রান্ত ১৭ টি ফরম রয়েছে।

বাংলাদেশ



গেজেট

অতিরিক্ত সংখ্যা

কর্তৃপক্ষ কর্তৃক প্রকাশিত

বৃহস্পতিবার, সেপ্টেম্বর ৫, ২০১৩

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
আইন, বিচার ও সংসদ বিষয়ক মন্ত্রণালয়
লেজিসলেটিভ ও সংসদ বিষয়ক বিভাগ

প্রজ্ঞাপন

তারিখঃ ২৬ আগস্ট, ২০১৩ ইং

নং ১৩ (আঃম)(লেঃস)(মুঃপ্রঃ)-আইন-অনুবাদ-২০১৩—সরকারি কার্যবিধিমালা, ১৯৯৬ এর প্রথম তফসিল (বিভিন্ন মন্ত্রণালয় এবং বিভাগের মধ্যে কার্যবন্টন) এর আইটেম ২৯(খ) এর ক্রমিক ৫ এবং মন্ত্রিপরিষদ বিভাগের বিগত ০৩-০৭-২০০০ইং তারিখের সভায় গৃহীত সিদ্ধান্ত বাস্তবায়নের নিমিত্ত “উদ্ভিদ সংগনিরোধ আইন, ২০১১” এর ইংরেজী অনুবাদ সর্বসাধারণের জ্ঞাতার্থে প্রকাশ করিল।

মোঃ দেলোয়ার হোসেন
সহকারী সচিব (চঃ দাঃ)।

(৭৪৭৭)

মূল্য : টাকা ২০.০০

Plant Quarantine Act, 2011

Act No, V of 2011

[5 April, 2011/22 Chaitra, 1417]

An Act to make provisions, in the context of international traffic in plants and plant products, for preventing the introduction of insects or pests into, and spread thereof within, Bangladesh and for the matters relating to phytosanitary and other measures incidental and ancillary thereto

WHEREAS it is expedient and necessary to make provisions, in the context of international traffic in plants and plant products, for preventing the introduction of insects or pests into, and spread thereof within, Bangladesh and for the matters relating to phytosanitary and other measures incidental and ancillary thereto;

THEREFORE, it is hereby enacted as follows:—

First Chapter Preliminary

1. **Short title and commencement.**—(1) This Act may be called the Plant Quarantine Act, 2011.

(2) It shall come into force at once.

2. **Definitions.**—In this Act, unless there is anything repugnant in the subject or context—

- (1) “**import**” means to bring anything into Bangladesh from any other country through water, land or air ways;
- (2) “**import permit**” means an official certificate issued under section 10 authorizing importation of plants or plant products, beneficial organisms or packing materials subject to compliance of phytosanitary requirements;
- (3) “**importer**” means any person, organization, agency, institution, proprietor, consignee or agent having possession, superintendence or control of any plants or plant products, beneficial organisms or packing materials which have arrived or are likely to be arrived legally in Bangladesh from any other countries;

- (4) **“infestation”** or **“infection”** means the presence of a living pest in a certain plant, plant product or in its packing materials;
- (5) **“beneficial organisms”** means fungi, bacteria, nematodes, viruses, virus-like organisms including any other similar organisms or invertebrate animals which are utilized for the control of pests, or for pollination, or for the production of commercially valuable agricultural products, and which are, from time to time to, officially declared by the Government to be beneficial to agricultural production;
- (6) **“phytosanitary certificate”** means—
 - (a) in case of import, a phytosanitary certificate issued by the competent authority of the country of origin; and
 - (b) in case of export, a phytosanitary certificate issued in accordance with the provision of sub-section (3) of section 17 and rules;
- (7) **“plant quarantine officer”** means a plant quarantine officer appointed under section 8;
- (8) **“plants or plant products”** means all species of plants or plant products or including seeds any part thereof, whether living or dead, propagative material, germplasm, or any other products of plant origin, whether processed or not, which are, by their nature or by processing, capable of carrying, infecting and spreading pests;
- (9) **“containment”** means the application of phytosanitary measures in and around an infected area to prevent the spread of a quarantine pest;
- (10) **“Authority”** means the National Plant Quarantine Authority mentioned in section 3;
- (11) **“transit”** means transportation of plants or plant products, beneficial organisms or packing materials from one country to another through Bangladesh under phytosanitary measures and quarantine procedure;
- (12) **“controlled area”** means an area to be declared as controlled area under section 21;

- (13) **“packing materials”** means the materials used in packing for containing or preserving plants or plant products, pests or beneficial organisms;
- (14) **“inspection”** means visual examination of plants or plant products or packing materials to determine the presence of pests or to ensure that phytosanitary requirements are being complied with;
- (15) **“post-entry quarantine”** means, after entry into Bangladesh, official confinement of plants or plant products for conducting quarantine activities of observation, research, inspection or treatment of the plants or plant products, and prohibitions imposed by a plant quarantine officer on consignment of such plants or plant products;
- (16) **“crops”** means any agricultural, horticultural, medicinal and fiber crops, and all kinds of plants, herbs and shrubs and any type of plants or plant products having economic importance;
- (17) **“conveyance”** means all kinds of vehicles, either self propelled or not or driven by animal or human, which are able to carry plants or plant products, pests, beneficial organisms or packing materials from one place to another through land, water and airways;
- (18) **“disinfestations”** or **“disinfection”** means any scientific measures applied for the purpose of extirpating or reducing any infestation or infection by insects or pest that occurs or may occur on, in or amongst plants or plant products;
- (19) **“pests”** means any form of plants or species of living animals, strain or biotype, or any pathogenic agent other than beneficial organisms capable of injuring plants or plant products or beneficial organisms directly or indirectly, and also includes living modified organisms (LMO), alien invasive species and weeds;
- (20) **“rules”** means the rules made under the provision of this Act; and
- (21) **“export”** means taking out anything legally from Bangladesh to any other country through land, sea or airways.

Second Chapter National Plant Quarantine Authority and Its Functions

3. **National Plant Quarantine Authority.**—(1) For the purposes of this Act, the Government shall establish an authority to be called the National Plant Quarantine Authority.

(2) The Director, Plant Protection Wing, Department of Agricultural Extension, shall be deemed to be the National Plant Quarantine Authority and shall exercise all the powers of the Authority under this Act until an independent National Plant Quarantine Authority is established under sub-section (1).

(3) All the officers and employees of the Plant Protection Wing, Department of Agricultural Extension shall act as the officers and employees of the Authority until a separate organization established under sub-section (1).

4. **Powers and functions of the Authority.**—The powers and functions of the Authority shall be as follows:—

- (a) to regulate the import of plants or plant products, beneficial organisms and packing materials for preventing the introduction of quarantine pests into Bangladesh from other country;
- (b) to regulate the export of plants or plant products, pests, beneficial organisms and packing material according to the phytosanitary requirements of the importing country in consistence with international agreements;
- (c) to inspect and supervise the consignments of plants or plant products, beneficial organisms and packing materials which are in international traffic and may incidentally be used as carriers of pests;
- (d) to inspect growing plants areas under cultivation, and plants or plant products remaining in storage or in transit and to take regulatory measures in order to prevent the outbreak and spread of pests;
- (e) to make arrangement for issuing phytosanitary certificates in accordance with the phytosanitary requirements of the importing countries;

- (f) to conduct treatment formalities for disinfestation or disinfection of pests of the consignments of plants or plant products and their containers, packing materials, conservation stores or conveyances;
- (g) to regulate the introduction of beneficial organisms;
- (h) to declare any infected area as a "controlled area";
- (i) to conduct activities regarding post-entry quarantine of plants or plant products and to implement the phytosanitary measures;
- (j) to conduct pest risk analysis and pest risk management;
- (k) to undertake regular review and revision of lists of plants or plant products, pests and beneficial organisms, the importation of which is prohibited and restricted into Bangladesh, with a view to updating and harmonizing phytosanitary measures;
- (l) to exchange technical information, opinion and report with recognized international, regional or other national plant protection organizations and to keep abreast of the latest advancements in the field of plant protection and quarantine;
- (m) to conduct activities regarding diagnostics, detection and identification of particular pests;
- (n) to conduct activities regarding promotion and control of integrated pest management in Bangladesh;
- (o) to comply with the international agreements, protocols, conventions, etc. on phytosanitary measures, of which Bangladesh is a party or a signatory country, and to conduct implementation activities thereof, and to follow, conduct and coordinate the activities regarding conservation of plant bio-diversity;
- (p) to undertake risk analysis of the transboundary movements of genetically modified organisms (GMOs), living modified organisms (LMOs) and alien invasive species and their introduction and to control them;
- (q) to undertake surveys and surveillance on plant quarantine pests present in Bangladesh and to conduct plant quarantine research;
- (r) to preserve pest related information about plants or plant products within Bangladesh, information about preventive and controlling measures of their infestation and infection and information of the matters relating thereto;

- (s) to take the following measures if there is reasonable grounds to believe that an offence has been, is being or is about to be committed under this Act or any conditions of import permit or phytosanitary certificate is being breached, such as :—
- (i) to collect extract from the register and record kept under the custody of the concerned person, and to seize and keep the registers under its custody for a certain period if required to prove the offence;
 - (ii) to search the body of a person, or to search, examine and seize any materials carried by the person or conveyance at the time of entry and exit of Bangladesh;
 - (iii) to prohibit the distribution, sale or use of any plants or plant products for a certain period;
 - (t) to maintain and develop plant quarantine laboratories; and
 - (u) to do any other act as may be assigned to it by the Government.

5. Delegation of powers by the Authority.—For the purposes of this Act, the Authority may delegate any of its powers to the plant quarantine officers or any other officer working under the Authority.

6. Prohibition or restriction on import and export of plants or plant products, etc.—(1) The import or export of any plants or plant products which have the potential threat to introduce any pest into plants and plant products may be prohibited, restricted or otherwise controlled subject to the conditions mentioned in the import or export policy order issued by the Government, from time to time, under the Imports and Exports (Control) Act, 1950 (Act No. XXXIX of 1950).

(2) For the purposes of this Act, the powers of the customs officers to impose restrictions on import and export, from time to time, under the Customs Act, 1969 (Act No. IV of 1969) may be exercised in the case of import and export of plants and plant products and packaging materials, and accordingly the provisions of the said Act shall have effect in this behalf.

7. Regulations of plants or plant products for quarantine.—All the plants or plant products confined or confiscated for quarantine shall remain under the custody of the plant quarantine officer and he shall take necessary measures in the manner prescribed by rules for the purposes of quarantine of such plants or plant products.

8. **Appointment of plant quarantine officer.**—The Government may, by notification in the official Gazette, appoint such number of officers of Plant Protection Wing of the Department of Agricultural Extension as plant quarantine officers as may be required for carrying out the purposes of this Act.

Chapter Three Import and Export

9. **Prohibition against import.**—(1) No importer shall, without an import permit, import any plant or plant product, beneficial organism, soil or packing materials into Bangladesh.

(2) The Authority may, with prior sanction of the Government, from time to time, prescribe the procedure for importing plants or plant products.

(3) The Authority may, with approval of the Government, by notification in the official Gazette, from time to time, exempt certain plants and plant products from the conditions of import.

10. **Permit and certificate.**—(1) Plants or plant products, beneficial organisms or packing materials shall not be imported into Bangladesh without an import permit and certificate issued by the Authority.

(2) Any plant or plant product, beneficial organism or packing material shall be imported into Bangladesh only through a designated point of entry, and upon notification for importation, the import permit issued against the consignment and the phytosanitary certificate issued by the National Plant Protection Authority of the exporting country shall have to be submitted to the concerned plant quarantine officer for examination.

(3) On the import permit, there shall have a description regarding the type of treatment to be applied on the plants or plant products, if imported, or other measures, including post-entry quarantine for ascertaining phytosanitary before or after importation of plants or plant products.

11. **Correction, cancellation, etc. of import permit and certificate.**—The Authority may, on reasonable grounds,—

- (a) cancel an import permit and certificate issued; and
- (b) alter or correct it at any time.

12. **Notification to plant quarantine officer.**—(1) If any person, with or without his consent, receives any plants or plant products, beneficial organisms or packing materials from outside Bangladesh, he shall notify it to the nearest plant quarantine officer.

(2) The plant quarantine officer shall, upon examination thereof, make arrangement for their release or destruction or treatment or disposal.

13. **Inspection.**—The person who transports or stores any plant or plant product, beneficial organism or packing material or is in charge of the conveyance or the store shall be bound to make the conveyance or store and its contents available for inspection and treatment, if required, in accordance with the order of a plant quarantine officer.

14. **Examination and sample collection.**—Any importer shall, on demand by a plant quarantine officer, be bound to allow him to examine and collect sample from the imported materials.

15. **Movement of container.**—No plant or plant product, pest, beneficial organism or packing material under examination of a plant quarantine officer shall be moved or no container shall be opened, except in accordance with the permission of the plant quarantine officer :

Provided that this provision shall be relaxable for an officer of customs or of the post office.

16. **Seizure of plants or plant products harbouring pests.**—If any plant or plant product, which is suspected of harbouring any pest, is imported into Bangladesh or remains in transit through Bangladesh or is transported from one part of Bangladesh to another in contravention of the provisions of this Act, the plant or plant product may be seized or, as the case may be, refused to entry, destroyed, moved or treated, or any other necessary phytosanitary measures may be taken.

17. **Pre-export-examination.**—(1) In case of export of plant or plant products, each and every consignment shall have to be examined by the plant quarantine officer.

(2) Each consignment of plants or plant products submitted for export shall be examined by a plant quarantine officer in such manner as may be prescribed by rules in accordance with the phytosanitary requirements of the importing country.

(3) If the consignment submitted deems to be fit for issuance of a phytosanitary certificate, the plant quarantine officer shall issue a phytosanitary certificate in such manner as may be prescribed by rules.

18. Prohibition against export.—(1) No. exporter shall export any plant or plant product without a phytosanitary certificate issued by the Authority.

(2) The Authority may, with prior approval of the Government, from time to time, prescribe the procedure for exportation of plants or plant products.

(3) The Authority may, with approval of the Government, by notification in the official Gazette, from time to time, exempt certain plants or plant products from the conditions for export.

Fourth Chapter Containment and Eradication of Pests

19. Containment or eradication of pests.—The Authority may, with prior approval of the Government, by notification in the official Gazette, restrict or prohibit the entry, introduction, sale, cultivation, multiplication or transportation of any plant product, pest, genetically modified organism, living modified organism and alien invasive species, beneficial organism, germplasm, packing material or any similar material capable of harbouring and spreading pests.

20. Declaration regarding quarantine pest.—(1) If any pest presents, or is likely to be present or is a threat to the production of crops or to the trade in plants or plant products, to the beneficial organisms or to the natural environment, and if any pest which presents in Bangladesh is considered to be necessary for confinement or eradication, the Authority may, by notification in the official Gezette, declare such pest as a quarantine pest.

