

# **WORKSHOP REPORT**

## **Regional Workshop on the International Standards, Pest Risk Analysis And Phytosanitary Capacity Evaluation Kuala Lumpur, Malaysia, 19 – 30 July 2004**

### **1.0 INTRODUCTION**

#### **1.1 Background**

A Regional Workshop on The International Standards, Pest Risk Analysis and Phytosanitary Capacity Evaluation was held in Kuala Lumpur, Malaysia from 19<sup>th</sup> – 30<sup>th</sup> July 2004. The workshop was jointly organized by the Secretariats of the International Plant Protection Convention (IPPC), the Asia and Pacific Plant Protection Commission (APPPC) and the Department of Agriculture under the Ministry of Agriculture and Agro-Based Industries Malaysia. The workshop covered member countries in the Far East Region and was fully funded by the Food and Agriculture Organization (FAO).

This workshop was part of the overall program of FAO to promote capacity building in plant health and coordinate implementation of phytosanitary measures as applied to international and regional trade. FAO has developed a Phytosanitary Capacity Evaluation (PCE) Tool to assist countries to undertake needs assessment of the phytosanitary system of their National Plant Protection Organization (NPPO). The primary function of the PCE is to serve as a diagnostic tool for the NPPO to gauge the capacity gap between the current situation and what is needed to meet the requirements of the international standards.

#### **1.2 Objectives And Focus Of Workshop.**

The objectives of the workshop were:

- i. To promote capacity building in plant health
- ii. To coordinate implementation of phytosanitary measures as applied to international and regional trade.

To achieve the above objectives, the workshop program focused on the following topics:

- i. The global phytosanitary/trade environment as defined by International Treaties.
- ii. The International Standards for Phytosanitary Measures.
- iii. Skills training in Pest Risk Analysis.
- iv. Opportunities and problems for developing countries with regards to international trade in agricultural commodities.
- v. Phytosanitary systems analysis: Phytosanitary Capacity Evaluation.
- vi. Regional/sub-regional perspectives, treaties and trading problems.
- vii. Harmonization of phytosanitary measures in the ASEAN Region.

### **1.3 Participation**

Participants consisted of senior plant protection officers who were involved directly in capacity building in phytosanitary services in their respective countries. 18 participants from 11 countries attended this workshop, namely Bangladesh, Cambodia, China, Laos, Malaysia, Myanmar, Pakistan, Philippines, Thailand, Vietnam and The United Kingdom (refer to Appendix 1). Also in attendance were FAO Consultants Dr Jeffrey E. Jones, Dr Bob Ikin and Mr. Yongfan Piao. Ms Asna Booty Othman, as Project Coordinator led the workshop from Malaysia, supported by 5 officers from the Crop Protection and Plant Quarantine Division, Department of Agriculture as members of the workshop secretariat.

### **1.4 Workshop Program** – as in Appendix 2.

## **2.0 OPENING SESSION**

### **2.1 Opening Remarks**

Ms. Asna Booty Othman, Chairman of the Organizing Committee and as Project Coordinator welcomed distinguished speakers, participants and guests to the workshop. She extended appreciation to the speakers Dr Jeffrey E. Jones from FAO and Dr Bob Ikin, a Biosecurity Consultant from Australia who had kindly spared their time to share their vast experiences in the various fields on International Standards of Phytosanitary Measures (ISPM), Pest Risk Analysis (PRA) and PCE which would undoubtedly be very useful to the participants of the workshop.

The organizers hoped that the workshop will be able to bring together professionals with relevant experiences in the national phytosanitary service, phytosanitary systems management, and those in the implementation of the international standards for phytosanitary measures to have meaningful discussions on phytosanitary capacity gap, to propose capacity building and to enhance coordination of the implementation of phytosanitary measures in the region.

On behalf of the organizing committee, Ms Asna thanked the Honourable Y. Bhg Dato' Soffian Mohd Salleh, Deputy Director-General II of Agriculture for officiating the workshop. She also extended her appreciation to FAO, Rome and its Regional Office in Bangkok for their support and encouragement to Malaysia to host the workshop.

### **2.2 Welcoming Address**

In his welcoming address, Dr. Jeffrey Jones, Consultant from FAO, Rome, welcomed all participants while acknowledging and complimenting the host country, Malaysia, led by Ms. Asna Booty Othman for the efficient and effective coordination of the workshop. He then stressed that the objective of the workshop was to develop skills of participants, which can be applied for their own countries in developing PRA, analyze priority issues, and identify their weaknesses and strengths. Participants were reminded of their heavy commitments in coordinating the implementation and development of phytosanitary measures and to ensure efficient phytosanitary systems management in their own countries. The workshop would assist capacity building in developing countries to comply with international agreements.

## **2.3 Inaugural Address**

The Honourable Dato' Soffian Mohd Salleh, Deputy Director-General II of Agriculture Malaysia delivered the inaugural speech on behalf of the Director-General. He welcomed all distinguished speakers, guests and participants to the workshop. He was pleased that Directors, Senior Plant Protection and Plant Quarantine Personnel from 18 countries from this Region had participated in the workshop. He stated that this reflected the full commitment from member countries in their endeavor to cooperate in enhancing and strengthening their plant quarantine services, capacity and capabilities to face challenges in the era of globalization and trade liberalization.

The Honourable Deputy Director-General II also hoped that the workshop would gather information on the strengths and weaknesses of the phytosanitary capacity and come up with common prioritized needs of the region to address capacity gaps in the development and strengthening of the phytosanitary system. In this context, he offered Malaysia's assistance to collaborate with the FAO to develop projects for the region to strengthen its capacity building. He also congratulated the APPPC of the FAO and the Department of Agriculture of Malaysia for jointly organizing this important workshop. He then thanked the FAO for the financial support extended in making this workshop a reality while extending his appreciation to the organizing committee for the hard work they have put in to ensure the success of the workshop.

Finally the Honourable Y. Bhg Dato' Soffian Salleh, declared open the Regional Workshop on International Standards for Phytosanitary Measures, Pest Risk Analysis and Phytosanitary Capacity Evaluation.

## **3.0 WORKSHOP PRESENTATION.**

Several papers were presented during the workshop namely:

- Global Phytosanitary Environment
- Principles of Plant Quarantine as related to International Trade
- Opportunities and Problems for Developing Countries with respect to International Trade
- The International Standards for Phytosanitary Measures ( ISPMs)
- Phytosanitary Systems Approach: Phytosanitary Capacity Evaluation (PCE)
- Legislation & Institutional Modules
- Needs Assessment Modules – Background module
- Pest Surveillance – Pest Surveillance Module
- Pest Free Area – PFA Module
- Export Certification – Export Certification Module
- Exotic Pest Response Module
- Import Regulatory Structure
- Inspection Module
- Introduction to Pest Risk Analysis – PRA Module

## **4.0 GROUP WORK REPORTS**

### **4.1 PCE Tools**

The participants carried out an exercise on the use of PCE tools using computers. Training was provided to enable the participants to:

- fill in necessary information – country's background on phytosanitary capacity
- use the standards to evaluate the NPPO capacity. ISPM No. 6 on Guidelines for Surveillance and ISPM No. 7 on Export Certification were used as an example for the these exercises.

The participants were expected to continue evaluation of the phytosanitary capacity with the help of the experts of their own country upon their return, and to submit their reports on PCE at a later given date. This data obtained would be useful for the countries in their phytosanitary capacity planning (which includes training, human resources etc), requesting for technical assistance and project funding and in evaluating their level of preparedness with the compliance of the SPS Agreement and WTO.

### **4.2 Pest Risk Analysis (PRA)**

Participants were required to perform a PRA exercise where several situations were put forward by the facilitators. For this purpose, participants were divided into 4 groups. Each group was given a different situation of pest risks, namely:

- Importation of vegetative planting materials
- Importation of grain for consumption
- Importation of grain seeds as planting material
- Importation of fruits

Using the CABI Compendium for Host Pest List, the participants were first required to list the pests found in the exporting country, then subtract the pests from the list of the importing countries, to obtain the potential quarantine pest list. Several pests from this list were then selected for the PRA exercise.

The group exercises were as follows:

- Group A: Banana Corms from China to Malaysia (banana planting materials)
  - Mr. A.S.M. Golam Hafeez (Bangladesh)
  - Mr. Phan Manh Hung (Vietnam)
  - Mr Yip Kin San (Malaysia)
  - Mr Pu Min (China)
  - Dr Wu Xingxia (China)
- Group B: Wheat Grain from Pakistan to Laos
  - Mr Phaydy Phixaysarakham (Laos)
  - Mr Heng Chhunhy (Cambodia)
  - Mr Hoang Trung (Vietnam)
  - Ms Asna (Malaysia)

- Group C: Rice Seeds from Philippines to Myanmar  
Ms. Azean binti Ahmad (Malaysia)  
Ms Khin Mar Oo (Myanmar)  
Ms Erlinda L. Leones (Philippines)
- Group D: Oranges from Pakistan to Philippines  
Mr Ho Haw Leng (Malaysia)  
Mr Udom Unahawutti (Thailand)  
Ms Than Than Htay (Myanmar)  
Mr. Raashid Bashir Mazari (Pakistan)  
Ms. Loreta C. Dulce (Philippines)

#### **4.2.1 PRA Reports Presentation And Discussion**

The facilitators pointed out several areas where the PRA exercise reports could be improved upon. Clarification was also put forward on some important issues related to the preparation of PRA.

##### **4.2.1.1 Purpose Of The PRA Exercise Reports**

One of the guidelines suggested for the preparation of a PRA was that the process was based on the availability of technical information to the PRA team. As such, there may be other information available which could influence the decision making process, and the report should be viewed as an exercise. The Pest Risk Analysis Reports of the 4 groups were as in Appendices 3a, 3b, 3c and 3d.

##### **4.2.1.2 PRA On Fruits Should Include PRA On Seeds**

The PRA team should not overlook other pathways not associated with visible inspection of the produce. The PRA on fruits should also include a PRA on the seeds inside the fruit, where applicable, especially in cases where pathogens such as mycoplasma, spiroplasma and other seed-borne organisms may be present. The analysis of the fruit pathway should also include the seed pathway.

##### **4.2.1.3 Difference Between Consignment And Lot**

Under normal circumstances, a phytosanitary certificate was issued for a single consignment, irrespective of the origin of the produce. Where applicable to high-value crops, consignments may be sub-divided into lots to separate them according to their sources. They may save the entire consignment from destruction if a quarantine pest was detected only on one lot, which was isolated in the country of origin from the other lots in the same consignment. For this implementation, the importing country would need to ensure that materials were not mixed at the packinghouse, and at the same time, have a very effective auditing system.

##### **4.2.1.4 Factor Of Pest Host-Range In PRA**

The host range of a pest should be included as a factor in PRA, when the pest was not of economic importance on the host under evaluation in both the exporting and importing country, but may be of economic importance to another host in the importing country. There would also be a need for expert opinion on the possibility of variations in biotype or strain of the pest, and this issue could be resolved at a

technical level with the necessary reference to literature. The burden of proof would lie with the exporting country.

#### **4.2.1.5 Sampling Size**

The facilitators explained that a sample size of 600 was used in Australia when sampling fruits. This number was used after statistical analysis and was found to sufficient to detect presence of quarantine pests in a consignment.

#### **4.2.1.6 Process of Non-compliance**

The facilitators explained that there should be a process of non-compliance to be included in each PRA report.

#### **4.2.1.7 Pathway Variation Resulting From Purpose Of Importation**

PRA analysis should take into consideration the purpose of importation, which may result in different pathways. For instance, *Sorghum halepense*, which is usually considered a quarantine pest, may be considered a non-quarantine pest if the grain was imported for the purpose of consumption, and that there was no chance for the weed seeds to escape into the environment. This decision lay with the PRA team doing the analysis. However, the preferred process was that it could be considered a pest which could be established, and the PRA be continued until the notification stage for the consideration of management options.

#### **4.2.1.8 Khapra Beetle And Certification For Pest-free Area**

In the case of *Trogoderma granarum* (khapra beetle), it was not feasible to try to establish a pest-free area in the exporting country, as the relevant area of concern was not in the field, but in the storage area. The conveyance of the consignment should also be certified, and the ship should be sanitized by quarantine officials. The participants shared their experiences where large consignments of more than 10,000 tons were intercepted, and the general recommendation was to re-fumigate, rather than to destroy.

In some countries, legislation does not cover inspection of the ship. In this case, legislation should be amended to allow for operations to inspect the ship.

Sampling size for khapra beetle was undetermined, but usually some are taken for observation under Burlese funnels.

#### **4.2.1.9 Option for Devitalization**

If no other management options were available, the grain may need to be devitalized, for example, for bacterial or systemic fungi. For the treatment of huge volumes eg. 20,000 tons of sorghum (for cattle feed), steam may be used at 120<sup>0</sup>C for 30 minutes, as this treatment was effective to devitalize grains and weed seeds.

#### **4.2.1.10 Quarantine and Tissue Culture Material**

Tissue cultures come from growing conditions that were sterile, and do not require a quarantine period, provided that mother plants were checked prior to production. However, materials could be checked for contaminations, which will show after a 3-4 day withholding period should there be a suspicion of variation to

the tissue culture production process. The specifications for tissue culture planting materials are as follows:

- The container must be clean
- The agar must be clean
- The agar must be poured into the container where the plants were grown.
- No antibiotics should be used

#### **4.2.1.11 Consultation With Exporters**

The PRA team should involve the exporters in their decision-making process. As stakeholders and the interested party, exporters could contribute greatly in terms of information exchange, and could simplify the PRA process.

#### **4.2.1.12 Seed Certification As Alternative To Pest-Free Area Certification**

Seed certification may serve as an alternative to pest-free area certification when weed seeds were the potential quarantine pests. A seed certification program would be easier to implement in this case compared to a pest-free area certification program in the cropping zone.

#### **4.2.1.13 Information Gap**

One of the most difficult situations faced by the PRA team would be the information gap. The facilitators explained that each NPPO should collaborate with researchers in their countries and attempt to incorporate the resources that can contribute to the source of knowledge to accomplish their tasks. Where the information is insufficient to complete a PRA, the team should not be under obligation to commit a decision. A request may be sent to the exporting country to obtain the necessary information.

#### **4.2.1.14 Bioterrorism And Plant Quarantine**

The facilitators explained that bioterrorism was a potential pathway for the entry of quarantine pests, and the NPPO should take this new potential pathway into consideration when attempting a PRA.

#### **4.2.1.15 Feedback From Participants**

The general consensus among the participants was that they were very grateful for the opportunity to participate in the workshop, and that they had acquired a vast amount of information and skills which would be very useful in the implementation of plant quarantine procedures upon their return to their home countries. Experienced participants felt that this workshop was the highest level of PRA training they have received to date. All the participants thanked FAO and the host country for the success of the workshop and expressed keen interest in the continued support of the program.

## **5.0 WORKSHOP DISCUSSION**

### **5.1 Meeting IPPC Standards**

The matter of some developing countries being unable to meet IPPC standards was discussed. The facilitators explained that although an agreement was made in 1995 to enable developing countries to comply with IPPC requirements after a 5-year period, that period had long lapsed. The question of where we are in relation to what is to be expected was often brought up, and that gap is continuously being narrowed by implementation of training programs. The ultimate responsibility of this implementation lies with the NPPO, which should identify these gaps, as to whether they were technical, administrative, or financial. Many training programs remain at the awareness level, and specific training programs are needed to build capacity in terms of skills development and technical knowledge to encourage effective implementation of the international standards.

Meanwhile, NPPOs should take steps to identify priority issues, whether they should be tackled at national, at regional, or at international level. The FAO recognized the need of developing countries for capacity development, and encourage donor countries and agencies to assist developing countries to build capacity. This translates into a catalytic role for the FAO, through which technical assistance can be applied to address priority weaknesses such as updating legislation, strengthening border control, staff training, information exchange and phytosanitary systems analysis. These catalytic technical cooperation programs (TCP) have a maximum allocation of \$400,000.

### **5.2 TBT And SPS In Plant Quarantine**

The facilitators explained that TBT (Technical Barriers to Trade) was an agreement whereby certain conditions permitted the denial of entry of imports based on non-phytosanitary issues, such as produce quality and packaging. SPS (Sanitary and PhytoSanitary) issues were related to the denial of entry based on the presence of organisms or prohibited pests in the product.

### **5.3 Multiple Enforcement Agencies In Plant Quarantine**

Inspection of certain commodities in some countries is being done by more than one agency, resulting in conflict of interest. For instance, both the Forestry authorities and the Plant Quarantine authorities may do the inspection of forest products. The facilitators explained that this problem could be resolved by amendment to the legislation of the country to enable a distinct definition of responsibilities.

### **5.4 Dispute Settlement**

The IPPC provides for dispute mediation when issues arise. At this level, disputing parties are encouraged to avoid, or settle disputes based on technical information. Where such disputes are not resolved at this level, the disputing parties may take these disputes to the WTO. The facilitators encouraged those countries that are not contracting parties to the IPPC (1997) to do so.



## **5.5 Acceptable Level Of Protection**

The facilitators explained that the level of protection might be viewed as the opposite of the level of risk, which made the country comfortable, although this may not necessarily be technically acceptable. An important point to note, however, is that this acceptable level of protection must be consistently applied, to avoid some instances where there was one level of protection for one pathway and another level for another pathway.

## **5.6 Revision Of Phytosanitary Standards**

From time to time, certain standards may need to be revised when they were not longer suitable or applicable to current situations. The NPPO may send comments and recommendations to the IPPC secretariat to request for a revision of a standard, which they think, should be revised.

## **5.7 Standards Lacking In Specifics**

Some NPPOs faced difficulty in the implementation of certain standards because of the lack of documented specifics. The facilitators explained that standards were constructed based on conceptual principles instead of specifics to accommodate generalization among different countries. As such, standards should be viewed as guidelines. Where appropriate, recommendations for specific standards may be sent to the IPPC secretariat for consideration. There was also a recommendation to develop Regional Standards. Where necessary, a situation may be resolved through bilateral agreements.