(2) The occupier or owner of any land or premises on which a pest is found and identified as, or suspected to be, a quarantine pest shall notify it to the nearest plant quarantine officer.

21. To declare the infected area as a controlled area.—The Authority may, by notification in the official Gazette, undertake the following measures for conducting plant quarantine activities, such as—

- (a) to declare any area in Bangladesh, which is infected or reasonable suspected of being infected with any pest, as an infected area;
- (b) to declare any land or premises, which is infected or suspected of being infected with any pest, as an area controlled under quarantine;

- (c) to conduct treatment measures for the plants or plant products or packing materials, and the conveyances or the storage areas suspected of being infected in order to eradicate or limit the spread of pests;
- (d) to prohibit, restrict and control the cultivation and harvesting of crops for the whole or any part of an infected place under quarantine area by the quarantine officer, if it appears to the officer that the pest cannot instantly be controlled or eradicated by taking phytosanitary measures, and in this behalf to prescribe the period within which such prohibition, restriction and control shall have effect.

22. Written notice.—(1) If a plant quarantine officer is confirmed that a quarantine pest is present at any place, the officer may issue a written notice to the owner or occupier of such place, and order the owner or occupier of the land or premises to complete necessary phytosanitary measures for eradication and containment of pests and for limiting spread thereof within a period specified in the notice.

(2) If an owner or occupier of the land or premises does not comply or is unable to comply with any condition of the notice issued under sub-section (1) within the period specified in such notice, any plant quarantine officer may enter into the land or premises and, by issuing a written notice take necessary measures for phytosanitary.

(3) The plant quarantine officer shall regularly review the condition of the land or premises remaining under quarantine measures and when he is confirmed that the relevant pest has been eradicated and there is no necessity to continue the quarantine restrictions in respect of the land or any part thereof, he shall, by issuing a notice, conveyed it to the owner or occupier of the land mentioning the date from which the land is no longer under quarantine restrictions.

23. Assistance.—All officers of Customs, Coast Guard, Police Department, Border Guard Bangladesh, Postal Department, Port Authorities, Civil Aviation Authorities, Railway Department, Shipping Agencies, Airlines and such other institutions shall assist to prevent the activities repugnant to this Act and extend necessary cooperation to the plant quarantine officer in exercising powers and performing duties under this Act.

24. **Compensation.**—(1) Where any plant or plant product or other material is destroyed for taking necessary measures to eradicate, contain or limit the spread of a quarantine pest, the Government may, subject to the provision of sub-section (2), depending on the supply and availability of fund, give compensation for the plants, plant products or similar other materials destroyed to the owner thereof.

(2) No person shall be entitled to get compensation under sub-section (1) if the measures has been taken for remedy, and the damage occurs due to inattentiveness of the concerned person or for his failure to comply with the instructions given lawfully or for the contravention of the provisions of this Act.

(3) Subject to the prior approval of the Government, the Authority may, by notification in the official Gazette, determine the amount of compensation by analyzing and considering its overall circumstances.

25. **In the case of seizure, notification to the owner.**—Where any plant quarantine officer takes steps to seize, keep waiting for, prohibit entry of, return, treat, remove or destroy any plant or plant product, he shall, as soon as possible, notify the owner about the steps taken and the reasons of taking such steps.

Fifth Chapter Offences and Punishments

26. **Offences.**—If any person, company or organization, either personally or through any employee or agent, dose any of the following acts or violates any provision of the Act, such act or violation shall be deemed to be an offence under this Act, such as:—

- (a) to import into, or export from Bangladesh any plant or plant product, pest, beneficial organism, soil or packing material prohibited under this Act;
- (b) to produce, possess, sell, advertise for sale, transport or distribute any prohibited plant or plant product, pest, beneficial organism, soil or packing material knowingly;
- (c) to contravene any condition of the notice issued under section 22;
- (d) to impede, prevent or intimidate any plant quarantine officer in performing his duties;

- (e) to refuse or neglect to comply with any order or direction made or given under this Act;
- (f) to disobey or ignore to comply with the direction given under section 13, 14 and 15;
- (g) to knowingly or recklessly provide any information which is false in material for the purpose of obtaining any permit or certificate or for the purpose of complying the provisions of this Act wrongfully; and
- (h) to alter or tamper any document submitted to or issued by the plant quarantine officer.

27. Offences committed by the company, etc.—Where an offence under this Act is committed by a company, every director, partner, chief executive, manager, secretary or any other officer or employee or representative who has direct involvement with the offence shall be deemed to have committed the offence unless he proves that the offence has been committed without his knowledge or he tried his level best to prevent the offence.

Explanation: Under this section—

- (a) “company” means any company, statutory body, commercial organization, partnership business, society or any organization consisting of more than one person; and
- (b) “director”, in case of any commercial organization, means any of its partner, or member of the Board of Directors.

28. Trial by Magistrates.—All the offences under this Act shall be tried by any Judicial Magistrate of the first class or any Metropolitan Magistrate.

29. Cognizance of Offences.—No court shall take cognizance of an offence punishable under this Act except upon a written complaint made by any plant quarantine officer.

30. Offences to be non-cognizable and bailable.—All offences under this Act shall be non-cognizable and bailable.

31. Punishment—(1) Any person who commits an offence referred to in section 26 shall be punished with imprisonment for a term not exceeding 2 (two) years, or with a fine not exceeding taka 5,00,000 (five lac) or with both.

(2) All money and profit accrued from the prohibited products may be confiscated.

32. Disposal of confiscated property.—(1) If any product is confiscated under this Act, the product, except the one which has to be destroyed, may be sold by open auction or in any other commercially profitable legal way, or may be disposed of by any other means.

(2) The money accrued from sale or disposal by any other means under sub-section (1) shall be credited to the government treasury.

33. Special power of Magistrates for imposing punishment.—Notwithstanding anything contained in the Code of Criminal Procedure, 1898, any Judicial Magistrate of the first class, or a Metropolitan Magistrate may impose any of the punishments referred to in section 31.

34. Appeal against administrative orders, etc.—(1) If a recipient of any permit or certificate is aggrieved by any written order issued under this Act, the aggrieved person may prefer appeal against the order for relief, within 15 days from the date of receiving such notice, to—

(a) the Authority, if the order is issued by a plant quarantine officer; and

(b) the Government, if the order is issued by the Authority.

(2) If any appeal is preferred under sub-section-(1), it shall be disposed of within a period not exceeding 90 (ninety) days from the date of preferring such appeal.

Sixth Chapter Miscellaneous

35. Fees and charges.—The Government may, from time to time, determine fees and charges for inspection, examination or treatment of plants or plant products, beneficial organisms or packing materials and may also determine the procedure of collecting such fees and charges.

36. Incurring expenditure.—If an importer imports any plant or plant product, beneficial organism or packing material violating the conditions mentioned in the import permit, the importer shall incur all the expenses for the treatment or removal or destruction of the imported things.

37. **Indemnity.**—No suit, prosecution or other legal proceeding shall lie against the Authority or any plant quarantine officer or the Government on the ground that any person is affected or likely to be affected by anything which is done in good faith by the Authority or the plant quarantine officer or the Government under this Act or rules made thereunder.

38. **Removal of ambiguity.**—If any ambiguity arises in case of application of any provision of this Act for its obscurity, the Government may, by notification in the official Gazette, remove such ambiguity subject to its being consistent with the provisions of this Act.

39. **Power to make rules.**—(1) The Government may, by notification in the official Gazette, make rules to carry out the purposes of this Act.

(2) Without prejudice to the generality of sub-section (1), such rules may also provide for the following matters, namely:—

- (a) procedures for detection of pests which are likely to be introduced into Bangladesh being transmitted with plants or plant products or packing materials;
- (b) determination of entry or exit points of importation and exportation and the matters relating to establishment of plant quarantine stations;
- (c) obligations to be complied with by the plant quarantine officers in exercising their powers;
- (d) matters relating to inspection, supervision, treatment, destruction and removal;
- (e) procedures for submission of applications for obtaining import permits or certificates, disposal thereof and for preferring appeal and disposal of appeal;
- (f) matters relating to phytosanitary certificates;
- (g) matters relating to declaration of controlled areas and payment of compensation;
- (h) matters relating to training, establishment of laboratories and security systems;
- (i) procedure of collection of fees and charges; and
- (j) any such other matters as may be required under this Act.

40. Publication of Authentic English Text.—After the commencement of this Act, the Government shall, as soon as possible, by notification in the official Gazette, publish an Authentic English Text of this Act:

Provided that in the event of conflict between the original Bangla Text and the English Text, the Bangla Text shall prevail.

41. Repeal and Savings.—The Destructive Insects and Pests Act, 1914 (Act No. II of 1914), hereinafter referred to as the said Act, is hereby repealed. Notwithstanding such repeal, any act done or action taken under the said Act shall be deemed to have been done or taken under this Act.

মোঃ মজরুল ইসলাম (উপসচিব), উপপরিচালক, বাংলাদেশ সরকারি মুদ্রণালয়, তেজগাঁও, ঢাকা কর্তৃক মুদ্রিত।
আবদুর রশিদ (উপসচিব), উপপরিচালক, বাংলাদেশ ফরম ও প্রকাশনা অফিস,
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রেজিস্টার্ড নং ডি এ-১



বাংলাদেশ

গেজেট

অতিরিক্ত সংখ্যা
কর্তৃপক্ষ কর্তৃক প্রকাশিত

বৃহস্পতিবার, মে ১০, ২০১৮

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

কৃষি মন্ত্রণালয়

প্রজ্ঞাপন

তারিখ : ১১ বৈশাখ ১৪২৫ বঙ্গাব্দ/২৪ এপ্রিল ২০১৮ খ্রিস্টাব্দ

এস, আর, ও নং ১১৯ আইন/২০১৮।—উদ্ভিদ সংগনিরোধ আইন, ২০১১ (২০১১ সনের ৫ নং আইন) এর ধারা ৩৯ এ প্রদত্ত ক্ষমতাবলে সরকার নিম্নরূপ বিধিমালা প্রণয়ন করিল, যথা :—

১। শিরোনাম।—এই বিধিমালা উদ্ভিদ সংগনিরোধ বিধিমালা, ২০১৮ নামে অভিহিত হইবে।

২। সংজ্ঞা।—বিষয় বা প্রসঙ্গের পরিপন্থি কোন কিছু না থাকিলে, এই বিধিমালায়—

- (১) “আইএসপিএম (International Standard for Phytosanitary Measures-ISPM)” অর্থ জাতিসংঘের খাদ্য ও কৃষি সংস্থার (FAO) অধীন আন্তর্জাতিক উদ্ভিদ সংরক্ষণ কনভেনশন (International Plant Protection Convention) দ্বারা উদ্ভিদ স্বাস্থ্যসুরক্ষা বিষয়ে নির্ধারিত একটি আন্তর্জাতিক মানদণ্ড;
- (২) “কনসাইনমেন্ট” অর্থ নির্দিষ্ট পরিমাণ উদ্ভিদ, উদ্ভিদজাত দ্রব্যাদি, উপকারী জীবাণু বা প্যাকিং দ্রব্যাদি, যাহা উদ্ভিদ স্বাস্থ্য সনদপত্রসহ এক দেশ হইতে অন্য দেশে স্থানান্তর করা হয়;
- (৩) “কর্তৃপক্ষ” অর্থ উদ্ভিদ সংগনিরোধ আইন, ২০১১ (২০১১ সনের ৫ নং আইন) এর ধারা ৩ এর অধীন প্রতিষ্ঠিত জাতীয় উদ্ভিদ সংগনিরোধ কর্তৃপক্ষ;
- (৪) “শ্রোয়িং মিডিয়া ” অর্থ সেই সকল উপাদান যাহা উদ্ভিদের মূল জন্মাতে বা মূলের বৃদ্ধিতে সহায়তা করে;
- (৫) “জার্মপ্লাজম” অর্থ প্রজনন বা সংরক্ষণের উদ্দেশ্যে ব্যবহার করা হয় এইরূপ উদ্ভিদ;

(৫৫১১)

মূল্য : টাকা ১২৪.০০

- (৬) “জেনেটিক্যালি মডিফাইড অর্গানিজমস” অর্থ জেনেটিক ইঞ্জিনিয়ারিং এর মাধ্যমে জেনেটিক গঠন পরিবর্তন করিয়া সংশ্লেষণ বা উদ্ভাবন করা হইয়াছে এইরূপ জীবসত্তা;
- (৭) “ট্রান্সজেনিক” অর্থ ভিন্ন প্রজাতির এক বা একাধিক কৌলিক উপাদান সন্নিবেশিত করে কোন প্রজাতির কোষ বা অণুজীব তৈরীতে ব্যবহৃত উপাদান;
- (৮) “তপশিল” অর্থ এই বিধিমালার তপশিল;
- (৯) “প্লান্টিং ম্যাটেরিয়ালস্” অর্থ বীজ, ফল, কাণ্ড, পাতা, মূল, বালব বা টিউবার এবং প্লান্টলেটসসহ উদ্ভিদের বংশবিস্তারের জন্য ব্যবহৃত হয় এইরূপ উদ্ভিদ অংগ বা উদ্ভিদের অংশ বিশেষ;
- (১০) “ফরম” অর্থ এই বিধিমালার ফরম;
- (১১) “বায়োলজিক্যাল কন্ট্রোল এজেন্ট” অর্থ পরজীবী (Parasite), পরভোজী (Predator), প্যারাসাইটয়েড (Parasitoid), আণুবীক্ষণিক জীবাণু (Microbial Organisms) বা স্ব-উৎপাদনশীল (Self-replicated) কোন অজানুসহ যে কোন জৈবিক এজেন্ট, যাহা বলাই দমনে ব্যবহার করা হয়;
- (১২) “বলাই ঝুঁকি বিশ্লেষণ” অর্থ কোন বলাই নিয়ন্ত্রণ করা যাইবে কিনা এবং উহার জন্য কি মাত্রায় উদ্ভিদ স্বাস্থ্য সুরক্ষা ব্যবস্থা গ্রহণ করিতে হইবে উহা নির্ধারণের লক্ষ্যে জৈবিক বা বৈজ্ঞানিক বা অর্থনৈতিক তথ্যাদি (Evidence) মূল্যায়ন প্রক্রিয়া;
- (১৩) “বিষবাস্পীকরণ” অর্থ কোন রাসায়নিক দ্রব্য দ্বারা শোধন করা, যাহা গ্যাসীয় অবস্থায় দ্রব্যের সমগ্র অংশে পৌঁছায়;
- (১৪) “লিভিং মডিফাইড অর্গানিজমস” অর্থ আধুনিক বায়োটেকনোলজি প্রয়োগের কারণে কৌলিক বস্তুর উত্তম বৈশিষ্ট্যের সম্মিলনে উদ্ভূত যে কোন জীবসত্তা।

৩। আমদানি অনুমতিপত্র।—(১) আইনের ধারা ১০ এর বিধান সাপেক্ষে নিম্নবর্ণিত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে আমদানিকারককে ফরম-১ অনুযায়ী কর্তৃপক্ষ বরাবর আমদানি অনুমতিপত্রের জন্য আবেদন করিতে হইবে, যথা :—

- (ক) বপনের জন্য বীজ ও অন্যান্য বংশবিস্তারকারী উপকরণ;
- (খ) গ্রোয়িং মিডিয়া;
- (গ) নিম্নবর্ণিত উদ্ভিদজাত দ্রব্য -
- (অ) খাদ্য হিসাবে ব্যবহৃত খাদ্যশস্য, দানাজাতীয় শস্য, বিভিন্ন ধরনের ডাল ও তৈলবীজ;
- (আ) মূল ও কাণ্ড জাতীয় দ্রব্য;
- (ই) মসলা;
- (ঈ) তাজা ফল;
- (উ) শুকনা ফল;

- (উ) ঔষধি উদ্ভিদ বা উদ্ভিদজাত দ্রব্য;
- (ঋ) কাঁচা ও আঁশ তুলা;
- (এ) কাঠ ও কাঠজাত দ্রব্য;
- (ঐ) বাঁশ ও বাঁশজাত দ্রব্য;
- (ও) আখ ও আখজাত দ্রব্য;
- (ঘ) প্যাকিং দ্রব্যাদি;
- (ঙ) উপকারী জীবাণু।

(২) গবেষণা ও শিক্ষামূলক কাজে ব্যবহারের জন্য নিম্নবর্ণিত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে আমদানিকারককে ফরম-২ অনুযায়ী কর্তৃপক্ষ বরাবর আমদানি অনুমতিপত্রের জন্য আবেদন করিতে হইবে, যথা :—

- (ক) গ্রোয়িং মিডিয়া;
- (খ) জার্মপ্লাজম;
- (গ) জেনেটিক্যালি মডিফাইড অর্গানিজমস;
- (ঘ) ট্রান্সজেনিক;
- (ঙ) প্লান্টিং ম্যাটেরিয়ালস;
- (চ) বায়োলজিক্যাল কন্ট্রোল এজেন্ট;
- (ছ) লিভিং মডিফাইড অর্গানিজমস;
- (জ) তপশিল-১ এ উল্লিখিত বীজ নমুনা।

(৩) কর্তৃপক্ষ, উপ-বিধি (১) ও (২) এর অধীন আবেদন প্রাপ্তির ৭ (সাত) কার্যদিবসের মধ্যে আবেদনপত্র ও সংযুক্ত দলিলাদি যাচাই-বাছাইক্রমে—

- (ক) সন্তুষ্ট হইলে, যথাক্রমে, ফরম-৩ ও ফরম-৪ অনুযায়ী আমদানি অনুমতিপত্র প্রদান করিবে; এবং
- (খ) সন্তুষ্ট না হইলে, আমদানি অনুমতিপত্র ইস্যু না করিবার কারণ উল্লেখক্রমে উহা আবেদনকারীকে জানাইবে।

(৪) উপ-বিধি (১) ও (২) এর অধীন দাখিলকৃত আবেদনপত্র অসম্পূর্ণ অথবা অন্য কোন দলিলাদি প্রয়োজন হইলে আবেদনপত্র প্রাপ্তির ৭ (সাত) কার্যদিবসের মধ্যে কর্তৃপক্ষ আবেদনকারীকে অবহিত করিবে এবং আবেদনকারীর নিকট হইতে প্রয়োজনীয় তথ্য ও দলিলাদি প্রাপ্তি সাপেক্ষে আমদানি অনুমতিপত্র প্রদান করিবে।

(৫) উদ্ভিদ ও উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে আমদানিকারককে ঋণপত্র (Letter of Credit) খোলার পূর্বে আমদানি অনুমতিপত্রের জন্য আবেদন করিতে হইবে।

(৬) ২০ (বিশ) কেজির অধিক পরিমাণ নিয়ন্ত্রিত ফসলের বীজ এবং ৫ (পাঁচ) মেট্রিক টনের অধিক পরিমাণ অন্যান্য ফসলের বীজ আমদানির ক্ষেত্রে সরকারের পূর্বানুমোদন গ্রহণ সাপেক্ষে কর্তৃপক্ষ আমদানি অনুমতিপত্র প্রদান করিবে।

ব্যখ্যা—“নিয়ন্ত্রিত ফসল” বলিতে বীজ আইন, ২০১৮ (২০১৮ সনের ৬ নং আইন) এর ধারা ২(৭) এ সংজ্ঞায়িত নিয়ন্ত্রিত ফসল বা জাতকে বুঝাইবে।

(৭) উপ-বিধি (১), (২) ও (৩) এ যাহা কিছুই থাকুক না কেন, তপশিল-২ এ উল্লিখিত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে উক্ত তপশিলে উল্লিখিত শর্ত সাপেক্ষে আমদানি অনুমতিপত্র প্রদান করা যাইবে।

(৮) তপশিল-১ এ উল্লিখিত নমুনা উক্ত তপশিলে বর্ণিত পরিমাণের অধিক আমদানি করা যাইবে না।

(৯) এই বিধির অন্যান্য বিধানে যাহা কিছুই থাকুক না কেন, তপশিল-৩ এ উল্লিখিত আগাছা মিশ্রিত কোন কনসাইনমেন্ট বা দ্রব্য আমদানি করা যাইবে না।

৪। বালাই ঝুঁকি বিশ্লেষণ—(১) তপশিল-২এ তালিকাভুক্ত নহে এইরূপ উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি অথবা নূতন এলাকা হইতে উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে বালাই ঝুঁকি বিশ্লেষণ ব্যতীত আমদানি অনুমতিপত্র প্রদান করা যাইবে না।

(২) উপ-বিধি (১) এর অধীন বালাই ঝুঁকি বিশ্লেষণের জন্য ফরম-৫ অনুযায়ী কর্তৃপক্ষের নিকট আবেদন করিতে হইবে।

(৩) কর্তৃপক্ষ, উপ-বিধি (২) এর অধীন আবেদন প্রাপ্তির পর, যথাযথ পদ্ধতি অনুসরণক্রমে বালাই ঝুঁকি বিশ্লেষণ করিবে এবং বালাই ঝুঁকি বিশ্লেষণের পর সন্তুষ্ট হইলে বিধি ৩ এর অধীন আমদানি অনুমতিপত্র ইস্যু করিতে পারিবে।

৫। পোস্ট অফিস ও কুরিয়ার সার্ভিসের মাধ্যমে আমদানি—(১) বিধি ৩ এর বিধান সাপেক্ষে পোস্ট অফিস বা কুরিয়ার সার্ভিসের মাধ্যমে উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানির ক্ষেত্রে উক্ত পোস্ট অফিস বা কুরিয়ার সার্ভিস কর্তৃপক্ষের দায়িত্বপ্রাপ্ত কর্মকর্তা বিধি ৯ এর বিধান মোতাবেক আমদানিকারক কর্তৃক ছাড়পত্র দাখিলের পর উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি ছাড়করণ করিতে পারিবে।

(২) পোস্ট অফিস বা কুরিয়ার সার্ভিস কর্তৃপক্ষের দায়িত্বপ্রাপ্ত কর্মকর্তা উপ-বিধি (১) এর অধীন আমদানিকৃত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির পার্সেল পৌঁছানোর ২৪ (চব্বিশ) ঘন্টার মধ্যে সংশ্লিষ্ট উদ্ভিদ সংগনিরোধ কর্মকর্তাকে অবহিত করিবে।

৬। আমদানি অনুমতিপত্রের মেয়াদ, সংশোধন ও বাতিল—(১) আমদানি অনুমতিপত্রের মেয়াদ হইবে অনুমতিপত্র ইস্যুর তারিখ হইতে ৪ (চার) মাস, তবে কর্তৃপক্ষ, আবেদনকারীর আবেদনের প্রেক্ষিতে, উক্ত সময়সীমা ২ (দুই) মাস পর্যন্ত বৃদ্ধি করিতে পারিবে।

(২) কর্তৃপক্ষ আমদানিকারকের লিখিত আবেদনের প্রেক্ষিতে যুক্তিসঙ্গত মনে করিলে, আমদানি অনুমতিপত্রে উল্লিখিত প্রবেশ পথ পরিবর্তন করিতে পারিবে।

(৩) আমদানিকারক আমদানি অনুমতিপত্রের শর্ত ভঙ্গ করিলে কর্তৃপক্ষ, আমদানিকারককে যুক্তিসঙ্গত শুনানির সুযোগ প্রদান করিয়া, আমদানি অনুমতিপত্র বাতিল করিতে পারিবে।

৭। উদ্ভিদ সংগনিরোধ কর্মকর্তাকে অবহিতকরণ।—(১) আমদানিকারককে কোন কনসাইনমেন্টের সম্ভাব্য আগমনের অন্ত্যন ৭ (সাত) দিন পূর্বে উদ্ভিদ সংগনিরোধ কর্মকর্তাকে অবহিত করিতে হইবে।

(২) শুষ্ক কর্মকর্তা উপ-বিধি (১) এ উল্লিখিত কনসাইনমেন্ট বন্দর বা টার্মিনালে প্রবেশের সঙ্গে সঙ্গে উদ্ভিদ সংগনিরোধ কর্মকর্তাকে অবহিত করিবেন।

৮। নোঙর অনুমতি।—(১) সামুদ্রিকযানে বৃহৎ পরিমাণে (Bulk) আমদানিকৃত কাঁচা তুলা বা খাদ্যশস্যের কনসাইনমেন্ট আগমনের অন্ত্যন ১৫ (পনেরো) দিন পূর্বে জাহাজের প্রতিনিধিকে ফরম-৬ অনুযায়ী নোঙর অনুমতিপত্রের জন্য কর্তৃপক্ষের নিকট আবেদন করিতে হইবে।

(২) উপ-বিধি (১) এর অধীন আবেদন প্রাপ্তির পর কর্তৃপক্ষ ফরম-৭ অনুযায়ী নোঙর অনুমতিপত্র প্রদান করিবে।

৯। পরিদর্শন ও ছাড়পত্র।—(১) আমদানিকারককে বিধি ৩ এর উপ-বিধি (১) এ উল্লিখিত দ্রব্যাদি ছাড়করণের জন্য ফরম-৮ এবং উপ-বিধি (২) এ উল্লিখিত দ্রব্যাদি ছাড়করণের জন্য ফরম-৯ অনুযায়ী উদ্ভিদ সংগনিরোধ কর্মকর্তার নিকট আবেদন করিতে হইবে।

(২) আবেদনপত্রের সহিত আমদানি অনুমতিপত্র, উদ্ভিদ স্বাস্থ্য সনদপত্র এবং প্রযোজ্য ক্ষেত্রে, পুনঃরপ্তানিকারক দেশের উদ্ভিদ স্বাস্থ্য সনদপত্র দাখিল করিতে হইবে।

(৩) উদ্ভিদ সংগনিরোধ কর্মকর্তা উপ-বিধি (১) এর অধীন আবেদন প্রাপ্তির পর, উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি, উপকারী জীবাণু অথবা প্যাকিং দ্রব্যাদি বহনকারী বাহন, উহার অভ্যন্তরস্থ দ্রব্যাদি এবং কনটেইনার পরিদর্শন করিবেন এবং পরীক্ষা করিবার জন্য তপশিল-৪ অনুযায়ী নমুনা সংগ্রহ করিবেন।

(৪) উপ-বিধি (৩) এর অধীন নমুনা সংগ্রহের পর উহা পরীক্ষা করিয়া আমদানির সকল শর্ত প্রতিপালিত হইয়াছে মর্মে সন্তুষ্ট হইলে উদ্ভিদ সংগনিরোধ কর্মকর্তা তপশিল-৬ এ উল্লিখিত ফি গ্রহণ সাপেক্ষে ফরম-১০, বা ক্ষেত্রমত, ফরম-১১ অনুযায়ী ছাড়পত্র ইস্যু করিবে।

(৫) উপ-বিধি (৪) এর অধীন নমুনা পরীক্ষা করিবার পর বালাই পাওয়া গেলে বা বালাই পোষণকারী হিসাবে সন্দেহযুক্ত হইলে বিষবাস্পীকরণ অথবা অন্য কোন শোধন প্রক্রিয়ায় বালাই মুক্ত করিবার পর সংগনিরোধ কর্মকর্তা ছাড়পত্র ইস্যু করিতে পারিবে।

(৬) আমদানিকারকের প্রতিনিধি এবং শুষ্ক কর্তৃপক্ষ, বন্দর কর্তৃপক্ষ বা টার্মিনাল কর্তৃপক্ষের দায়িত্বপ্রাপ্ত কর্মকর্তার উপস্থিতিতে কনসাইনমেন্ট হইতে উপ-বিধি (৩) এর অধীন নমুনা সংগ্রহ করিতে হইবে এবং সংগৃহীত নমুনা কর্তৃপক্ষ কর্তৃক নির্ধারিত ব্রাশ সিলমোহরের মাধ্যমে সংরক্ষণ করিতে হইবে।

(৭) আইএসপিএম-১৫ অনুসারে শোধন ব্যতীত কাঁচা অথবা নিরেট কাঠের তৈরি প্যাকেজিং ম্যাটেরিয়াল দ্বারা মোড়কীকৃত কোন পণ্যের জন্য ছাড়পত্র ইস্যু করা যাইবে না।

(৮) বাংলাদেশের বাহির হইতে কোন যাত্রী কর্তৃক, তাহার সহিত বা ব্যাগেজে, উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আনিবার ক্ষেত্রে, উদ্ভিদ সংগনিরোধ কর্মকর্তার নিকট ঘোষণা প্রদান করিতে হইবে, এবং ক্ষেত্রমত, উহার সহিত উদ্ভিদ স্বাস্থ্য সনদপত্র থাকিতে হইবে।

১০। জাহাজের কনটেইনার পরিদর্শন।—(১) উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি, উপকারী জীবাণু বা প্যাকিং দ্রব্যাদি বহনকারী জাহাজের প্রতিনিধিকে জাহাজ বন্দরে পৌছাইবার অনূন ১৫ (পনেরো) দিন পূর্বে উদ্ভিদ সংগনিরোধ কর্মকর্তার নিকট শিপিং ম্যানিফেস্ট উপস্থাপন করিতে হইবে এবং জাহাজ বন্দরে পৌছানোর সঙ্গে সঙ্গে সংশ্লিষ্ট বন্দর কর্তৃপক্ষ উদ্ভিদ সংগনিরোধ কর্মকর্তাকে অবহিত করিবে।