## **5.8 Supporting Documents Other Than Phytosanitary Certificates**

Some importing countries may require other supporting documents other than a phytosanitary certificate, for example, a CITES certificate, or a treatment certificate. The facilitators advised that the relevant standards where necessary should be followed, example, the standard on phytosanitary certificate.

## **5.9 Period Of Validity For Phytosanitary Certificates**

The facilitators explained that a phytosanitary certificate should have a period of validation. Most PCs have a validity of 6 months from the date of issue and this period can be used as a guide, but that some certificates should be valid for short periods if infestations could reoccur.

## **5.10 Guidelines For Import Of Planting Material**

In a case where planting material imported were infested with pests already present in the country, the authorities should ensure that the pest status is not more than that of the status of the local material. There is no tolerance for pests that are exotic and considered quarantine pests, but tolerance levels can be set for non-exotic pests that are considered regulated non-quarantine pests.

In a case where import of foreign planting materials was made into a country where the crop was new, the facilitators explained that even though a known tested pathogen level was established based on experience, there was no technical

justification for this level to be regulated by law as a regulated non-quarantine pest. This was because the idea of regulated non-quarantine pests was to protect the local industry. The workshop debated whether or not a certification scheme in the importing country was a pre-requisite for developing a list of regulated non-quarantine pest. It further considered that based on historical evidence, a tolerance level can be set for the purposes of protecting plants for planting.

Where imported planting materials contained non-regulated pests already present in the country, the authorities could advise the importer to treat the planting materials to reduce direct damage. This is only advisory, and not mandatory.

#### **5.11 Rejection Of Imports Where Pest Levels Are High**

Some consignments imported into a country may harbour pests already present in that country. This is not justification to reject the consignment because the idea of equivalence of trades does not provide for discrimination where levels of infestation were the same for the importing and exporting country. The primary concern of the importing country was that these pests might further worsen the situation as they might contribute to the indigenous population. The facilitators explained that where necessary, rejection of the consignment may be based on an issue of crop quality, and a declaration that the import was not suitable for consumption, especially when the levels of infestation were observed to be high. High pest levels may cause difficulties in the identification of all pests present in the consignment.

#### **5.12 Issue Of Pest Strain/Biotype**

There was concern that pests entering the importing country may be of a different strain or biotype than that of the local pest. The facilitators explained that where possible, a PRA should be used to determine if a different biotype is of increased economic importance. The responsibility to provide the information lay with the exporter in order for the importing NPPO to develop and complete the PRA. Trade should not take place before the PRA was done.

#### **5.13 Information Gap**

One of the general issues discussed was that information necessary to prepare the PRA was difficult to access. The facilitators explained that the research network which often concentrated on reporting information on pest problems at the cropping stage and not at the post-harvest stage, and that mostly plant quarantine personnel were interested to have access to information on pest behaviour/biology after the crop has been harvested.

#### **5.14 Non-identification Of Pests**

In the course of their duties, plant quarantine officers often encountered pests, which were not readily identified. The usual course of action was for the sample of the pest to be sent to experts for identification. Sometimes, experts also fail to identify this pest, and the recommendations for this situation were treatment, reconsignment or destruction. However, it is best for the importers to be advised to take voluntary action, as an alternative to an unreasonably long withholding period imposable by the

authorities, especially on perishable produce. General quarantine fumigation using methyl bromide may constitute voluntary action.

If an unexpected situation occurs, an inspector may do a preliminary pest risk action to determine whether or not emergency action is necessary.

A PRA could only be done when information on the pest was available. This might come from literature, and the submission of the sample to the exporting country for checking/identification. Where the PRA was not possible, trade should be deferred.

### **5.15 Infested/infected vs Affected**

For plant quarantine work, use of the terms *infested*, *infected* and *affected* were often interchanged. The facilitators explained that the correct terms should be either *infested* or *infected*, but not *affected* because *infested/infected* referred to the place/site of the pest on the produce (usually fruit), whereas the term *affected* may refer to infestation of another part of the plant not related to the produce but causing a symptom.

### **5.16 PRA is EESEY**

The determination of the status of a quarantine pest may be summarized by the alphabets “EESEY”

Entry  
Establishment  
Spread  
Economic  
Yes (to all those) = quarantine pest

### **5.17 Non-chemical Treatment**

The facilitators explained that treatment in systems approach was usually non-chemical, for example, cold treatment or hot treatment. Most European countries also do not encourage chemical treatment, especially the use of methyl bromide and those that leave residue. As non-chemical treatments usually have limitations, all other quarantine steps should be imposed to ensure security.

### **5.18 Burden Of Quarantine Services For Eradication Of A New Pest**

In the case of the eradication of citrus canker in Australia, the facilitators explained that the cost of the campaign was borne by the State as part of their quarantine services. The issue of compensation was also considered. It was felt that if compensation were not paid, growers would not report new pest discoveries, as they would lose their crops. However, compensation may not be paid if the outbreak was due to any illegal importation of plant materials.

## **6.0 PCE CONSTRAINTS IN THE REGION**

An exercise was done to evaluate the PCE constraints of each country, covering the areas of administration, operational, information, training, and the facilities and equipment available at the points of entry. The summary of the exercise as in Appendix 4 (a – j).

**Appendix 1: List of consultants, project coordinator, participants and secretariat.**

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6. Mr. Soffian Othman

**Regional Workshop on the International Standards,  
Pest Risk Analysis And Phytosanitary Capacity Evaluation  
Kuala Lumpur, Malaysia,  
19 – 30 July 2004**

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<b>19 July 2004 (Monday)</b>	<b>-- Arrival of participants at The Hotel Legend, Kuala Lumpur, Malaysia</b>
2030	- Registration
<b>20 July 2004 (Tuesday)</b>	
0830 - 0900	Registration
0900 – 1000	Opening Ceremony <ul style="list-style-type: none"><li>- Opening Remarks <i>by Ms. Asna Booty Othman</i> (Director, Crop Protection &amp; Plant Quarantine Division)</li><li>- Welcome Address <i>by Dr. Jeffrey E. Jones</i> (FAO, Rome)</li><li>- Inaugural Address <i>by Dato' Soffian Mohd Salleh</i> (Deputy Director-General II of Agriculture Malaysia)</li></ul>
1000 – 1030	Break
1030 – 1100	Objectives of the Workshop <i>led by Dr. Jeffrey Jones</i>
1100 – 1230	Global Phytosanitary Environment <i>led by Dr. Jeffrey Jones &amp; Dr. Bob Ikin</i>
1230 – 1400	Lunch
1400 – 1500	Principles of Plant Quarantine as related to International Trade <i>led by Dr. Jeffrey Jones &amp; Dr. Bob Ikin</i>
1500 – 1530	Break
1530 – 1700	Opportunities and Problems for Developing Countries with respect to International Trade <i>led by Dr Jeffrey Jones</i>

**21 July 2004 (Wednesday)**

0830 -1030	The International Standards for Phytosanitary Measures (ISPMs) – Summary presentation <i>led by Dr. Jeffrey Jones &amp; Dr. Bob Ikin</i>
1030 – 1100	Break
1100 – 1230	Phytosanitary Systems Approach: Phytosanitary Capacity Evaluation (PCE) <i>led by Dr. Jeffrey Jones</i>
1230 – 1400	Lunch
1400 – 1500	Legislation & Institutional modules <i>led by Dr. Jeffrey Jones &amp; Dr. Bob Ikin</i>
1500 – 1530	Break
1530 – 1700	Needs assessment module Background module

**22 July 2004 (Thursday)**

0830 – 1030	Pest Surveillance Pest Surveillance Module
1030 – 1100	Break
1100 – 1230	Pest Free Area PFA module
1230 -1400	Lunch
1400 – 1530	Export Certification Export Certification Module
1530 – 1700	Exotic pest response module Import regulatory structure Inspection module

**23 July 2004 (Friday)**

0830 – 1030	Introduction to Pest Risk Analysis PRA module
1030 – 1100	Break
1100 - 1230	Group work – common problems
1230 – 1400	Lunch
1430 – 1530	Group work
1530 – 1700	Group work

- 24 July 2004 (Saturday)**
- 0830 – 1200                      Field Tour to PUTRAJAYA CITY and WEST PORT KLANG
- 25 July 2004 (Sunday)**              Visit to Genting Highlands
- 26 July 2004 (Monday)**              Group work – common problems in the ASEAN region
- 27 July 2004 (Tuesday)**              Skills training in PRA
- 28 July 2004 (Wednesday)**      Skills training in PRA (continued)  
 Strengthening and Creating Confidence in Plant Health Systems  
*led by Dr. Gretel White*
- 29 July 2004 (Thursday)**              PRA Reports and discussion
- 30 July 2004 (Friday)**              Review, defining next steps  
 Recommendations for national and regional strategies  
 Close
- 31 July 2004 (Saturday)**              **Departure from Kuala Lumpur, Malaysia**

**Group A: PRA Exercise on Banana Planting Materials from China to Malaysia**

**Yip Kin San, Malaysia**

**Wu Xingxia, China**

**Phan Manh Hung, Viet Nam**

**A.S.M. Golam Hafeez, Bangladesh**

**A) Purpose/Objective.**

To present the outcomes of a pest risk analysis/import risk analysis of the importation of planting materials of banana from China, and to indicate the regulatory position of the NPPO of Malaysia.

Banana is the part of the plant traded. *Musa* is the botanical name and local name of the plant species. China is the country of export. Malaysia is the country of import.

**B) Background.**

This PRA was conducted as a practical exercise in quarantine decision-making at the PRA Workshop held in Kuala Lumpur, Malaysia from 19 to 30 July 2004.

This particular exercise involves the possible importation of banana planting materials from China to Malaysia.

**C) Process.**

**Stage 1 Pest Risk Initiation.**

The pests of banana were obtained using the CABI Crop Protection Compendium only.

**Table 1 - Total 142** Pests of banana that is being imported that occur in China.

**Table 2 - Total 133** pests that do occur on Banana in the Malaysia

**Table 3 – Total 38** pests that occur in the exporting country but not in the importing country

**Stage 2 Pest Risk Analysis.**

In stage 2 a technical assessment is made of the pests in **Table 3** to determine if they meet the specific requirements for a quarantine pest in accordance with the IPPC text and the ISPM #5 Glossary of Phytosanitary terms. In this exercise time does not permit the consideration of all the pests in Table 3 (Potential quarantine pests) in detail. Therefore a selection of 9 pests of different pest types (fungi, bacteria, arthropods, virus, mycoplasma) were selected as examples.

The criteria for their classification is categorised for each pest in **Table 5**.

The information compiled in the Pest datasheet obtained from the CABI CPC was used. This information resulted in the categorising of the pests as undertaken in **Table 5** is compiled in **Table 4**, together with an estimate of the risk they pose.

The datasheets of ten or twelve potential quarantine pests are **Annex 1** of this report.

The pests are classified in accordance with the IPPC terminology into the following categories –

***Quarantine pest***

***Non-regulated pest***

Those pests that satisfy the definition of quarantine pests require management options to be considered, these pests are identified in **Table 4**.

**Stage 3 Pest Risk Management.**

The Quarantine pests are considered and a number of pest management options are considered as suitable, and can be conducted overseas or in your country.

Final management options are selected and listed in **Table 6**.

This table is compiled in the sequence from the point of production to the point of release in the country of destination.

**Stage 4. Risk communication.**

**D) References.**

CABI (2002) Crop Protection Compendium

Appendices.

Table 1 Pests of Banana in China

Table 2 Pests of Banana in Malaysia

Table 3 Pests of Banana in China not in Malaysia (Potential Quarantine pests)

Table 4 Risk analyses of pests of concern to importing country on part of planting in Malaysia

Table 5 Technical evaluations of risk factors of the potential quarantine pests in

Table 3

Table 6 Management of quarantine pests.

Annex 1 Datasheets of potential quarantine pests from CABI CPC (2003).

## Attachments.

### Tables format for PR

#### Pest List of Banana from China. (Table 1)

- \**Achatina fulica* (giant African land snail)
- Adoretus sinicus* (rose beetle)
- \**Ageratum conyzoides* (billy goat weed)
- \**Agrotis ipsilon* (black cutworm)
- \**Aleurocanthus woglumi* (citrus blackfly)
- \**Amaranthus spinosus* (calaloo)
- \**Aonidiella aurantii* (red scale)
- \**Aonidiella orientalis* (oriental red scale)
- \**Aphis gossypii* (cotton aphid)
- \**Araecerus fasciculatus* (areca nut weevil)
- \**Aspergillus niger* (*Aspergillus* ear rot)
- \**Aspidiotus destructor* (coconut scale)
- \**Aspidiotus nerii* (aucuba scale)
- \**Atherigona orientalis* (pepper fruit fly)
- \**Bactrocera dorsalis* (Oriental fruit fly)
- \**Bactrocera dorsalis* species complex (Oriental fruit fly species complex)
- \*Banana bunchy top virus (bunchy top of banana)
- \*Banana streak virus
- \**Bipolaris sacchari* (eye spot)
- Cania bilinea*
- \**Cassia obtusifolia* (sicklepod)
- \**Ceratocystis paradoxa* (black rot of pineapple)
- \**Ceroplastes floridensis* (soft scale)
- \**Ceroplastes rubens* (pink wax scale)
- \**Chenopodium album* (fat hen)
- \**Chondracris rosea* (citrus locust)
- \**Chromolaena odorata* (archangel)
- \**Chrysomphalus aonidum* (black scale)
- Chrysomphalus dictyospermi* (Spanish red scale)
- \**Cladosporium musae* (banana leaf speckle)
- \**Cnaphalocrocis medinalis* (leaf folder, rice)
- \**Coccus hesperidum* (brown soft scale)
- \**Cochliobolus lunatus* (black kernel of rice)
- \**Colletotrichum musae* (banana black rot)
- \**Commelina benghalensis* (benghal dayflower)
- \**Commelina diffusa* (water grass)
- \**Conyza canadensis* (Canadian fleabane)
- Coptotermes formosanus* (soil-nesting, termite, oriental)
- \**Corticium rolfsii* (collar rot)
- \**Cosmopolites sordidus* (banana weevil)
- \*Cucumber mosaic virus (cucumber mosaic)
- \**Cyperus difformis* (small-flowered nutsedge)
- \**Dactyloctenium aegyptium* (crow's foot)
- \**Datura stramonium* (jimsonweed)
- \**Diaphania indica* (cotton caterpillar (Japan))
- \**Echinochloa crus-galli* (barngrass)
- \**Emilia sonchifolia* (consumption weed)
- \**Erionota thrax* (palm redeye)
- \**Erwinia carotovora* subsp. *atroseptica* (potato blackleg disease)
- \**Erwinia carotovora* subsp. *carotovora* (bacterial root rot of sweet potato)
- \**Erwinia chrysanthemi*
- \**Erwinia chrysanthemi* pv. *chrysanthemi* (bacterial maize stalk rot)
- \**Erwinia chrysanthemi* pv. *zeae* (bacterial stalk rot)
- \**Eudocima fullonia* (fruit-piercing moth)
- \**Euphorbia hirta* (asthmaweed)
- \**Eutetranychus orientalis* (Citrus brown mite)
- \**Ferrisia virgata* (guava mealybug)
- \**Fimbristylis littoralis* (lesser fimbriistylis)
- \**Fusarium oxysporum* f.sp. *cubense* (banana wilt)
- \**Gibberella fujikuroi* (bakanae disease of rice)
- \**Gibberella zeae* (cobweb disease)
- \**Glomerella cingulata* (anthracnose)
- \**Guignardia musae* (freckle disease of banana)
- \**Helicotylenchus dihystra* (common spiral nematode)
- \**Heliotropium indicum* (devil weed (Pakistan))
- \**Hemiberlesia lataniae* (latania scale)
- \**Hemicriconemoides mangiferae*
- \**Hoplolaimus indicus* (lance nematode)
- \**Hoplolaimus pararobustus* (lance nematode)
- \**Icerya aegyptiaca* (breadfruit mealybug)
- \**Icerya seychellarum* (Okada cottony-cushion scale)
- \**Imperata cylindrica* (bedding grass)
- \**Lasiodiplodia theobromae* (brown pod rot of cocoa)
- \**Lepidosaphes beckii* (purple scale)
- \**Leptochloa chinensis* (Asian sprangletop)
- \**Locusta migratoria* (migratory locust)
- \**Longidorus* (longidorids)
- \**Maconellicoccus hirsutus* (pink hibiscus mealybug)
- \**Melanitis leda* ismene (rice butterfly)
- \**Meloidogyne arenaria* (peanut root-knot nematode)
- \**Meloidogyne incognita* (root-knot eelworm)
- \**Meloidogyne javanica* (sugarcane eelworm)
- \**Metopolophium dirhodum* (rose-grass aphid)
- \**Mimosa pudica* (action plant)
- \**Momordica charantia* (balsam apple)
- \**Mycosphaerella fijiensis* (black Sigatoka)
- \**Mycosphaerella musicola* (leaf spot of banana)
- \**Nipaecoccus nipae* (avocado mealybug)
- \**Odoiporus longicollis* (banana stem weevil)
- \**Opogona sacchari* (banana moth)
- \**Oryctes rhinoceros* (Asiatic rhinoceros beetle)
- \**Oxalis corniculata* (creeping woodsorrel (USA))
- \**Panicum maximum* (buffalo grass)
- \**Panicum repens* (creeping panic)
- \**Parasa lepida* (nettle caterpillar)
- \**Parasaissetia nigra* (black coffee scale)
- \**Paratrichodorus porosus*
- \**Paspalum conjugatum* (buffalo grass)