(২) উদ্ভিদ সংগনিরোধ কর্মকর্তা শিপিং ম্যানিফেস্ট অনুযায়ী জাহাজের খোল (Hold) অথবা উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির কনটেইনারবাহী খোল পরীক্ষা করিবেন।

(৩) উদ্ভিদ সংগনিরোধ কর্মকর্তা জাহাজ হইতে বালাই-এর বিস্তৃতি রোধ করিবার লক্ষ্যে উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির যথাযথ শোধন করিতে পারিবেন।

(৪) উদ্ভিদ সংগনিরোধ কর্মকর্তা জাহাজের ভাড়ার ঘর ও খাদ্য দ্রব্যের সংরক্ষণাগার পরিদর্শন করিতে পারিবেন এবং প্রয়োজনে, জাহাজ সমুদ্র যাত্রা করিবার পূর্ব মুহূর্ত পর্যন্ত উহা সিল করিয়া রাখিতে পারিবেন, তবে জাহাজ বন্দরে অবস্থান করিবার সময় পর্যন্ত জাহাজের নাবিকদের প্রয়োজনীয় খাদ্য আলাদা সংরক্ষণাগারে সংরক্ষণের ব্যবস্থা করিবেন।

১১। স্থানান্তর আদেশ।—(১) বিধি ৯ ও ১০ এর অধীন পরীক্ষা এবং শোধন বা বিষবাস্পী করণের পর উদ্ভিদ সংগনিরোধ কর্মকর্তা ফরম-১২ অনুযায়ী কনটেইনার স্থানান্তরের আদেশ দিবেন।

(২) উদ্ভিদ সংগনিরোধ কর্মকর্তা কর্তৃক প্রদত্ত স্থানান্তর আদেশ ব্যতীত কোন কনটেইনার পাটাতনসহ অথবা উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি দ্বারা পূর্ণ অবস্থায় বন্দরের সংরক্ষিত এলাকার বাহিরে নেওয়া যাইবে না।

১২। আটক, বাজেয়াপ্ত, ইত্যাদি।—(১) আমদানি অনুমতিপত্র ও উদ্ভিদ স্বাস্থ্য সনদপত্র ব্যতিত কোন কনসাইনমেন্ট বাংলাদেশে প্রবেশ করিলে অথবা আমদানিকৃত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদিতে কোন সংগনিরোধ বালাই বা অন্য কোন বালাইয়ের উপস্থিতি পাওয়া গেলে বা আমদানি অনুমতিপত্রের শর্ত প্রতিপালিত না হইলে উদ্ভিদ সংগনিরোধ কর্মকর্তা উক্ত কনসাইনমেন্টটি আটক করিতে অথবা উহার প্রবেশে অসম্মতি প্রদান করিতে বা রপ্তানিকারকের নিকট ফেরত পাঠাইতে পারিবেন।

(২) উপ-বিধি (১) এর অধীন আটককৃত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি উদ্ভিদ সংগনিরোধ কর্মকর্তা ধ্বংস, অপসারণ, শোধন করিতে পারিবেন অথবা ফরম-১৩ অনুযায়ী বাজেয়াপ্ত করিতে পারিবেন।

(৩) উপ-বিধি (১) ও (২) এর অধীন আটক, ধ্বংস বা বাজেয়াপ্ত করিবার ক্ষেত্রে উদ্ভিদ সংগনিরোধ কর্মকর্তা বিষয়টি আমদানিকারক ও রপ্তানিকারক দেশের জাতীয় উদ্ভিদ সংরক্ষণ কর্তৃপক্ষ এবং আন্তর্জাতিক উদ্ভিদ সংরক্ষণ কনভেনশন সচিবালয়কে অবহিত করিবে।

১৩। প্রবেশোত্তর সংগনিরোধ।—(১) প্রবেশোত্তর উদ্ভিদ সংগনিরোধের ক্ষেত্রে আমদানিকারককে আমদানি অনুমতিপত্রের আবেদনের সহিত প্রবেশোত্তর সংগনিরোধ কার্যক্রম পরিচালনার জন্য আবেদন করিতে হইবে।

(২) সরকার কর্তৃক, সময় সময়, নির্দিষ্ট স্থানে সংগনিরোধ কর্মকর্তার তত্ত্বাবধানে প্রবেশোত্তর সংগনিরোধ কার্যক্রম পরিচালনা করিতে হইবে।

(৩) উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির প্রবেশোত্তর সংগনিরোধ কার্যক্রম পরিচালনার ক্ষেত্রে আইএসপিএম-৩৪ অনুসরণ করিতে হইবে।

১৪। আমেরিকান তুলা আমদানি।—(১) আমেরিকান তুলা আমদানি করা হইলে উদ্ভিদ সংগনিরোধ কর্মকর্তা বন্দর কর্তৃপক্ষের অনুমতিক্রমে এবং তদকর্তৃক নির্ধারিত এলাকার মধ্যে বিষবাঙ্গীকরণের মাধ্যমে উহা শোধন করিবে।

(২) আমেরিকান তুলাবাহী জাহাজে অন্য কোন তুলার গাইট (Bale) বা তুলা দ্বারা তৈরী বস্ত্র আমদানি করা হইলে উহাও আমেরিকান তুলা হিসাবে গণ্য হইবে।

(৩) বিমান, পোস্ট অফিস বা কুরিয়ার সার্ভিসের মাধ্যমে অনধিক ১০ (দশ) কেজি আমেরিকান তুলার নমুনা আমদানি করা যাইবে।

(৪) উপ-বিধি (৩) এর অধীন আমদানিকৃত আমেরিকান তুলার ক্ষেত্রে সংশ্লিষ্ট বিমানবন্দর, পোস্ট অফিস বা কুরিয়ার সার্ভিস কর্তৃপক্ষ ছাড়করণের পূর্বে উহা পরীক্ষণ ও বিষবাঙ্গীকরণের জন্য উদ্ভিদ সংগনিরোধ কর্মকর্তার নিকট হস্তান্তর করিবে।

(৫) আমেরিকান তুলার ট্রানজিট বা ট্রানশিপমেন্টের ক্ষেত্রে আংশিক বা সম্পূর্ণ কনসাইনমেন্ট বন্দর এলাকায় বা বার্জে (Barges) খালাসের প্রয়োজন হইলে উহা বিষবাঙ্গীকরণের মাধ্যমে শোধন করিতে হইবে।

ব্যখ্যা।—“আমেরিকান তুলা” বলিতে উত্তর, দক্ষিণ ও মধ্য আমেরিকা এবং উহাদের সন্নিহিত দ্বীপসমূহে উৎপাদিত তুলাকে বুঝাইবে।

১৫। উদ্ভিদ স্বাস্থ্য সনদপত্রের আবেদন।—(১) রপ্তানিকারককে কোন উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি রপ্তানি বা পুনঃরপ্তানির উদ্দেশ্যে উদ্ভিদ স্বাস্থ্য সনদপত্রের জন্য কর্তৃপক্ষের নিকট, যথাক্রমে, ফরম-১৪ ও ফরম-১৫ অনুযায়ী আবেদন করিতে হইবে।

(২) পচনশীল দ্রব্যের রপ্তানির ক্ষেত্রে জাহাজীকরণের অনূন্য ১ (এক) দিন পূর্বে এবং অপচনশীল দ্রব্যের ক্ষেত্রে জাহাজীকরণের অনূন্য ১৫ (পনেরো) দিন পূর্বে উপ-বিধি (১) এর অধীন উদ্ভিদ স্বাস্থ্য সনদপত্রের জন্য আবেদন দাখিল করিতে হইবে।

(৩) কর্তৃপক্ষ, উপ-বিধি (১) এর অধীন আবেদন প্রাপ্তির পর, রপ্তানির জন্য উপস্থাপনকারী উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি পরীক্ষাক্রমে উহা বালাইমুক্ত হইলে এবং সংশ্লিষ্ট দেশের আমদানি অনুমতিপত্রে উল্লিখিত শর্তাবলি পূরণ করা হইলে, যথাক্রমে, ফরম-১৬ বা ফরম-১৭ অনুযায়ী উদ্ভিদ স্বাস্থ্য সনদপত্র ইস্যু করিবে, অন্যথায় উদ্ভিদ স্বাস্থ্য সনদপত্র ইস্যু না করিবার কারণ উল্লেখক্রমে উহা আবেদনকারীকে জানাইবে।

(৪) নিম্নবর্ণিত ক্ষেত্রে উদ্ভিদ স্বাস্থ্য সনদপত্র ইস্যু করা যাইবে না, যথা :—

(ক) বালাই আক্রান্ত বা সংক্রমিত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি হইতে সংগৃহীত অথবা ইহার সহিত সংমিশ্রিত উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি; এবং

(খ) কোন উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির কোন দেশে প্রবেশ করিবার বিষয়ে নিষেধাজ্ঞা থাকিলে, উক্ত দেশে রপ্তানির ক্ষেত্রে।

(৫) যে উদ্ভিদ বা উদ্ভিদজাত দ্রব্যের জন্য উদ্ভিদ স্বাস্থ্য সনদপত্র ইস্যু করা হইবে উহার সহিত অন্য কোন উদ্ভিদ বা উদ্ভিদজাত দ্রব্য মিশ্রিত বা প্রতিস্থাপন করা যাইবে না।

(৬) উদ্ভিদ বা উদ্ভিদজাত দ্রব্যের জাহাজীকরণের পূর্বে উদ্ভিদ সংগনিরোধ কর্মকর্তা যে কোন সময়ে উহা পুনঃপরীক্ষা করিতে পারিবেন এবং পরীক্ষার পর, উদ্ভিদ স্বাস্থ্য সনদপত্রের শর্ত ভঙ্গ করা হইয়াছে মর্মে নিশ্চিত হইলে বা উহাতে বালাই পাওয়া গেলে কনসাইনমেন্টটির জাহাজীকরণ বন্ধ করিয়া দিবেন এবং প্রয়োজনে :—

- (ক) কনসাইনমেন্টটি বাজেয়াপ্ত ও ধ্বংসের আদেশ প্রদান করিতে পারিবেন;
- (খ) রপ্তানিকারকের নিকট ফেরত প্রদানের জন্য আদেশ প্রদান করিতে পারিবেন;
- (গ) রপ্তানিকারককে কালো তালিকাভুক্ত করিতে পারিবেন; অথবা
- (ঘ) উদ্ভিদ স্বাস্থ্য সনদপত্র বাতিল করিতে পারিবেন।

(৭) কোনো উদ্ভিদ বা উদ্ভিদজাত দ্রব্য গন্তব্য দেশে নিষিদ্ধ না হইলে বহির্গামী যাত্রীর আবেদনের প্রেক্ষিতে উদ্ভিদ সংগনিরোধ কর্মকর্তা যাত্রীর সহিত বহনকৃত বা লাগেজের মাধ্যমে পরিবহনকৃত উদ্ভিদ বা উদ্ভিদজাত দ্রব্য পরীক্ষা-নিরীক্ষাক্রমে, প্রয়োজনে শোধনপূর্বক, উদ্ভিদ স্বাস্থ্য সনদপত্র ইস্যু করিতে পারিবেন।

১৬। উদ্ভিদ স্বাস্থ্য সনদপত্রের মেয়াদ ও সংশোধন।—(১) উদ্ভিদ স্বাস্থ্য সনদপত্রের মেয়াদ হইবে উহা ইস্যুর তারিখ হইতে ১৫ (পনেরো) দিন, তবে পচনশীল উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদির ক্ষেত্রে ২৪(চব্বিশ) ঘন্টা।

(২) রপ্তানিকারকের আবেদনের প্রেক্ষিতে নিম্নবর্ণিত কারণে উদ্ভিদ স্বাস্থ্য সনদপত্র সংশোধন করা যাইবে, যথা :—

- (ক) ইস্যুকৃত উদ্ভিদ স্বাস্থ্য সনদপত্র নষ্ট হইয়া বা হারাইয়া গেলে;
- (খ) ঠিকানা পরিবর্তন হইলে; বা
- (গ) গন্তব্য দেশ বা প্রবেশ পথ পরিবর্তন হইলে।

(৩) কর্তৃপক্ষ উপ-বিধি (২) এর অধীন আবেদনের প্রেক্ষিতে নূতন নম্বর সংবলিত উদ্ভিদ স্বাস্থ্য সনদপত্র প্রদান করিতে পারিবে।

১৭। প্রবেশ পথ ও বহির্গমন পথ।—উদ্ভিদ এবং উদ্ভিদজাত দ্রব্যাদি আমদানি ও রপ্তানির ক্ষেত্রে তপশিল-৫ এ বর্ণিত প্রবেশ ও বহির্গমন পথ ব্যবহার করিতে হইবে।

১৮। ফিস ও মাসুল।—আমদানিকারক, বা ক্ষেত্রমত, রপ্তানিকারককে উদ্ভিদ বা উদ্ভিদজাত দ্রব্য, উপকারী জীবাণু এবং প্যাকিং দ্রব্যাদির জন্য আমদানি অনুমতিপত্র, ছাড়পত্র, উদ্ভিদ স্বাস্থ্য সনদপত্র, বিষবাস্তীকরণ, শোধন, ইত্যাদির জন্য তপশিল-৬ এ উল্লিখিত হারে ফিস বা মাসুল ১-৪৩৩১-০০০০-২০৪৩ নম্বর কোডে জমা প্রদান করিতে হইবে।

১৯। অপসারণ, ধ্বংস, ইত্যাদির ব্যয়।—আমদানি অনুমতিপত্রের শর্ত লংঘন করিয়া কোন উদ্ভিদ বা উদ্ভিদজাত দ্রব্যাদি আমদানি করা হইলে উক্ত কোন কনসাইনমেন্টের অপসারণ, ধ্বংস অথবা প্রবেশোত্তর সংগনিরোধের জন্য প্রয়োজনীয় ব্যয় আমদানিকারককে বহন করিতে হইবে।

২০। রহিতকরণ ও হেফাজত।—(১) এই বিধিমালা কার্যকর হইবার সঙ্গে সঙ্গে Destructive Insects and Pests Rules, 1966, অতঃপর উক্ত Rules বলিয়া উল্লিখিত, এতদ্বারা রহিত করা হইল।

(২) উপ-বিধি (১) এর অধীন রহিত হওয়া সত্ত্বেও, উক্ত Rules এর অধীন—

- (ক) কৃত সকল কার্যক্রম বা গৃহীত ব্যবস্থা এই বিধিমালার অধীন কৃত বা গৃহীত হইয়াছে বলিয়া গণ্য হইবে:
- (খ) কোন কার্য অনিষ্পন্ন বা চলমান থাকিলে উহা এমনভাবে নিষ্পন্ন করিতে হইবে যেন উক্ত Rules রহিত হয় নাই।

Quarantine and Inspection Procedures

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Plant Quarantine Wing (PQW), Department of Agricultural Extension (DAE) is not only an important part of the Ministry of Agriculture but also a vital legislative wing for looking after the Plants and Plant Products-based trade compliances.

According to the IPPC (International Plant Protection Convention), it is under the functions of NPPO (National Plant Protection Organization) to inspect the consignments of plants moving in international trade and to examine the other regulated articles to prevent the introduction and/or spread of pests. Inspection is the most widely used phytosanitary measure and the total inspection procedure is supported by two specific International Standards for Phytosanitary Measures (ISPM NO. 23: Guideline for Inspection and ISPM NO: 31: Methodologies for Sampling of Consignments).

Definition

Import permit: Official document authorizing importation of a commodity in accordance with specified phytosanitary import requirements [FAO, 1990; revised FAO, 1995; ICPM, 2005]

Inspection: Official visual examination of plants, plant products or other regulated articles to determine if pests are present or to determine compliance with phytosanitary regulations [FAO, 1990; revised FAO, 1995; formerly “inspect”]

Inspector: Person authorized by a national plant protection organization to discharge its functions [FAO, 1990]

Additional declaration: A statement that is required by an importing country to be entered on a phytosanitary certificate and which provides specific additional information on a consignment in relation to regulated pests or regulated articles [FAO, 1990; revised ICPM, 2005; CPM, 2016]

Phytosanitary: An official paper document or its official electronic equivalent, consistent with the certificate model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements [FAO, 1990; revised CPM, 2012]

Point of entry: Airport, seaport, land border point, or any other location officially designated for the importation of consignments, or the entrance of persons [FAO, 1995; revised CPM, 2015]

Quarantine pest: A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled [FAO, 1990; revised FAO, 1995; IPPC 1997]

ISPM: International Standard for Phytosanitary Measures. An international standard adopted by the conference of FAO, the interim commission on phytosanitary measures established under IPPC.

Procedure for Import Permit (IP) and Approval

Applications are received online http://pqw.dae.gov.bd/dae_plant_quarantine/users/login in the specific format following Form-I [Rule 3(1)] and Form-II [Rule 3(2)]. The relevant technical staff will receive the application and after pre-scrutiny of the documents, the application is forwarded to the relevant desk officers in turn for further checking and approval. After successful completion and submission of the required information, an Import Permit is issued under Form-III [rule 3(3)(a)] subject to the prerequisite conditions as well as a required additional declaration in the Import Permit. Such as:

1. The consignment is to be imported within four months of the date of issue of this permit.
2. The consignment is accompanied by a Phytosanitary Certificate from the country of origin (by the competent authority), and of re-export if applicable, declaring the plants or plant products to be free from injurious pests or to have been rendered free from injurious pests by effective fumigation or other treatment.
3. On arrival of the consignment, it will be examined and will only be released if found to be free from injurious pests, otherwise it may be fumigated or otherwise treated as deemed necessary by the examining Plant Quarantine Officer stationed at, or may be returned to the consignor, or may be seized and destroyed following the Plant Quarantine Act, 2011, if not complying with the import conditions. All relevant expenses for such treatment will be borne by the importer.
4. Additional conditions to be stated on the Phytosanitary Certificate.

For Research and educational purposes, the IP is issued Subject to the following conditions:

- a. The consignment is to be imported within four months of the date of this permit.
- b. The consignment shall be free from soil, weed seeds, and plant debris.
- c. The consignment shall be accompanied by a Phytosanitary Certificate from the country of origin by the competent authority, and re-export if applicable with additional declarations that the pest(s) specified below do not occur in the country of origin or that the consignment is free from these pest(s):
(i) (ii) (iii)
- d. On arrival of the consignment, it shall be duly examined by a Plant Quarantine Officer, and if the accompanying Phytosanitary Certificate conforms to the requirements as outlined in the Import Permit, the consignment shall be considered fit for release.
- e. Samples shall be drawn from the consignment for laboratory tests and post-entry quarantine following standard diagnostic procedures and protocols.

Procedure for Release Order (RO)

4.1 Receipt of application

The imported products can be entered into one or several consignments. After entering the full consignment or partial consignments, the importer is needed to apply for RO for releasing the Imported Plants or Plant Products under Form IX [Rule 9(1)] online by submitting the prescribed fees and providing relevant information. The application for the release order was submitted to the specific point of entry as mentioned in IP. In case of emergency, the point of entry can be changed for valid reasons according to legislation.

4.2 Verification of Application

A pre-scrutiny desk verifies the information of the application and attached documents in the online submission. If necessary, the desk officer backward the application for any deficiencies and ensured that appropriate corrections are incorporated.

4.3 Checking documents

Inspector shall verify all documents delivered by the importer/agent. Essential documents are:

- i. PC and documents attached to it.
- ii. Import permit (IP), if applicable.
- iii. Trade documents (freight documents, contract between exporter and importer, and bill of sale).

The purpose is to compare the different sources of information and conclude on the credibility of PC paying attention to the following:

- i. That the certificate is an original print and has a serial number given by Plant Protection Service of exporting country. If it is a copy of the original one, it shall be confirmed by signature and stamp of exporting country's Plant Protection Service. Copy of original certificate may be accepted if properly justified as why to the original certificate is not attached to the consignment.
- ii. That if the changes are made after the PC is first issued, those possible changes have been verified by the signature and date of the authorized inspector in the country of export.
- iii. That the detailed information given in PC is the same as in import permits, inspection applications, and trading documents.
- iv. That there are no stipulated restrictions or conditions concerning the country of origin.
- vi. That the requested treatments are indicated in the certificate.
- vii. That the additional declaration is in compliance with import requirements.
- viii. That the certificate dated, signed, and stamped by an authorized inspector, are original.
- ix. That the time period between the date in the certificate and arrival of the consignment is reasonable and consistent with the time required to transit.

- x. That the consignment has passed some country or several countries without being exposed to pest infestation/ split into smaller parts/ having packing changed. If the consignment imported has passed through some country where it has been inspected and perhaps stored, split into smaller parts and re-packed, and then arrives at the check-post, it shall have both re-export certificate) and original PC.

If there are no relevant discrepancies or there is no reason to believe non-compliance with the consignment, the inspection for checking the identity will be carried out.

4.4 Identity checking

The purpose of identity checking is to verify the consignment consists of material as indicated in the PC and other important documents. Inspector shall verify:

- i. plant species and, if possible, varieties,
- ii. quantities in consignment, and compare with the information in documents,
- iii. register numbers of containers, and information concerning the transport vehicles (identification numbers of railway wagons, registration numbers of transport vehicles).

4.5 Plant Quarantine Inspection

The scrutinized application after the prescribed payment of the fee will be forwarded to the Quarantine Entomologist/ Pathologist for further checking and allotting the officer for Inspection.

The Importers or their agents arrange the inspection of the consignment. The Plant Quarantine Inspector verifies the identity of the consignment (In case of Sea Port: The container no and the seal no mentioned in the BL; In case of Airport: Unique Load Device which is checked by airlines authority and send the Plant Products to the specific shed and In Case of Land Port: The vehicle passes for product identification) imported as per document received through online/manual and carry out Plant Quarantine Inspection. During the inspection, the inspector does a visual inspection, draws samples (In a prescribed format for specific entry points and after labeling properly sends the sample for further laboratory test as per requirements.

Inspectors also go for necessary treatment at the point of entry if required.

It is also the responsibility of the inspector to submit an online inspection report on the same day of inspection. The consignment shall be made free from restrictions and accepted to be imported.

- i. if the pest or disease detected is not of quarantine concern,
- ii. if suitable disinfestations treatment has been imparted,
- iii. if infested parts are eliminated from uninfected ones, in case possible, and
- iv. if the material is found free from pests during post-entry growing.

Upon receipt of the inspection report and sample from the inspector, the QE/QP sends the sample for further laboratory tests, if necessary, or sends the approval desk for approval.

If a lab test is needed, after completion of the laboratory test, the lab officer submits the lab report to the QE/QP.

Subsequent to the laboratory test result, the QE/QP forward the recommendation of approval to the next desk. After authorization from the approval desk and signing the document, the Release Order is generated online with a verification code. This document can be used by Customs Authority for additional administering.

4.6 Maintenance of records

Application for import inspection, the IPs, inspection form, decisions made by an inspector using different forms, permission to transfer consignment to another place from point of entry, PC attached to imported consignment and decisions concerning destruction or treatment of infested commodities, and other documents linked with inspected consignment shall be maintained in NPPO headquarters. The maintenance of the record will be both in the form of an electronic version and the Import Certification Register.

Guidelines for Inspection

According to ISPM 23 (Adopted 2005; published 2019), the objective of inspection of consignments is to confirm compliance with import or export requirements relating to:

- i. Quarantine pests or regulated non-quarantine pests.
- ii. Measures were taken at a previous stage in time.
- iii. An Import inspection ensures the consignment meets specified phytosanitary requirements of the country according to legislation.

NPPO (Director, Plant Quarantine Wing) is responsible for inspection. The result of the inspection contributes to the decision to be made as to whether the consignment meets the import conditions for release. The use of inspection as a means to detect the presence of pests in a consignment is based on the pests of concern, or the signs or symptoms they cause, are visually detectable. Again, the technical requirements for inspection involve three distinct procedures.

First of all, the examination of documents associated with a consignment, then the verification of consignment identity or integrity, and finally the examination for pest and other phytosanitary requirements. Examination of documents associated with a consignment means that may be complete or consistent or accurate or valid and not fraudulent.

Equipment for inspection

For the proper inspection, PQW needs to have the following items:

- i. Magnifying glass
- ii. Illuminating glass
- iii. Knives
- iv. Paintbrush to pick up insects
- v. Tweezers
- vi. Flashlight or torch

- vii. Sampling spears or triers
- viii. Inspection Table
- ix. Shaker box
- x. Waterproof aprons
- xi. Plastic gloves
- xii. Vials and plastic bags for samples
- xiii. Weighing balance
- xiv. Moisture meter
- xv. Compound microscope
- xvi. Stereo binocular microscope
- xvii. Digital handy microscope
- xviii. Refrigerator

In addition, The Director, PQW shall also develop enhanced laboratory facilities with some equipment/ reagents as decided by the NPPO for further laboratory tests.

Sampling of Fruits, Berries, and Vegetables as per PQR’2018; Schedule:4

All imported consignments shall be inspected. Each plant species and variety are inspected separately. Products are usually transported in wooden or cardboard cages. Pay attention to possible soil or debris in the bottom of cages and on packaging material (hay, plant material, etc). Some fruits and vegetables (tomato, cucumber, melons, etc) may be attached with leaves or stems, which may be infested by insects or diseases.

It is important that the sample is a good representative of the whole shipment. Keep in mind that in containerized shipments, a trader may put the cleanest boxes in the track section of the container.

Number of units (cages etc.)	Number of units to be sampled for inspection
Less than 10	All units
11 – 100	20% or at least 10
101-1000	5% or at least 20
More than 1000	2 % or at least 50

Seed for propagation (Sampling)

The sampling of the seed for propagation shall be in accordance with the sampling procedures prescribed by International Seed Testing Association (ISTA) Rules, 2022, Sampling regime for seed lots in bulk.

Minimum number of primary samples to be taken from seed lots in consignment or from seed streams

Seed lot size (bulk)	Number of primary samples to be taken
Up to 500 kg	At least five primary samples
501–3000 kg	One primary sample for each 300 kg, but not less than five
3001–20 000 kg	One primary sample for each 500 kg, but not less than 10
20001 kg and above	One primary sample for each 700 kg, but not less than 40

Phytosanitary Certification: Documentation and Processes

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Phytosanitary certificate

An official paper document or its official electronic equivalent, consistent with the model certificates of the IPPC, attesting that a consignment meets phytosanitary import requirements.

ISPM No. 12 Guidelines for Phytosanitary Certificates

Specific Principles and Guidelines for Preparation and Issue of Phytosanitary Certificates

Phytosanitary certificates and phytosanitary certificates for re-export should include only information related to phytosanitary matters. They should not include statements that requirements have been met and should not include references to animal or human health matters, pesticide residues or radioactivity, or commercial information such as letters of credit. To facilitate cross-referencing between the phytosanitary certificates and documents not related to phytosanitary certification (e.g. letters of credit, bills of lading, CITES certificates), a note may be attached to the phytosanitary certificate which associates the phytosanitary certificate with the identification code, symbol or number(s) of the relevant document(s) which require cross-referencing. Such a note should only be attached when necessary and should not be considered an official part of the phytosanitary certificate. All components of the phytosanitary certificates and phytosanitary certificates for re-export should normally be completed. Where no entry is made, the term "None" should be entered or the line should be blocked out (to prevent falsification).

Requirements for completing the phytosanitary certificate

(Headings in bold refer to the components of the model certificate) The specific components of the phytosanitary certificate are explained as follows:

No. _____ This is the certificate identification number. It should be a unique serial number associated with an identification system that allows "trace-back", facilitates audits and serves for record keeping.

Plant Protection Organization of _____

This component requires the name of the official organization and the name of the country that is issuing the certificate. The name of the NPPO may be added here if it is not part of the printed form.

TO: Plant Protection Organization(s) of _____

The name of the importing country should be inserted here. In cases where the shipment transits through a country which has specific transit requirements, including the need for phytosanitary certificates, the names of both importing country and country of transit may be inserted. Care should be taken to ensure that the import and/or transit regulations of each country are met and appropriately indicated. In cases where the shipment is imported and re-exported to another country, the names of both importing countries may be inserted, provided the import regulations of both countries have been met.

Section I. Description of Consignment

Name and address of exporter: _____

This information identifies the source of the consignment to facilitate "trace back" and audit by the exporting NPPO. The name and address should be located in the exporting country. The name and address of a local exporter's agent or shipper should be used, where an international company with a foreign address is the exporter.

Declared name and address of consignee: _____

The name and address should be inserted here and should be in sufficient detail to enable the importing NPPO to confirm the identity of the consignee. The importing country may require that the address be a location in the importing country.

Number and description of packages: _____

Sufficient detail should be included in this section to enable the NPPO of the importing country to identify the consignment and its component parts, and verify their size if necessary. Container numbers and/or railcar numbers are a valid addition to the description of the packages and may be included here, if known.

Distinguishing marks: _____

Distinguishing marks may be indicated at this point on the phytosanitary certificate, or else on a stamped and signed attachment to the certificate. Distinguishing marks on bags, cartons or other containers should be included only where they assist in identifying the consignment. Where no entry is made, the term "None" should be entered or the line should be blocked out (to prevent falsification).

Place of origin: _____

This refers to place(s) from which a consignment gains its phytosanitary status, i.e. where it was possibly exposed to possible infestation or contamination by pests. Normally, this will be the place where the commodity was grown. If a commodity is stored or moved, its phytosanitary status may change over a period of time as a result of its new location. In such cases the new location may be considered as the place of origin. In specific circumstances, a commodity may gain its phytosanitary status from more than one place. In these cases where pests from one or more place may be involved, NPPOs should decide which place or places of origin most accurately describe the situation which has

given the commodity its phytosanitary status. In such cases, each place should be declared. It is noted that in exceptional cases, such as with mixed seed lots that have more than one country of origin it is necessary to indicate all possible origins.