\*Passiflora foetida (love-in-a-mist)  
 \*Pentalonia nigronervosa (banana aphid)  
 \*Pinnaspis strachani (lesser snow scale)  
 \*Planococcus citri (citrus mealybug)  
 \*Pratylenchus coffeae (banana root nematode)  
 \*Pratylenchus loosi (Loos' root lesion nematode)  
 \*Pratylenchus penetrans (Cobb's root-lesion nematode)  
 \*Pseudococcus calceolariae (citrophilus mealybug)  
 \*Pseudococcus comstocki (Comstock mealybug)  
 \*Pseudomonas cichorii (bacterial blight of endive)  
 \*Pseudomonas syringae pv. syringae (bacterial canker or blast (stone and pome fruits))  
 \*Pythium debaryanum (damping-off)  
 Ralstonia solanacearum race 1  
 \*Rastrococcus invadens (mango mealybug)  
 \*Rhizobium radiobacter (crown gall)  
 \*Rhizobium rhizogenes (bacterial gall)  
 \*Rhopalosiphum maidis (green corn aphid)  
 \*Rhopalosiphum padi (grain aphid)  
 \*Rottboellia cochinchinensis (corn grass)  
 \*Rotylenchulus reniformis (reniform nematode)  
 \*Saissetia coffeae (brown coffee scale (Sri Lanka))  
 \*Sclerotinia sclerotiorum (collar rot)

\*Scutellonema brachyurus  
 \*Scutellonema clathricaudatum  
 \*Setaria parviflora (knotroot bristlegrass)  
 \*Setaria pumila (cat's tail grass (Fiji))  
 \*Setaria verticillata (bristly foxtail)  
 \*Solanum nigrum (black nightshade)  
 \*Sorghum halepense (aleppo grass)  
 \*Spodoptera exigua (beet armyworm)  
 \*Spodoptera litura (armyworm)  
 \*Stellaria media (chickweed)  
 \*Stephanitis typica (banana lace-wing bug)  
 \*Synedrella nodiflora (Cinderella weed (Australia))  
 \*Tetranychus cinnabarinus (carmine spider mite)  
 \*Tetranychus piercei  
 \*Thrips hawaiiensis (flower thrips)  
 Tiracola plagiata (androng caterpillar)  
 \*Tirathaba rufivena (coconut spike moth)  
 \*Trichodorus (paratrichodorids)  
 \*Tridax procumbens (p.w.d.weed (Kenya))  
 \*Tyrophagus putrescentiae (cereal mite)  
 \*Unaspis citri (citrus snow scale)  
 Xylotrupes gideon



**Table 2**  
**Pest List of Banana in Malaysia.**

*Achatina fulica (giant African land snail)	*Fimbristylis littoralis (lesser fimbristylis)
Adoretus sinicus (rose beetle)	*Fusarium oxysporum f.sp. cubense (banana wilt)
*Adoretus versutus (Fijian cane root grub)	*Gibberella fujikuroi (bakanae disease of rice)
*Ageratum conyzoides (billy goat weed)	*Glomerella cingulata (anthracnose)
*Agrotis ipsilon (black cutworm)	*Guignardia musae (freckle disease of banana)
*Aleurocanthus woglumi (citrus blackfly)	*Haplobasidium musae (diamond leaf spot)
*Aleurodicus dispersus (spiralling whitefly)	*Helicotylenchus dihystra (common spiral nematode)
*Amaranthus spinosus (calaloo)	*Helicotylenchus multicinctus (banana spiral nematode)
Amathusia phidippus (palm king)	*Heliotropium indicum (devil weed (Pakistan))
*Aonidiella aurantii (red scale)	*Hemiberlesia lataniae (latania scale)
*Aonidiella orientalis (oriental red scale)	*Icerya aegyptiaca (breadfruit mealybug)
*Aphis gossypii (cotton aphid)	*Icerya seychellarum (Okada cottony-cushion scale)
*Araecerus fasciculatus (areca nut weevil)	*Imperata cylindrica (bedding grass)
*Artona catoxantha (coconut leaf moth)	*Lasiodiplodia theobromae (brown pod rot of cocoa)
*Aspergillus niger (Aspergillus ear rot)	*Lepidosaphes beckii (purple scale)
*Aspidiotus destructor (coconut scale)	*Leptochloa chinensis (Asian sprangletop)
*Atherigona orientalis (pepper fruit fly)	*Locusta migratoria (migratory locust)
*Bactrocera dorsalis species complex (Oriental fruit fly species complex)	*Longidorus (longidorids)
*Bactrocera papayae (papaya fruit fly)	*Maconellicoccus hirsutus (pink hibiscus mealybug)
*Banana bunchy top virus (bunchy top of banana)	Mahasena corbetti (coconut case caterpillar)
*Banana streak virus	*Marasmius palmivorus (oil palm bunch rot)
*Brevipalpus californicus (citrus flat mite)	*Melanitis leda ismene (rice butterfly)
*Brevipalpus phoenicis (false spider mite)	*Meloidogyne arenaria (peanut root-knot nematode)
*Cassia obtusifolia (sicklepod)	*Meloidogyne incognita (root-knot eelworm)
*Ceroplastes floridensis (soft scale)	*Meloidogyne javanica (sugarcane eelworm)
*Ceroplastes rubens (pink wax scale)	Merremia peltata
*Chaetanaphothrips orchidii (anthurium thrips)	*Mikania micrantha (mile-a-minute)
*Chondracris rosea (citrus locust)	*Mimosa invisa (giant sensitive plant)
*Chromolaena odorata (archangel)	*Mimosa pudica (action plant)
*Chrysomphalus aonidum (black scale)	*Momordica charantia (balsam apple)
Chrysomphalus dictyospermi (Spanish red scale)	*Mycosphaerella eumusae (eumusae leaf spot)
*Cladosporium musae (banana leaf speckle)	*Mycosphaerella fijiensis (black Sigatoka)
*Cnaphalocrocis medinalis (leaf folder, rice)	*Mycosphaerella musicola (leaf spot of banana)
*Coccus hesperidum (brown soft scale)	*Nacoleia octasema (banana scab moth)
*Cochliobolus lunatus (black kernel of rice)	*Odoiporus longicollis (banana stem weevil)
*Colletotrichum musae (banana black rot)	*Oryctes rhinoceros (Asiatic rhinoceros beetle)
*Commelina benghalensis (benghal dayflower)	*Oxalis corniculata (creeping woodsorrel (USA))
*Commelina diffusa (water grass)	*Panicum maximum (buffalo grass)
*Corticium rolfsii (collar rot)	*Panicum repens (creeping panic)
*Cosmopolites sordidus (banana weevil)	*Parasa lepida (nettle caterpillar)
*Criconemella (ring nematode)	*Parasaissetia nigra (black coffee scale)
*Cucumber mosaic virus (cucumber mosaic)	*Paspalum conjugatum (buffalo grass)
*Cyperus difformis (small-flowered nutsedge)	*Passiflora foetida (love-in-a-mist)
*Dactyloctenium aegyptium (crow's foot)	*Pentalonia nigronervosa (banana aphid)
*Darna diducta (nettle caterpillar)	*Pinnaspis strachani (lesser snow scale)
*Darna trima (nettle caterpillar)	*Planococcus citri (citrus mealybug)
*Diaphania indica (cotton caterpillar (Japan))	*Pratylenchus coffeae (banana root nematode)
*Dysmicoccus brevipes (pineapple mealybug)	*Pratylenchus zeae (nematode, Corn root lesion)
*Echinochloa crus-galli (barngrass)	*Pseudococcus jackbeardsleyi (Jack Beardsley mealybug)
*Emilia sonchifolia (consumption weed)	*Pythium debaryanum (damping-off)
*Erionota thrax (palm redeye)	*Radopholus similis (burrowing nematode)
*Erwinia chrysanthemi	Ralstonia solanacearum race 1
*Erwinia chrysanthemi pv. zeae (bacterial stalk rot)	Ralstonia solanacearum race 2 (moko disease)
*Eudocima fullonia (fruit-piercing moth)	*Rastrococcus iceryoides (downey snow line mealy bug)
*Euphorbia hirta (asthmaweed)	*Rastrococcus invadens (mango mealybug)
*Ferrisia virgata (guava mealybug)	

\*Rhabdoscelus obscurus (beetle borer)  
\*Rhizobium radiobacter (crown gall)  
\*Rhopalosiphum maidis (green corn aphid)  
\*Rhopalosiphum padi (grain aphid)  
\*Rottboellia cochinchinensis (corn grass)  
\*Rotylenchulus reniformis (reniform nematode)  
\*Saissetia coffeae (brown coffee scale (Sri Lanka))  
Scopelodes testacea  
\*Setaria parviflora (knotroot bristlegrass)  
\*Solanum nigrum (black nightshade)  
\*Spodoptera exigua (beet armyworm)

\*Spodoptera litura (armyworm)  
\*Stephanitis typica (banana lace-wing bug)  
\*Synedrella nodiflora (Cinderella weed (Australia))  
\*Tetranychus cinnabarinus (carmine spider mite)  
\*Tetranychus piercei  
Thosea vetusta  
\*Thrips hawaiiensis (flower thrips)  
Tiracola plagiata (androng caterpillar)  
\*Tridax procumbens (p.w.d.weed (Kenya))  
\*Unaspis citri (citrus snow scale)  
Xylotrupes gideon