Countries may require that “pest free area,” “pest free place of production,” or “pest free production site” be identified in sufficient detail in this section. In any case, at least the country of origin should be indicated.

Declared means of conveyance: _____

Terms such as “sea, air, road, rail, mail, and passenger” should be used. The ship’s name and voyage number or the aircraft’s flight number should be included if known.

Declared point of entry: _____

This should be the first point of arrival in the country of final destination, or if not known, the country name. The point of entry of the first country of importation should be listed where more than one country is listed in the “TO:” section. The point of entry for the country of final destination should be listed in cases where the consignment only transits through another country. If the country of transit is also listed in the “TO:” section, the points of entry into the transit country as well as the final destination country may be listed (e.g. point A via point B).

Name of produce and quantity declared: _____

The information provided here should be sufficiently descriptive of the commodity (which should include the commodity class, i.e. fruit, plants for planting, etc.) and the quantity expressed as accurately as possible to enable officials in the importing country to adequately verify the contents of the consignment. International codes may be used to facilitate identification (e.g. customs codes) and internationally recognized units and terms should be used where appropriate. Different phytosanitary requirements may apply to the different end uses (for example, consumption as compared to propagation) or state of a product (e.g. fresh compared to dried); the intended end use or state of the product should be specified. Entries should not refer to trade names, sizes, or other commercial terms.

Botanical name of plants: _____

The information inserted here should identify plants and plant products using accepted scientific names, at least to genus level but preferably to species level.

It may not be feasible to provide a botanical description for certain regulated articles and products of complex composition such as stock feeds. In these cases, NPPOs should agree bilaterally on a suitable common name descriptor, or the words “Not applicable” or “N/A” may be entered.

Certifying statement

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.

Section II. Additional Declaration

Additional declarations should be only those containing information required by the importing country and not otherwise noted on the certificate. Additional declarations should be kept to a minimum and be concise. The text of additional declarations may be specified in, for example, phytosanitary regulations, import permits or bilateral agreements. Treatment(s) should be indicated in Section III.

Section III. Disinfestation and/or Disinfection Treatment

Treatments indicated should only be those which are acceptable to the importing country and are performed in the exporting country or in transit to meet the phytosanitary requirements of the importing country. These can include devitalization and seed treatments.

Stamp of organization

This is the official seal, stamp or mark identifying the issuing NPPO. It may be printed on the certificate or added by the issuing official upon completion of the form. Care should be taken to ensure that the mark does not obscure essential information.

Name of authorized officer, date and signature

The name of the issuing official is typed or hand-written in legible capital letters (where applicable). The date is also to be typed or hand-written in legible capital letters (where applicable). Only abbreviations may be used to identify months, so that the month, day and year are not confused. Although portions of the certificate may be completed in advance, the date should correspond to the date of signature. Certificates should not be post- or pre-dated, or issued after dispatch of the consignment unless bilaterally agreed. The NPPO of the exporting country should be able to verify the authenticity of signatures of authorized officers upon request.

Financial liability statement

The inclusion of a financial liability statement in a phytosanitary certificate is optional.

Unacceptable certificates

Importing countries should not accept certificates that they determine to be invalid or fraudulent. The issuing authorities should be notified as soon as possible regarding unacceptable or suspect documents (see ISPM No. 13: Guidelines for the notification of non-compliance and emergency action). The NPPO of the exporting country should take corrective action when necessary and maintain systems for vigilance and security to ensure that a high level of confidence is associated with phytosanitary certificates issued by that authority.

Invalid phytosanitary certificates

Reasons for rejecting a phytosanitary certificate and/or for requesting additional information include:

- illegible
- incomplete
- period of validity expired or not complied with
- inclusion of unauthorized alterations or erasures
- inclusion of conflicting or inconsistent information
- use of wording that is inconsistent with the model certificates herein
- certification of prohibited products - non-certified copies.

Fraudulent certificates

Fraudulent certificates include those:

- not authorized by the NPPO
- issued on forms not authorized by the issuing NPPO
- issued by persons or organizations or other entities that are not authorized by NPPO
- containing false or misleading information.

Government of the People's Republic of Bangladesh
Ministry of Agriculture
Department of Agricultural Extension
Plant Quarantine Wing

Form IX



VALID FOR SHIPMENT WITHIN 24 HOURS FROM THE
DATE OF ISSUE FOR PERISHABLE GOODS



PC - 0388621

Place of Issue HAZRAT SHAHJALAL
INTERNATIONAL
AIRPORT, DHAKA

PHYTOSANITARY CERTIFICATE

Rule 27(3)

To : The Plant Protection Organization of SAUDI ARABIA

Date Inspected 27 FEB. 2024

I. Description of the consignment

Name and address of exporter : OMAR FARUK TRADE INTERNATIONAL, SAHARA CENTER 4TH
FLOOR, 37/A, KAKRAIL VIP ROAD, DHAKA-1000, BANGLADESH.

Declared name and address of consignee : THAFIRAH AHMED FOR FOOD EST. P.O BOX
NO:-50917, KHAMIS, MUSHAYAT K.S.A

Number and description of packages : 283 CARTOON

Distinguishing mark : DLO. HMD.CIP

Place of origin : BANGLADESH

Declared means of conveyance : By AIR

Declared point of entry : JEDDAH, KSA

Name of produce and quantity declared : FRESH FRUITS & VEGETABLES, 2600.000 KG

Botanical name of plant : SEE LIST PRINTED ON REVERSE SIDE

This is to certify that the plant & 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 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 None

Chemical (active ingredient) and concentration None

Duration of exposure and temperature None

Additional information None

WARNING : Any alteration, forgery, or unauthorized use of this phytosanitary certificate is punishable with imprisonment for a term not exceeding 2 (two) years, or with a fine not exceeding BDT 5,00,000 (five lac) or with both, (Section 31 of Plant Quarantine Act, 2011).



Name of authorised officer :

Date of Issue 27 FEB. 2024

Signature :

Shahjahan Seraj (2032)
Deputy Director
Plant Quarantine Station
Hazrat Shahjalal International Airport

This certificate shall be attached to the Ministry of Agriculture or the Department or to any of its Officer or representative with respect to the certificate.

Sample of Phytosanitary Certificate (PC) issued by PQW, DAE, MoA, Bangladesh

Public-Private Partnerships in Phytosanitary Measures

Dr. Md. Saleh Ahmed
CABI Country Representative in Bangladesh
CAB International

Over recent years, increased attention has focused on the role and potential of partnerships between the public and private sector (PPPs) to promote investment, improve food safety, animal and plant health, and facilitate trade. Partnerships engage stakeholders in collective action based on shared objectives. The goal is to achieve more together, than would be possible alone, and to improve the effectiveness of the results generated. Experiences indicate that countries with more capacity to manage sanitary and phytosanitary (SPS) risks have a better understanding of the importance of close cooperation between the various public and private sector stakeholders involved and are proactive in developing and implementing collaborative initiatives and partnerships.

What is public and private sector partnership?

General. A Public-Private Partnership (PPP) is a partnership between the public sector and the private sector for the purpose of delivering a project or a service. PPPs strengthen the implementation of SPS measures, improve SPS outcomes, enhance market access and promote competitiveness. At the basic level, successful PPPs depend upon commitment and trust; clarity about the partnership's objectives, responsibilities and financing; good governance and transparency; and high-level leadership.

What are PPPs and who is involved?

Public-private partnerships have been defined as a “collaborative venture between the public and private sectors built on the expertise of each partner that best meets clearly defined goals through the appropriate allocation of resources, risks and rewards”. These arrangements generally entail “reciprocal obligations and mutual accountability, voluntary or contractual relationships, the sharing of investment and reputational risks, and joint responsibility for design and execution”.

Depending on the context, different stakeholders play the driving role in the emergence and development of partnerships in the area of agricultural development, trade and SPS. In some instances, especially where government agencies in developing countries are particularly weak, development partners and donor governments have taken on the role of the “public sector” to complement the role of local government agencies.

In a number of countries, both developed and developing, PPPs have been triggered by governments to get the private sector more involved in addressing specific challenges, and/or to strengthen public-private collaboration. Significant developments and innovations in such PPPs have occurred in several countries. Some of these PPPs were created to address specific challenges, such as outbreaks of plant pests or animal diseases or trade embargoes, or to comply with SPS requirements in importing countries.

Others address strategic issues such as better implementation of SPS national policies and regulation, or improved market positioning, and have a more medium to long-term duration.

Most PPPs in the SPS area involve public and private actors based in the same country. Although less common, transnational PPPs that involve stakeholders from more than one country also exist. An interesting example was the trilateral agricultural partnership created in 2002 by the governments of The Netherlands, Malaysia and Indonesia. The objective was to enhance market access through capacity building and to identify and address bottlenecks in the production chains for palm oil, shrimp and fruits and vegetables.

Categories of partnerships in PPPs

Several bilateral donors and international organizations engage in partnerships with the private sector to promote, among other goals, economic development and poverty reduction in developing countries. These partnerships have been categorized into five major types of collaboration:

- (i) mechanisms that help businesses in finding business partners in development countries or implementing partners for development projects;
- (ii) funding mechanisms that provide financial support to companies' investments in development countries;
- (iii) programmes that offer technical support to companies;
- (iv) initiatives that promote knowledge sharing, policy dialogue or advocacy; and
- (v) programmes through which businesses can directly contribute to bi- or multilateral development projects (DCED, 2010).

Some examples of these types of partnerships supported by donors and development agencies are presented below.

- a). The German Federal Ministry for Economic Cooperation and Development (BMZ)
- b). The Danish International Development Agency (DANIDA) initiated its Public Private Partnership (PPP) Programme in 2004 in response to the recommendations of the World
- c). The Ministry of Foreign Affairs in The Netherlands, and
- d). United States Agency for International Development (USAID).

Functions of PPPs

Some of the PPPs have a number of different functions and could therefore fit in more than one category.

- **SPS dialogue, networking and coordination:** PPPs in this category bring together representatives of the public and private sector in informal or formal mechanisms to discuss and/or proactively address crosscutting or specific (e.g. food safety/Codex) SPS issues. Some of these PPPs operate at the national level, for instance, as committees focused on cross-cutting or broad SPS issues or particular subjects such as the Market Access Working Group for Fresh Fruits and Vegetables (FFV) in South Africa.

- **SPS infrastructure:** Partnerships have traditionally been instrumental in the provision of goods and services that have public goods aspects, for example roads, ports, irrigation and other infrastructure. Partnerships exist also for the provision of SPS infrastructure, such as diagnostic laboratories in Chile and Uganda, and SPS check-points in Mexico, as well as infrastructure for cold storage and food processing.
- **Value chain development:** This category of partnerships brings together private and public sector stakeholders with an interest in increasing capacity to address issues affecting a particular value or supply chain, such as horticulture products in Kenya or tomatoes in Mexico, to expand production and increase exports. Often these partnerships address a range of issues including, but not limited to, SPS requirements.
- **Trade facilitation:** Facilitating trade is about streamlining and simplifying international trade procedures to allow for easier flow of goods and trade at both national and international level (OECD). Broadly defined, trade facilitation refers to at-the-border and behind-the-border measures, which make trade easier, less costly and more efficient. The SPS partnerships in this category typically focus on SPS documentation and transparency in the operations of regulatory agencies and customs, such as electronic certification or traceability.
- **Joint public-private companies for SPS implementation:** In some cases, public and private sector actors have established non-for-profit companies that are jointly financed by government and industry. They are generally highly developed and sophisticated PPPs, based on legally binding agreements, responsible for the planning and delivery of a range of SPS functions.

The Partnership Cycle

Phase 1: Identifying a common interest. In the SPS area, as in agricultural research and development, the “point of departure” is normally the identification of a technical problem or technological or market opportunity to be resolved or addressed. At the outset, the stakeholders involved need to discuss and define their common interest(s). These interests may change as the partnership develops and membership changes.

Phase 2: Designing the partnership (negotiating the partnership contract). During this phase, the partners involved review the goal of the partnership and the interests and capabilities of the potential partners. Attention focuses on how the partnership will operate in terms of governance and organizational design, finance and legal arrangements, as well as the specific partnership activities. Some of the key questions considered include: (i) funding needs and sources, and the contributions of each of the partners involved; (ii) distribution of benefits and profits (if appropriate); (iii) structure and organization of the partnership including processes for decision-making and communications; (iv) specific activities to be carried out. These discussions may result in a formal (e.g. contract or MOU) or informal agreement among the partners involved.

Phase 3: Operation of the partnership. Based on the agreement reached in the preceding phase, the partnership is operationalized.

Phase 4: Monitoring and evaluation. The partnership may be evaluated for a number of different reasons, for instance, to justify the use of the funds, to understand whether the expected results were generated and how efficiently, etc.

Phase 5: Termination or continuation. After evaluating the partnership and examining whether the expected results have been achieved, the partners must decide whether to continue or to terminate the partnership. The partnership may be continued where the partners' original interests have been broadened and consolidated or where the initial problem has not yet been resolved. On the other hand, it may be terminated if the partners believe that it has satisfactorily achieved the desired results or if they determine that the initial goals cannot be attained without incurring additional, prohibitive costs. (Hartwich et al., 2007).

Public-Private Partnerships in support of enhanced SPS capacity

Public and private sector stakeholders design and implement SPS measures to protect against food safety, animal and plant health risks for domestic purposes, and to facilitate access to external agri-food markets. SPS measures intended to protect human, animal or plant life or health against risks arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms; or to protect human or animal health against risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; or otherwise, to prevent or limit damage from the entry, establishment or spread of pests.

Effective implementation of SPS measures requires capabilities and competencies in the public and private sector, as well as good communication and collaboration between the various public sector organizations involved, and with the private sector. Typically, governments are responsible for the establishment and oversight of an enabling regulatory framework for food safety, animal health, veterinary services, plant health and/or trade, and for ensuring the compliance of agri-food exports with SPS requirements of trading partners. Ultimately, it is the private sector that plays the leading role in food and agricultural production and trade, and that is responsible for meeting SPS requirements in export markets.

Preconditions for successful PPPs

The preconditions for successful PPPs includes the following.

- Ownership, commitment and trust of the key stakeholders involved.
- Identification of a common interest, agreement on clear objectives and alignment of expectations
- Clarity on how the PPP will be implemented and managed, including the roles, responsibilities and obligations of the stakeholders involved.
- Good governance and transparency.

- High-level support, leadership and capable partners; and
- Clarity on the financial costs and contributions required. Donors and development partners can play a useful role in some cases in facilitating the emergence and/or operation of PPPs. However, it is crucial to ensure that partnerships are firmly based on local demand and the full commitment of the relevant public and private sector stakeholders for them to remain relevant and sustainable.