**Table 3: Pests of Banana in China NOT in Malaysia.**

**(Potential Quarantine pests)**

- \**Aspidiotus nerii* (aucuba scale)
- \**Bactrocera dorsalis* (Oriental fruit fly)
- \**Bipolaris sacchari* (eye spot)
- Cania bilinea*
- \**Ceratocystis paradoxa* (black rot of pineapple)
- \**Chenopodium album* (fat hen)
- \**Conyza canadensis* (Canadian fleabane)
- Coptotermes formosanus* (soil-nesting, termite, oriental)
- \**Datura stramonium* (jimsonweed)
- \**Erwinia carotovora* subsp. *atroseptica* (potato blackleg disease)
- \**Erwinia carotovora* subsp. *carotovora* (bacterial root rot of sweet potato)
- \**Erwinia chrysanthemi* pv. *chrysanthemi* (bacterial maize stalk rot)
- \**Eutetranychus orientalis* (Citrus brown mite)
- \**Gibberella zeae* (cobweb disease)
- \**Hemicriconemoides mangiferae*
- \**Hoplolaimus indicus* (lance nematode)
- \**Hoplolaimus pararobustus* (lance nematode)
- \**Metopolophium dirhodum* (rose-grass aphid)
- \**Nipaecoccus nipae* (avocado mealybug)
- \**Opogona sacchari* (banana moth)
- \**Paratrichodorus porosus*
- \**Pratylenchus loosi* (Loos' root lesion nematode)
- \**Pratylenchus penetrans* (Cobb's root-lesion nematode)
- \**Pseudococcus calceolariae* (citrophilus mealybug)
- \**Pseudococcus comstocki* (Comstock mealybug)
- \**Pseudomonas cichorii* (bacterial blight of endive)
- \**Pseudomonas syringae* pv. *syringae* (bacterial canker or blast (stone and pome fruits))
- \**Rhizobium rhizogenes* (bacterial gall)
- \**Sclerotinia sclerotiorum* (collar rot)
- \**Scutellonema brachyurus*
- \**Scutellonema clathricaudatum*
- \**Setaria pumila* (cat's tail grass (Fiji))
- \**Setaria verticillata* (bristly foxtail)
- \**Sorghum halepense* (aleppo grass)
- \**Stellaria media* (chickweed)
- \**Tirathaba rufivena* (coconut spike moth)
- \**Trichodorus* (paratrichodorids)
- \**Tyrophagus putrescentiae* (cereal mite)

**Table 4 . Risk analysis of Pests of concern to Malaysia for the Import of Banana from China In Table 3.**

Pest	Present in exporting country	Present in importing country	Economic impact	Potential Qtine pest/NQ	Pathway	Entry	Establish	Spread	Risk High Med Low	Category QP NRP	Management option
<i>Aspidiotus nerii</i> Bouché	Y	N	N	NQ						NQP	
<i>Bipolaris sacchari</i> (E. J. Butler) Shoemaker	Y	N	Y	PQP	Y	Y	N			NQP	
<b>Ceratocystis paradoxa</b>	Y	N	Y	PQP	Y	Y	Y	Y	M	QP	Yes
<i>Erwinia carotovora</i> subsp. <i>carotovora</i>	Y	N	Y	PQP	Y	Y	Y	Y	H	QP	Yes
<i>Gibberella zeae</i> (Schwein.) Petch	Y	N	N							NQP	
<i>Hoplolaimus pararobustus</i>	Y	N	N							NQP	
<i>Pseudomonas syringae</i> pv. <i>syringae</i>	Y	N	Y	PQP	Y	Y	Y	Y	H	QP	Yes
<b>Rhizobium rhizogenes</b>	Y	N	Y	NQ	Y	Y	Y	Y	L	NQP	
<i>Tyrophagus putrescentiae</i>	Y	N	N							NQP	

<i>Aspidiotus nerii</i> Bouché	Pest absent from importing country, but has no economic impact to the crop.
<i>Bipolaris sacchari</i> (E. J. Butler) Shoemaker	Non quarantine pest. Temperature not suitable for the development of the diseases.
<i>Ceratocystis paradoxa</i>	Can cause considerable damage as high as 10% to other crops. Temperature favourable to the development of the diseases. Its status as a quarantine pest has yet to be determined.
<i>Erwinia carotovora subsp. carotovora</i>	Has a wide host range. Can be transmitted through plant parts, soil, water. Condition suitable. Meets all the criteria of a quarantine pest.
<i>Gibberella zeae</i> (Schwein.) Petch	A secondary host only to the crop. Not a quarantine pest.
<i>Hoplolaimus pararobustus</i>	Economic impact appears to be low. Not a quarantine pest.
<i>Pseudomonas syringae pv. syringae</i>	Wide host range. Transmitted through plant parts, soil water. Meets all the criteria of a quarantine pest.
<i>Rhizobium rhizogenes</i>	Limited to nursery/greenhouse. No significant loss estimated. Cannot be considered as quarantine pest.
<i>Tyrophagus putrescentiae</i>	A common and cosmopolitan pest of stored foodstuff. Not a quarantine pest.

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Aspidiotus nerii Bouché</i></b>
Type	Insect
Economic Importance	Usually only a minor or non-economic pest on most of its host. Particularly important where aesthetic value of the crop is high. Heavy infestation on a single host leads to distortion, discoloration, wilting and eventually host death
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, stems, growing points, and fruits/pods.
Entry	Yes. Transmitted by vegetative growing plant.
Establishment	Crawlers are the primary dispersal stage of armoured scales and move to new areas of the plant or are dispersed by wind or animal contact. Dispersal of sessile adults and eggs occurs through human transport of infested plant material.
Spread	
Risk	
Category	Non Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Bipolaris sacchari</i> (E. J. Butler) Shoemaker</b>
Type	Fungi
Economic Importance	<i>B. sacchari</i> caused seedling collar rot with 50% mortality (Sinha and Kishan-Singh, 1983).  In China, <i>B. sacchari</i> was one of the four most important disease organisms (Taylor, 1986).
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, and stems. Plant parts liable to carry the pest in trade/transport: - Leaves: - Stems (above ground)/shoots/trunks/branches: Spores - True seeds (inc. grain):
Entry	Yes. Transmitted through seedling stage, vegetative growing stage, and flowering stage.
Establishment	No. Temperature in Malaysia (>26 <sup>0</sup> C) not suitable.
Spread	
Risk	Low
Category	Non Quarantine pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Ceratocystis paradoxa</b>
Type	Fungi
Economic Importance	Pineapples: causes a loss of about 10% plus costs incurred while transporting diseased fruit
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, stems, roots, fruits/pods, and seeds.
Entry	Yes. Transmitted by whole plant, leaves, stems, roots
Establishment	Yes. Growth luxuriantly 25 - 31 <sup>0</sup> C; Optimum temp. 28 <sup>0</sup> C ; pH 5.5-6.3
Spread	Plant parts, wind, water.
Risk	Medium
Category	Quarantine Pest ?
Management	



**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Erwinia carotovora</i> subsp. <i>carotovora</i></b>
Type	Bacteria
Economic Importance	Affects a wide range of plants causing soft rot of potatoes and many fruits and vegetables. The extent of losses varies among countries and is influenced by climate and conditions of growth and storage. postharvest losses may reach 100%.
Pathway (Seed, or fruit, or plant, or leaf etc)	- Bulbs/tubers/corms/rhizomes: borne internally; borne externally; - Leaves: Roots: Stems (above ground)/shoots/trunks/branches Transmitted by soil water movement
Entry	Wide host range. Plant parts liable to carry the pest in trade/transport:
Establishment	Yes. Under suitable temperature (>20 <sup>0</sup> C)
Spread	Through plant parts, soil, water.
Risk	High
Category	Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Gibberella zeae (Schwein.) Petch</i></b>
Type	Fungi
Economic Importance	Of major economic importance include maize, and small grains, particularly wheat, barley, rye and triticale. Secondary hosts: <i>Musa x paradisiaca</i> (plantain)
Pathway (Seed, or fruit, or plant, or leaf etc)	
Entry	
Establishment	
Spread	
Risk	
Category	Non Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Hoplolaimus pararobustus</b>
Type	Nematodes
Economic Importance	Of common occurrence, its economic impact appears to be low;
Pathway (Seed, or fruit, or plant, or leaf etc)	
Entry	
Establishment	
Spread	
Risk	
Category	Non Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Pseudomonas syringae</i> pv. <i>Syringae</i></b>
Type	Bacteria
Economic Importance	Attacks major crops, including beans ( <i>Phaseolus vulgaris</i> ), cowpeas, stone fruits, pome fruits, kiwi fruit and grain sorghum widespread and may be devastating, causing great losses or requiring much effort to protect plants from them. Attacks plants from the seedling stage to maturity
Pathway (Seed, or fruit, or plant, or leaf etc)	Affected Plant Parts: Whole plant, leaves, stems, roots, fruits/pods, seeds, and inflorescence. Affected Plant Stages: Flowering stage, fruiting stage, seedling stage, vegetative growing stage, and post-harvest.
Entry	Pollen and budwood are liable to carry the pest in international trade. Transport pathways for long distance movement: - Non-host plant material: Weeds
Establishment	Found in soil and water and on plant surfaces worldwide. It is transmitted and disseminated through living plants and vegetative propagation material and by wind-driven rain. It can be isolated from apparently healthy plants without disease symptoms being evident for several years, indicating either an epiphytic phase or the presence of latent infections.
Spread	Wide host range. Affected Plant Stages: Flowering stage, fruiting stage, seedling stage, vegetative growing stage, and post-harvest. Affected Plant Parts: Whole plant, leaves, stems, roots, fruits/pods, seeds, and inflorescence.
Risk	High.
Category	Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Rhizobium rhizogenes</b>
Type	Bacteria
Economic Importance	Accounts of disease loss caused by crown gall are at best estimates as detailed, accurate surveys are rarely conducted, nor are there good survey instruments available for disease forecast and impact.
Pathway (Seed, or fruit, or plant, or leaf etc)	Not carried in or transmitted by true seed unless contaminated with soilborne <i>Rhizobium</i> . Seedling stage, vegetative growing stage, flowering stage, and fruiting stage.
Entry	Yes. Transmitted through contaminant with soil. Seedling stage, vegetative growing stage, flowering stage, and fruiting stage.
Establishment	Optimum temperature at 21°C, infection is inhibited above 33-36°C Wide host range: onion, sugarcane, rape, celery....
Spread	Through infected host plants. Transmitted by vector: nematode, insect. Wounds are required for the pathogen to infect the plants.
Risk	Low, does not occur every year in the field Commonly occur in nursery/greenhouse operations.
Category	NQP
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Tyrophagus putrescentiae</b>
Type	Insect
Economic Importance	A common and cosmopolitan contaminant of stored foodstuffs.
Pathway (Seed, or fruit, or plant, or leaf etc)	
Entry	
Establishment	
Spread	
Risk	
Category	Non Quarantine Pest.
Management	