Partnerships allow public and private sector stakeholders to combine their expertise to share the risks and costs of designing, implementing and maintaining activities to improve SPS compliance. While they are by no means a panacea, when well-designed and managed, experiences show that they can enhance the delivery and quality of SPS public goods. Given the extent of SPS capacity constraints in many developing countries, and the insufficiency.

Conclusions and recommendations

Conclusion

- SPS compliance is a shared responsibility
- Value of PPPs (stimulate innovation, leverage knowledge/resources, address infrastructure deficits, etc.)
- PPPs require capacity, leadership, resources and government should take proactive role
- Contribution of SPS capacity to agricultural production, economic growth, food security

Recommendation

- Creation of a favourable, enabling environment
- Identification of a common interest and win-win situation
- Existence of clear institutional and management arrangements
- Agreement on the resources needed
- Transparency and effective communications
- Monitoring and evaluation of performance and results

Basic Rules for Food Safety and Plant Health Standards

Dr. Md. Monirul Islam,
Ex-Member Director (Fisheries)
BARC

Bangladesh, a country predominantly reliant on agriculture, has successfully attained self-sufficiency in cereal production and holds significant global rankings in the production of rice, vegetables, fish, mangoes, and potatoes. However, despite recent improvements in nutritional status, a considerable number of five-year-old children in the nation suffer from stunted growth and wasting. As per the collaborative report titled Extent and Trends of Child Malnutrition by UNICEF, the World Health Organization, and the World Bank in May 2023, the prevalence of stunting and wasting among five year olds is 26 percent and 9.8 percent, respectively.

It's imperative for individuals to prioritize nutrition when considering food choices, particularly focusing on safe food consumption for a healthy and disease-free life. However, the relentless pressure to increase food production due to population growth has led to concerns about food safety. This has resulted in widespread worries, anxiety, and confusion among the public, distinguishing between what is true and what is false.

Various controversies surround the safety and quality of food items in the public mind. Despite many chemicals being harmless when used within approved limits, there exists a pervasive fear among the public regarding their use. This paper aims to elucidate whether such fears are founded in truth or merely rumors. Furthermore, it underscores the importance of considering the quality of household and personal care products, such as cosmetics, dyes, lipstick, instant henna, and plastic products, to ensure overall safety and well being.

Notably, Food safety involves a set of practices and roles to ensure that food is handled, prepared, and stored in a way that minimizes the risk of contamination and protects consumer health. Here is a summary of basic food safety roles:

1. Food Handlers/Cooks

- Emphasize personal hygiene and proper hand washing.
- Adhere to safe food handling and temperature control practices.
- Use separate tools for raw and cooked foods.

2. Managers/Supervisors

- Implement and enforce food safety policies.
- Provide staff training and monitor compliance.
- Conduct regular inspections to identify and address hazards.

3. Kitchen Staff

- Maintain a clean kitchen and prevent cross-contamination.
- Follow FIFO principles for inventory rotation.
- Report and address pest issues promptly.

4. Wait staff/Servers

- Serve food using sanitary practices.
- Communicate customer dietary needs to the kitchen.
- Address and report customer complaints promptly.

5. Cleaning Staff

- Regularly clean and sanitize surfaces and equipment.
- Dispose of waste properly and follow cleaning schedules.

6. Quality Assurance/Health Inspectors

- Conduct inspections to ensure compliance.
- Investigate complaints and guide corrective actions.

7. Farmers/Producers

- Implement good agricultural practices for raw ingredients.

8. Government Regulators

- Develop and enforce food safety regulations.
- Inspect establishments and respond to outbreaks.

It is noted that that collaboration among these roles is crucial to uphold food safety standards and protect both the industry and consumers.

Challenges to Ensuring Safe Food

1. Changes in Food Production and Consumption
2. Changes in Environment and Development
3. Poverty and Pollution
4. Travel and Migration
5. Trade in Food, Feed, and Animals
6. New and Emerging Pathogens
7. Antimicrobial Resistance
8. Increase in Street Food
9. Education and Promotion of Food Safety
10. Surveillance and Monitoring
11. Uncontrolled Urban Growth

Increased Foodborne Outbreaks Due to

1. The Emergence of New Foodborne Pathogens
2. Imported Foods
3. Composition of Food
4. Takeout Meals
5. Changing Demographics
6. Lack of Food Safety Management Systems in Small Operations

Additional Challenges to Ensure Safe Food Include

1. Time and Money
2. Language and Culture
3. Literacy and Education
4. Unapproved Suppliers
5. High-risk Customers
6. Staff Turnover

Challenges in the Fishery Sector

1. Genetic Degradation in Carp and Other Farmed Fish Species
2. Decline in the Growth of Inland Open Water Fisheries
3. Depletion of Resources and Degradation of Public Water Bodies and Habitat
4. Low Productivity of Aquaculture Fish and Brackish Water Shrimp
5. Limited Diseases Diagnostic and Research Facilities
6. Microbeads (Environmental Degradation)
7. Hormones/Additives Use

Challenges in the Livestock Sector

1. Restriction of Breeds and Livestock Breeding Programmes
2. Inappropriate Organizational Setup with Inadequate Extension Manpower
3. No Land Earmarked for Animal Grazing and Fodder Production
4. Inadequate Animal Health Care Services
5. Limited Diseases Diagnostic and Research Facilities
6. Preponderance of Emerging and Re-emerging Diseases
7. Shortage in Preventive and Curative Inputs Supply
8. Increasing Population and Food Safety Issues
9. Poor Investment and Weak Value Chain, Weak Research-Extension Linkages

Rumors and Panic Surrounding Chemicals Used in Food Items

Fruits, Fish, and Formalin

Formalin, a chemical often associated with food safety concerns, is highly soluble in water and volatile. When it comes to fruits and vegetables, which are fibrous foods, formalin gradually evaporates due to its volatile nature. Interestingly, various fruits and vegetables naturally produce glucose, fructose, and formaldehyde, which contribute to their own preservation process. Moreover, formaldehyde is naturally present in various fruits and vegetables at average levels ranging from 3 to 60 mg/kg, as per the World Health Organization (WHO). Upon entering the body, formaldehyde reacts with tissue, primarily the skin, and is converted into less toxic formic acid or formate. Approximately 70% of formaldehyde is rapidly excreted from the body through urine, while the remaining portion (30%) is converted into carbon dioxide and exhaled through respiration. Given its rapid decomposition in the metabolic process, formaldehyde is not significantly absorbed by the body or released into the environment.

Notably, according to the standards set by the European Union Food Safety Authority (EFSA), individuals can safely consume 100 parts per million (ppm) of formalin daily without encountering any health hazards. Typically, sea fish and fresh water fish contain 1-40 mg/kg of naturally occurring formaldehyde, with sea fish containing 1.4-7.35 micrograms/gram. However, in of 1985, the Italian Ministry of Health Authority set maximum allowable levels of formaldehyde in fish and shrimp consumption at 60 and 10 micrograms per kilogram ($\mu\text{g}/\text{kg}$), respectively. Furthermore, according to the US Food and Drug Administration (FDA), individuals can safely consume up to 0.2 micrograms of formalin per gram of body weight per day without posing any health risks.

Fruits and Ripening Chemicals

Ethepon is a chemical widely used worldwide for ripening fruits, and it is considered extremely safe. During ripening, various fruits naturally produce small amounts of ethylene gas, which activates genes within the fruit, leading to changes in color, sweetness, and texture as the fruit ripens.

Research findings indicate that both laboratory-sprayed samples (ranging from 250 to 10,000 ppm) and samples from marketed/farmers' field (banana, papaya, tomato, mango, etc.) showed rapid removal of ethylene from the applied fruit bodies after application. Within 24 hours, the residue levels of ethepon fell below the maximum intake level (2 ppm) prescribed for human consumption.

Apart from Maximum Residue Limits (MRLs), the harmful effects of ethepon also depend on the Acceptable Daily Intake (ADI) level. According to the recommendations of CODEX/FSSAI, a person can consume up to 0.05 ppm per kg of body weight per day without any health risk. For instance, if a person weighs 60 kg, they can safely consume a maximum of (60×0.05) 3 ppm of ethepon per day. Therefore, if a fruit contains 0.50 ppm of ethepon residue per kg, a person would need to consume at least 6 kg of fruit per day to exceed the recommended intake level.

Chemical Uses in Apples and Grapes

1. Waxes in Horticulture Crops: Fruits and vegetables, categorized as horticulture crops, contain a high percentage of water (40-96%). To prevent weight loss during storage, widely used waxes are applied. Paraffin Wax or Edipeel is commonly used to protect against disease-causing organisms, maintain gloss, guard against fungal attacks, facilitate long-term storage, prevent sensitivity during cold storage, and protect against moisture loss and external injuries. There are no health risks associated with the waxes used in apples.

2. Natural Coating on Grapes: The white powdery substance sometimes found on grape skins is entirely natural and known as bloom, blush, or old dust. This coating, composed of *Saccharomyces cerevisiae* (yeast), acts as a natural barrier, protecting grapes from rotting, spiders, and moisture. Additionally, it aids in the initial stages of fermentation during winemaking. Similar coatings can also be observed on palm fruits.

It's a common mistake to wash grapes immediately after purchase, as this can reduce their shelf life. Grapes are humidity-friendly but not moisture-friendly. Therefore, it's advisable to wash only the required amount before consumption to maintain their freshness for longer.

Vegetables and Pesticides: Analysis of Raw, Washed, and Cooked Samples

It's notable that approximately 98 percent of the pesticides utilized today are fungicides and insecticides, which have rapid action, and their toxicity significantly decreases within three days. Most pesticides are water-soluble, allowing them to be removed to some extent through washing. Research findings indicate that washing vegetables can eliminate about 70-85% of pesticide residues present on the surface.

Moreover, a study observed that even after cooking, certain samples of cooked vegetables retained residues of pesticides such as Dimethoate, Cypermethrin, Chlorpyrifos, and Carbendazim. However, in all cases, the levels of these residues were far below the maximum tolerable levels prescribed for human consumption. The residue levels of pesticides in raw, washed, and cooked vegetable samples are depicted in Figures 1a and 1b.

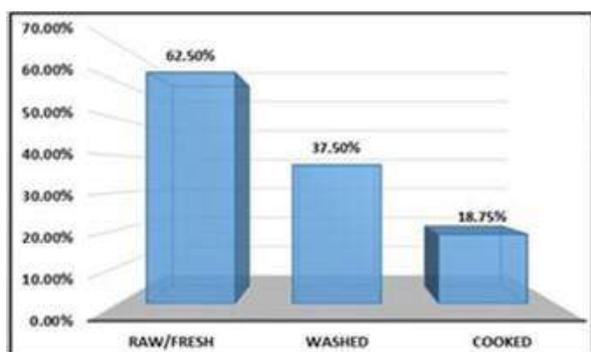


Fig 1a. Residue at Raw, Washed and Cooked Vegetables

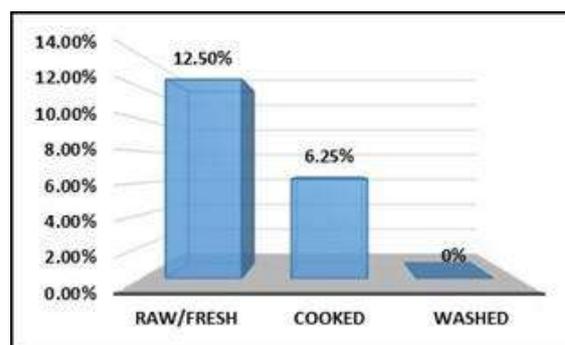


Fig 1b. Residue above MRL at Raw, Washed and Cooked Vegetables

These findings suggest that while some pesticide residues may persist on vegetables even after cooking, the levels present are typically within safe limits for human consumption. Proper washing and cooking practices can further reduce pesticide exposure, ensuring the safety of vegetable consumption.

Hotel and Restaurant Semi-Cooked and Cooked Vegetables Sample Analysis

An analysis of semi-cooked and cooked vegetable samples from various categories of hotels, including elite, premium, and normal hotels, revealed the presence of pesticide residues in a small percentage of samples. However, these residues were found to be well below the maximum tolerable levels prescribed for human consumption, indicating no significant health risks.

For instance, mixed semi-cooked fried vegetable samples obtained from Hotel Intercontinental and Radisson showed residues of Fenvelerate at 0.012 mg/kg and Imidacloprid at 0.014 mg/kg. Despite the Maximum Residue Limits (MRL) for Fenvelerate and Imidacloprid being 2.0 mg/kg and 0.50 mg/kg respectively, the levels detected were significantly lower. Considering the Acceptable Daily Intake (ADI) values, both Fenvelerate (0.02 mg/kg) and Imidacloprid remained below the estimated residue levels (0.012 mg/kg).

Similarly, cooked okra samples from premium hotels exhibited Chlorpyrifos and Thiamethoxam residues at levels of 0.030 mg/kg and 0.011 mg/kg respectively, both lower than the recommended value of 0.2 mg/kg. In contrast, cooked cabbage samples from normal hotels showed Chlorpyrifos and Cypermethrin residues at levels of 0.046 mg/kg and 0.063 mg/kg respectively, also below the recommended values of 0.2 mg/kg and 2.0 mg/kg respectively.

It's worth noting that approximately 30% of pesticides may contain adulterants, meaning they do not contain effective ingredients in prescribed doses. This deception not only cheats farmers but also contributes to the development of pesticide-resistant insects, posing challenges in pest management strategies.

Dried Fish and Pesticides

Currently, no DDT residues have been found in dried fishes. However, during the monsoon season, certain insecticides like Sorbicon, Lider, Mapon, and Emitap are commonly used to protect against insect attacks. Modernization in the method of preparing dried fish has led to the adoption of hygienic and safe practices, such as using yellow-pepper powder in a 1:1 ratio and employing advanced drying methods with vacuum packaging. Investigations have confirmed that pesticide residues in dried fishes remain well below the maximum tolerable levels prescribed by the Food and Agriculture Organization (FAO), which is 0.5 mg/kg. Additionally, government initiatives have led to the discontinuation of formalin dipping in high-value fishes like kachki and mola, ensuring safer fish consumption.

Safe and Nutrition Issues of Street Food

Research has observed that almost 100% of street food is contaminated with bacteria or microorganisms, making it unsafe for consumption. The processing and serving processes involved in street food preparation are often unhygienic, with unclean utensils and unsafe water being common issues. Bacteria such as E. coli and coliforms are prevalent in these foods, primarily originating from the environment, including soil, water, and vegetables, especially those contaminated with human and animal excreta. These factors collectively pose significant health hazards associated with street food consumption.