**Table 6: Management of Quarantine Pests on Banana from China.**

Pest		Treatment
Quarantine Pests	<i>Ceratocystis paradoxa</i>	<p>Option 1.</p> <ul style="list-style-type: none"> <li>The plant materials are to be produced from certified pest free place in the exporting country.</li> </ul> <p>Option 2.</p> <ul style="list-style-type: none"> <li>Offshore treatment and Certification</li> <li>Inspection of samples in the laboratory on arrival.</li> <li>Chemical (fungicide) treatment if pests are found.</li> </ul> <p>Option 3.</p> <ul style="list-style-type: none"> <li>The plant material are to be imported in the form of tissue cultures which are to be prepared under aseptic conditions and free from any anti-biotics.</li> <li>Inspection on arrival for a period for any contamination with the pathogens</li> </ul>
Quarantine pests	<i>Erwinia carotovora subsp. carotovora</i>	<p>Option 1.</p> <ul style="list-style-type: none"> <li>The plant materials are to be produced from certified pest free place in the exporting country.</li> </ul> <p>Option 2.</p> <ul style="list-style-type: none"> <li>The plant material are to be imported in the form of tissue cultures which are to be prepared under aseptic conditions and free from any anti-biotic.</li> <li>Inspection on arrival for a period for any contamination with the pathogens</li> </ul>
Quarantine Pests	<i>Pseudomonas syringae pv. syringae</i>	<p>Option 1.</p> <ul style="list-style-type: none"> <li>The plant materials are to be produced from certified pest free place in the exporting country.</li> </ul> <p>Option 2.</p> <ul style="list-style-type: none"> <li>The plant material are to be imported in the form of tissue cultures which are to be prepared under aseptic conditions and free from any anti-biotic.</li> <li>Inspection on arrival for a period for any contamination with the pathogens.</li> </ul>
Non-critical quarantine pests		

#### **Stage 4a. Risk communication.**

The final regulatory position is - -----

- a. Plant Import Permit is required subject to the following conditions –
  - i. Conditions prior to Export -  
as stipulated in the Import permit under Management of Quarantine Pests on Banana from China (Table 6).
  - ii. Certification at export
  - iii. Import inspection upon arrival on the sampling.
  - iv. Import treatment as necessary.
- b. Release subject to freedom from pests / or reconsignment or destruction.

#### **4b. Working instruction for Quarantine Inspections that can be inserted into the Quarantine Operation manual.**

1. Consignment to be imported from China to Malaysia.
  - i. Name of Plant - Banana
  - ii. Pests to be examined:
    - *Ceratocystis paradox*
    - *Erwinia carotovora subsp. Carotovora*
    - *Pseudomonas syringae pv. syringae*
2. Check documentation for compliance
  - Phytosanitary Certificate
  - Plant Import Permit
  - Declaration of compliance of the above documents
  - Area freedom from the targeted pest, etc.
3. Inspection of the plant materials for contamination.
4. Release if consignment meets conditions.
5. If not, the consignment will be treated, or post entry quarantine, or re-consigned, or destroyed



**Group B: PRA Exercise on Importation of wheat grain from Pakistan to Vietnam**

**Mr Phaydy Phixaysarakham – Laos**

**Mr Heng Chhunhy – Cambodia**

**Ms Asna Booty Othman – Malaysia**

**Mr Hoang Trung – Vietnam**

**A) Purpose/Objective.**

In order to prevent exotic pest associated imported wheat grain from Pakistan to Vietnam, the performance of PRA on this commodities is very necessary and important work for above purpose. To present the outcomes of a pest risk analysis/import risk analysis of the importation of wheat grain from Pakistan for consumption, and to indicate the regulatory position of the NPPO of Vietnam.

Wheat grain is the part of the plant wheat traded in international market. *Triticum sp* is the botanical name and local name of the plant species. Pakistan is the country of export wheat grain. Vietnam is the country that is doing the IRA

**B) Background**

This PRA was conducted as a practical exercise in quarantine decision-making at the PRA Workshop held in Kuala Lumpur in Malaysia. This particular exercise involves the possible importation of wheat grain for consumption from Pakistan to Vietnam

**- Process.**

**Stage 1 Pest Risk Initiation.**

Lists of pests were obtained using the CABI Crop Protection Compendium only.

(**Table 1**)- List all the pests of the crop that is being imported that occur in the exporting country. Total 155 pests

(**Table 2**)- List all the pests that do occur on the crop in the importing country. Total 67 pests

(**Table 3**)- List all the pests that do occur in the exporting country but not in the importing country. Total 103 pests

**Stage 2 Pest Risk Analysis.**

In stage 2 a technical assessment is made of the pests in **Table 3** to determine if they meet the specific requirements for a quarantine pest in accordance with the IPPC text and the ISPM #5 Glossary of Phytosanitary terms. All the pests in Table 3 as potential quarantine pests in detail are evaluated following to the criteria for their classification is categorizin for each pest in **Table 5**. This is including different pest types such as fungi, bacteria, insect and weed.

The information compiled in the Pest datasheet obtained from the CABI CPC was used. This information resulted in the categorizing of the pests as undertaken in **Table 5** is compiled in **Table 4**, together with an estimate of the risk they pose.

The datasheets of potential quarantine pests are **Annex 1** of this report.

The pests are classified in accordance with the IPPC terminology into the following categories –

***Quarantine pest***

***Non-regulated pest***

Those pests that satisfy the definition of quarantine pests require management options to be considered, these pests are identified in **Table 4**.

**Stage 3 Pest Risk Management.**

The Quarantine pests are considered and a number of pest management options are considered as suitable, and can be conducted overseas or in your country.

Final management options are selected and listed in **Table 6**.

This table is compiled in the sequence from the point of production to the point of release in the country of destination.

**Stage 4. Risk communication.**

The final **regulatory position** is

Import is permitted subject to the following conditions

- **Import permit**
- **Package condition must not be packed by in jute bag (this is host of TG)**
- **Working instruction for Quarantine Inspectors that can be inserted into the Quarantine Operational Manual**
- **Check documentation**

+ Phytosanitary certificate

+ Pest free area Certification for *Tilletia indica* and *Xanthomonas translucens*

+ Treatment Certification for *Trogoderma granarium* (By Methyl bromide), Pakistan is TG country

certification of ship as free of *T. granarium*

- **Import inspection**

+ Taking samples and check consignment integrity

+ Check pest, diseases and weed seed

+ Check for trash and soil

- **Release consignment if it meets all importing requirements**
- **If not, the consignment will be refumigated or returned. Notification of non-compliance**

**D) References.**

CABI (2002) Crop Protection Compendium

Appendices.

Table 1 Pests of wheat grain in country Pakistan

Table 2 Pests of Vietnam in importing country

Table 3 Pests of wheat grain in country Pakistan not in importing country (Potential Quarantine pests)

Table 4 Risk analyses of pests of concern to importing country on part of commodity wheat grain.

Table 5 Technical evaluations of risk factors of the potential quarantine pests in Table 3

Table 6 Management of quarantine pests.

Annex 1 Datasheets of potential quarantine pests from CABI CPC (2003).