Antibiotic Situation in Poultry Production and Marketing Process

Concerns have been raised regarding the presence of arsenic, lead, and chromium in animal or chicken feed. However, it's important to note that the majority (98%) of arsenic found in food items is organic arsenic, which is not harmful to human health. Chromium exists naturally in two forms: chromium-3 and chromium-6, with chromium-6 being more harmful. It's crucial to clearly identify whether the obtained chromium is trivalent (chromium-3) or hexavalent (chromium-6). The maximum tolerable levels for these heavy metals are 20-30 mg/kg for chromium, 0.5 mg/kg for lead, and 1.0 mg/kg for arsenic.

Industrial expansion and processing plants without Effluent Treatment Plants (ETP) have contributed to the natural deposition or presence of arsenic, lead, chromium, and other heavy metals in soil and water. Despite efforts, it's challenging to completely prevent their presence, even in developed countries.

A study on chicken feeds revealed that out of 15 brands tested (9 broiler feeds and 6 layer feeds), approximately 12.5% were contaminated with antibiotic residues, specifically Lincomycin and Oxytetracycline, exceeding the prescribed maximum tolerable levels. This highlights a concerning issue in poultry production and marketing processes, emphasizing the need for stricter regulations and monitoring to ensure food safety.

Milk

A concerning percentage of raw/open milk samples, ranging from 25% to 70%, were found to contain nitrites. This presence of nitrites indicates that the water mixed with these milk samples likely originates from untreated sources such as ponds or rivers.

Moreover, a significant portion (ranging from 40% to 100%) of milk sold in the open market is adulterated by sellers, with water being added in proportions of up to 20%. Additionally, formalin, in concentrations varying from 5% to 100%, is often added to the milk as a preservative (approximately 4-5 drops per liter). Artificial milk preparations typically include low-quality powdered milk, flour, arrowroot, sulfuric acid, mustard oil, hydrogen peroxide, urea, chalk powder, ammonium sulfate, mobil, among other substances. These practices pose serious health risks to consumers and underscore the need for stricter regulation and oversight in the milk industry.

Rice Bran Oil

Rice bran oil has gained popularity for its purported health benefits, particularly its association with γ -oryzanol, which is believed to make it heart-friendly. However, analysis of 15 brands of rice bran oil available in the market revealed adulteration in 25% of the samples. According to standards, rice bran oil should contain at least 1% γ -oryzanol, but in some marketed oils, this compound was either below the prescribed level or absent altogether. This indicates possible mixing with low-quality ingredients or other oils.

Additionally, the ratio of omega-3 to omega-6 fatty acids in rice bran oil is unbalanced, with approximately 1:33 instead of the ideal ratio of 1:5. While rice bran oil is generally considered a healthy edible oil, caution should be exercised regarding its regular consumption due to this imbalance. It's advisable to consume rice bran oil intermittently rather than regularly to avoid potential adverse effects resulting from the disproportionate ratio of omega-3 to omega-6 fatty acids.

Heavy Metals in Rice

Industrial waste is a primary source of groundwater and soil contamination by heavy metals, emphasizing the need for rigorous measures to safeguard the safety of crops cultivated in industrialized regions. To mitigate environmental pollution, advocacy campaigns should discourage farmers from utilizing low-quality fertilizers, while strict waste management regulations need implementation in industrial facilities. Consistent monitoring and legal penalties for offenders are imperative.

The majority of tested rice varieties exhibit acceptable arsenic levels, with 98% being organically sourced, thus posing minimal health hazards. Although trace amounts of heavy metals like chromium and arsenic are beneficial in small doses, thorough rinsing of rice effectively reduces arsenic content, further diminished by 25-30% during cooking.

Drinking Water

An alarming 96% of jar water samples were found to contain coliform bacteria, indicating contamination with human or animal excrement. The maximum levels of total coliform and fecal coliform in all samples were recorded at 1600 and 240 g/100 ml, respectively, posing a significant risk to public health.

Furthermore, water jars supplied by bottled water suppliers are often made of non-food-grade plastic, which poses additional health risks. It is imperative to ensure that the supplied water jars are transparent and food-grade. Additionally, these jars must be properly labeled with the name of the manufacturing company, date of manufacture, expiry date, and information about the quality of the water produced. Such measures are necessary to safeguard public health and prevent the spread of waterborne diseases.

Plant Health Standards and Food Safety: Safeguarding Global Nutrition

Plant health standards and food safety are critical components in ensuring the production and consumption of safe and nutritious food on a global scale. These standards, designed to protect crops and consumers alike, address issues related to pests, diseases, and contaminants. This essay explores the interconnectedness of plant health standards and food safety, emphasizing their importance in maintaining a secure and healthy food supply chain.

Plant Health Standards

Plant health standards involve regulations and measures to prevent, control, and manage plant diseases and pests. Entities like the International Plant Protection Convention (IPPC) establish guidelines for global cooperation in managing plant health, allowing countries to trade agricultural commodities while minimizing the risk of spreading harmful pests and diseases across borders.

Importance of Plant Health for Food Safety

The health of plants directly impacts the safety and quality of the food we consume. Pests and diseases pose threats not only to crop yields but also to the safety of food products. By prioritizing plant health and implementing Integrated Pest Management (IPM), we can mitigate the risks associated with contaminated crops and uphold high standards of food safety in a sustainable and environmentally friendly manner.

Food Safety Standards

Food safety standards focus on preventing, detecting, and managing hazards in food production and supply chains. The Codex Alimentarius Commission (CAC), among other international bodies, sets global benchmarks for food safety, offering guidelines and codes of practice for countries worldwide. Integrating plant health standards into broader food safety frameworks is essential, ensuring a comprehensive approach to minimizing contamination throughout the food production chain.

Conclusion

Plant health standards and food safety are inseparable elements in securing a safe and nutritious global food supply. The collaboration of international organizations, governments, and the agricultural industry is crucial in enforcing standards that uphold both plant health and food safety. By prioritizing these standards, we enhance public confidence in the agricultural and food industries, contributing to a more secure and sustainable future for global nutrition.

Capacity Building in Phytosanitary Systems

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Bangladesh is heavily reliant on agriculture for its economy and food security. Ensuring plant health is critical to maintain productivity, safeguard trade, and protect biodiversity. Phytosanitary systems are key to achieving these goals as they address plant pests, diseases, and invasive species that threaten agricultural productivity and export opportunities.

Major Areas for Capacity Building in Bangladesh

Institutional Strengthening

- **Policy Development:** Enhancing the framework for phytosanitary measures, aligned with international standards such as IPPC (International Plant Protection Convention).
- **Coordination:** Improving collaboration between government agencies, research institutions, and stakeholders to enforce plant health regulations effectively.
- **Funding and Resources:** Securing sustainable funding and resources to strengthen regulatory body (NPPO-Plant Quarantine Wing, Department of Agricultural Extension).

Technical Capacity

- **Surveillance and Monitoring:** Establishing robust pest surveillance and early warning systems to detect and respond to outbreaks efficiently.
- **Diagnostic Facilities:** Upgrading laboratories and training personnel for accurate pest identification using advanced technologies like molecular diagnostics.
- **Pest Risk Analysis (PRA):** Developing expertise in conducting PRAs to assess and mitigate risks associated with trade and import/export of agricultural commodities.

Human Resource Development

- **Training Programs:** Conducting workshops and training sessions for phytosanitary officers, customs officials, and agricultural workers to improve skills in plant health management.
- **Awareness Campaigns:** Educating farmers and traders about best practices in pest management and compliance with phytosanitary standards.

Compliance with International Standards

- **Harmonization of Regulations:** Aligning national phytosanitary measures with international standards set by IPPC and WTO's Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement).

- **Export Readiness:** Building the capacity to meet the phytosanitary requirements of importing countries, thereby enhancing access to global markets.

Use of Technology

- **Digital Tools:** Implementing electronic phytosanitary certification systems to streamline processes and reduce errors.
- **Data Management:** Developing databases for pest incidence, monitoring, and historical trends to support evidence-based decision-making.

Community Engagement and Sustainability

- Encouraging community participation in pest management initiatives and promoting sustainable practices to reduce reliance on chemical pesticides.

Expected Outcomes

- Reduced economic losses from pest infestations and improved agricultural productivity.
- Enhanced ability to meet international trade standards, boosting exports of agricultural products.
- Strengthened institutional and technical infrastructure for long term plant health management.

By investing in phytosanitary capacity building, Bangladesh can better safeguard its agricultural sector, ensure food security, and maintain sustainable development.

Successful Phytosanitary Practices in Bangladesh: Real-World Examples

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Bangladesh has implemented several effective phytosanitary interventions to protect its agriculture, ensure food security, and enhance its competitiveness in the global market. Below are examples of successful phytosanitary practices within the country:

1. Eradication of Wheat Blast Disease

Challenge: In 2016, Bangladesh faced a significant outbreak of wheat blast, a fungal disease caused by *Magnaporthe oryzae* pathotype Triticum, which threatened wheat production.

Intervention

- Implemented a national surveillance system to detect outbreaks early.
- Introduced disease resistant wheat varieties through collaboration with CIMMYT (International Maize and Wheat Improvement Center).
- Enforced strict quarantine measures, including regulating the movement of wheat seeds from affected areas.

Outcome: Contained the outbreak and resumed wheat production, with reduced risk of recurrence.

2. Fruit Fly Management in Mango Exports

Challenge: Fruit flies (*Bactrocera* spp.) posed a significant barrier to mango exports, as importing countries enforced stringent phytosanitary standards.

Intervention

- Established Integrated Pest Management (IPM) programs, including baiting and trapping systems.
- Developed hot water treatment facilities to meet export requirements, ensuring that mangoes were free of fruit fly larvae.
- Trained farmers and exporters on pre and post-harvest phytosanitary measures.

Outcome: Enabled the export of mangoes to high value markets (Europe and Middle East), boosting farmers' incomes.

3. Brown Plant Hopper (BPH) Management in Rice

Challenge: The brown plant hopper, a destructive pest, caused severe damage to rice crops, a staple food in Bangladesh.

Intervention

- Introduced pest resistant rice varieties by BRRI (Bangladesh Rice Research Institute).

- Promoted ecological pest management practices (maintaining predator populations and minimizing indiscriminate pesticide use).
- Conducted farmer field schools (FFS) to educate on pest management techniques.

Outcome: Reduced BPH infestations, increased rice yields, and minimized pesticide dependency.

4. Control of Bacterial Wilt in Potato

Challenge: Bacterial wilt caused by *Ralstonia solanacearum* was a persistent threat to potato cultivation, a key cash crop in Bangladesh.

Intervention

- Developed and promoted the use of disease free seed potatoes through tissue culture techniques.
- Established crop rotation programs and trained farmers on soil health management.
- Strengthened diagnostic laboratories for early detection and management.

Outcome: Improved potato yields and enhanced the export potential of Bangladeshi potatoes.

5. Surveillance for Invasive Pests

Challenge: Fall Armyworm (*Spodoptera frugiperda*), an invasive pest, posed a threat to maize crops in Bangladesh.

Intervention

- Launched nationwide surveillance and early warning systems to track pest movement.
- Promoted IPM practices, including biological control using natural predators and parasitoids.
- Partnered with international organizations like FAO to build technical capacity for pest management.

Outcome: Controlled the spread of the pest and safeguarded maize production.

6. Strengthening Phytosanitary Certification for Exports

Challenge: Meeting the phytosanitary requirements of importing countries was critical for agricultural exports.

Intervention

- Established electronic phytosanitary certification systems (ePhyto) to streamline documentation and improve transparency.
- Conducted pre-export inspections and fumigation for pest-free certification.
- Trained exporters and customs officials on compliance with international phytosanitary standards.

Outcome: Improved the credibility of Bangladeshi agricultural products in global markets, increasing export volumes.

Key Lessons from Bangladesh's Success

Integrated Approaches: Combining surveillance, biological control, resistant varieties, and community engagement yields sustainable results.

Collaboration: Partnerships with international organizations and research institutions strengthen technical capacity.

Awareness and Training: Empowering farmers and exporters through education ensures compliance and effective implementation.

Technology Adoption: Utilizing modern diagnostic tools and certification systems improves efficiency and accuracy.

By implementing these phytosanitary practices, Bangladesh has demonstrated the importance of proactive, science based interventions to protect its agricultural sector and capitalize on export opportunities.

Central Packing House (CPH)

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The People Republic of Bangladesh take decision to establish Central Pack House in 2014 in order to reduce non compliance rate in exporting fruits and vegetables in EU.

In 2014 started establiment work of central packing house through a project SPCB financed by Ministry of Agriculture and complited 2016

In May 2017, CPH launched/started exporting Mango in European Union.

November 9, 2017 Central Pack House declared as a “A” Category Quarentine station.

May, 2017 (24/05/2017) we provide 3263 PCs from CPH and export approximately 1876 ton fruits and vegetables and obtained 1358459 BDT as revenue.

It established on 60 decimal lands. It has 2 landing space, 4 pre cooling chamber, 2 cooling chamber, 4 deep cooling chamber, 2 shorting and grading room, 2 washing, 2 drying, 4 packaging room

CPH contains a lift which carrying capacity is over 2000 kg. An underground car parking can parks about 25 cars in CPH. A generator and a solar system can provide electricity when load shading started in CPH.

Manpower (21): Central Pack House govern by one Deputy Director, two (2) additional deputy director and One Quarantine Pathologist, one quarantine entomologist maintain quality of products and providing Phytosanitary certificates. Ten (10) Sub Assistant Agricultural Officer inspect product and monitoring shorting and grading. Besides, one office assistant, 4 Guards, 1 MLSS assist to run Central Pack House.

Achievements

- After establishment, fruits and vegetables export in Europe without non-compliance in 2017
- Ensure 100% computerized PC delivery
- Ensure 100% transparency and accountability and maintain professionalism
- Feeling proud to be as “A” Category station

Limitations

- Lack of coordination among exporters, managers with respective departments
- Lack of proper training/exposure for officers in home and abroad
- Not have acridation to fulfil the international standards.
- Producers and traders don't have much knowledge on international standards, packaging, processing, and storage.

The Central Packing House (CPH) in Shyampur, Dhaka, is a government established facility aimed at enhancing the quality and safety of Bangladesh's fruit and vegetable exports. Managed by Department of Agricultural Extension (DAE), CPH offers services such as cooling, sorting, grading, inspection, and packaging of fresh produce to meet international standards.

In 2015, the government initiated the construction of the CPH to address issues related to pests and diseases in export consignments, particularly to European nations. The facility was designed to ensure that exported fruits and vegetables are safe and of high quality, thereby reducing the rate of non-compliance and boosting exports, especially to Europe.

To further enhance its capabilities, DAE launched a project in 2021 to upgrade the existing plant quarantine laboratory at the CPH to international standards. This upgrade includes the installation of advanced equipment and infrastructure improvements to ensure the facility meets global phytosanitary requirements.

The CPH remains a critical component of Bangladesh's strategy to enhance the quality and competitiveness of its agricultural exports by providing essential services to ensure that produce meets international market standards.