## Attachments.

### Tables format for IRA

**Table 1: Pests of wheat grain in exporting country**

*Acidovorax avenae subsp. avenae (bacterial leaf blight)	*Ditylenchus destructor (potato tuber nematode)
*Acremonium strictum (black bundle disease: maize)	*Ditylenchus dipsaci (brown ring disease of hyacinth)
*Acyrtosiphon pisum (pea aphid)	*Diuraphis noxia (barley aphid)
*Ageratum conyzoides (billy goat weed)	*Echinochloa crus-galli (barngrass)
*Agrotis ipsilon (black cutworm)	*Eleusine indica (goose grass)
*Agrotis segetum (black cutworm)	*Elymus repens (couch grass)
*Alopecurus myosuroides (black-grass)	*Ephestia elutella (chocolate moth)
Alternaria alternata (alternaria leaf spot)	*Euphorbia helioscopia (cat's tail)
*Alternaria brassicae (Alternaria blight)	*Euphorbia hirta (asthmaweed)
*Alternaria triticina (leaf blight of wheat)	*Eurygaster integriceps (sunn pest)
*Amaranthus hybridus (green amaranth)	*Fumaria officinalis (common fumitory)
Anacridium rubripinum (red-spined tree locust)	*Fusarium sporotrichioides
*Anagallis arvensis (blue pimpernel)	*Galium aparine (cleavers)
*Anguina tritici (bunted wheat)	Galleria mellonella (greater wax moth)
*Argemone mexicana (Mexican poppy)	*Gibberella zeae (cobweb disease)
*Aspergillus niger (Aspergillus ear rot)	*Glomerella graminicola (anthracnose of cereals)
*Asphodelus tenuifolius (asphodelus (USA))	*Helicotylenchus dihystra (common spiral nematode)
*Atherigona naqvii (shootfly)	*Helicoverpa armigera (cotton bollworm)
*Atherigona orientalis (pepper fruit fly)	*Heliotropium europaeum (common heliotrope)
*Atherigona soccata (sorghum stem fly)	*Heterodera avenae (cereal cyst eelworm)
*Avena fatua (wild oat)	*Heterodera zeae (corn cyst nematode)
*Barley stripe mosaic virus (stripe mosaic of barley)	*Hibiscus trionum (bladder hibiscus)
*Barley yellow dwarf viruses (barley yellow dwarf)	*Hirschmanniella oryzae (rice root nematode)
*Cadra cautella (dried currant moth)	*Hypera postica (lucerne weevil)
*Capsella bursa-pastoris (shepherd's purse)	*Locusta migratoria (migratory locust)
*Cardaria draba (heart-podded hoary cress)	*Lolium multiflorum (Italian ryegrass)
*Chenopodium album (fat hen)	*Lolium rigidum (rigid ryegrass)
*Chenopodium murale (nettle-leaved goosefoot)	*Lolium temulentum (darnel)
*Chilo polychrysus (dark-headed striped borer)	*Longidorus (longidorids)
*Cirsium arvense (california thistle)	*Melanaphis sacchari (yellow sugarcane aphid)
*Cnaphalocrocis medinalis (leaf folder, rice)	*Melilotus indica (annual yellow sweetclover)
*Cochliobolus heterostrophus (maydis leaf blight)	*Meloidogyne graminicola (rice root knot nematode)
*Cochliobolus lunatus (black kernel of rice)	Microtermes obesi
*Cochliobolus sativus (root and foot rot)	*Monographella nivalis (foot rot: cereals)
*Convolvulus arvensis (bindweed)	*Mus musculus domesticus (house mouse)
*Conyza bonariensis (Argentine fleabane)	*Mycosphaerella graminicola (Septoria tritici blotch)
*Conyza canadensis (Canadian fleabane)	*Mythimna loreyi (maize caterpillar)
*Corticium rolfsii (collar rot)	*Mythimna separata (Chinese armyworm)
*Curvularia (black grain)	*Myzus persicae (cabbage aphid)
*Cyperus rotundus (coco grass)	*Nezara viridula (green shield bug)
*Dactyloctenium aegyptium (crow's foot)	*Oedaleus senegalensis (Senegal grasshopper)
*Datura stramonium (jimsonweed)	*Oryzaephilus surinamensis (saw toothed grain beetle)
*Delia platura (bean seed fly)	*Papaver rhoeas (common poppy)
*Dicladispa armigera (rice hispa)	

- \*Paratrichodorus minor (stubby root nematode)
- Peanut clump virus
- \*Pelopidas mathias (rice skipper)
- \*Phaeosphaeria nodorum (glume blotch)
- \*Phalaris minor (canarygrass)
- \*Poa annua (annual bluegrass (USA, Canada, South Africa))
- \*Polygonum aviculare (hogweed)
- \*Polygonum hydropiper (marsh pepper)
- \*Polygonum lapathifolium (pale persicaria)
- \*Polymyxa graminis (vector of streak mosaic: wheat)
- \*Portulaca oleracea (purslane)
- \*Pratylenchus brachyurus (meadow nematode)
- Pratylenchus neglectus (nematode, California meadow)
- \*Pratylenchus penetrans (Cobb's root-lesion nematode)
- Pseudomonas syringae
- \*Puccinia graminis (stem rust of cereals)
- \*Puccinia striiformis (yellow rust)
- \*Puccinia triticina (brown rust)
- \*Pyrenophora chaetomioides (leaf blotch)
- \*Pyrenophora teres (net blotch)
- \*Pyrilla perpusilla (sugarcane planthopper)
- \*Pythium aphanidermatum (damping-off)
- \*Pythium debaryanum (damping-off)
- \*Rathayibacter tritici (spike blight)
- \*Rhopalosiphum maidis (green corn aphid)
- \*Rhopalosiphum padi (grain aphid)
- \*Rhopalosiphum rufiabdominale (cereal root aphid)
- \*Rhyzopertha dominica (lesser grain borer)
- \*Rotylenchulus reniformis (reniform nematode)
- \*Saccharum spontaneum (wild sugarcane)
- \*Schistocerca gregaria (desert locust)
- \*Schizaphis graminum (greenbug)
- \*Scirpophaga excerptalis (sugarcane top borer)
- \*Sclerophthora macrospora (crazy top of maize)
- \*Sesamia cretica (corn stem borer)
- \*Sesamia inferens (Asiatic pink stem borer)
- \*Setaria pumila (cat's tail grass (Fiji))
- \*Setaria verticillata (bristly foxtail)
- \*Setaria viridis (green foxtail)
- \*Sipha maydis
- \*Sitobion avenae (English grain aphid)
- \*Sitophilus zeamais (greater grain weevil)
- \*Sitotroga cerealella (grain moth)
- \*Sminthurus viridis (clover springtail)
- \*Solanum nigrum (black nightshade)
- \*Sonchus arvensis (field sowthistle)
- \*Sorghum halepense (aleppo grass)
- \*Spergula arvensis (corn spurry)
- \*Spodoptera exigua (beet armyworm)
- \*Spodoptera mauritia acronyctoides (armyworm)
- \*Stellaria media (chickweed)
- \*Thlaspi arvense (bastardcress)
- \*Thrips flavus (apple blossom thrips)
- \*Tilletia indica (Karnal bunt of wheat)
- \*Tilletia laevis (common bunt)
- \*Tilletia tritici (complete bunt)
- \*Tribolium castaneum (red flour beetle)
- \*Tribulus terrestris (bendy-eye (Australia))
- \*Trichodorus (paratrichodorids)
- \*Tridax procumbens (p.w.d. weed (Kenya))
- \*Trogoderma granarium (beetle, khapra)
- \*Urocystis agropyri (flag smut)
- \*Ustilago hordei (covered smut of barley)
- \*Veronica persica (bird's eye speedwell)
- \*Vicia sativa (common vetch)
- \*Xanthium strumarium (clotbur)
- \*Xanthomonas translucens pv. translucens (bacterial leaf streak)
- \*Xestia c-nigrum (spotted cutworm)

**Table 2: Pests of wheat grain in Importing country**

* <i>Acidovorax avenae</i> subsp. <i>avenae</i> (bacterial leaf blight)	<i>Mycosphaerella brassicicola</i> (cabbage ring-spot)
* <i>Ageratum conyzoides</i> (billy goat weed)	* <i>Mythimna loreyi</i> (maize caterpillar)
* <i>Agrotis ipsilon</i> (black cutworm)	* <i>Mythimna separata</i> (Chinese armyworm)
* <i>Agrotis segetum</i> (black cutworm)	* <i>Myzus persicae</i> (cabbage aphid)
* <i>Alternaria brassicae</i> ( <i>Alternaria</i> blight)	* <i>Nezara viridula</i> (green shield bug)
* <i>Atherigona soccata</i> (sorghum stem fly)	* <i>Oryzaephilus surinamensis</i> (saw toothed grain beetle)
* <i>Bandicota indica</i> (greater bandicoot rat)	* <i>Paratrichodorus minor</i> (stubby root nematode)
* <i>Callosobruchus chinensis</i> (Chinese bruchid)	* <i>Pelopidas mathias</i> (rice skipper)
* <i>Chaetocnema confinis</i> (flea beetle)	* <i>Portulaca oleracea</i> (purslane)
* <i>Chilo polychrysus</i> (dark-headed striped borer)	* <i>Pratylenchus brachyurus</i> (meadow nematode)
* <i>Cnaphalocrocis medinalis</i> (leaf folder, rice)	* <i>Pratylenchus penetrans</i> (Cobb's root-lesion nematode)
* <i>Cochliobolus heterostrophus</i> (maydis leaf blight)	* <i>Pyrilla perpusilla</i> (sugarcane planthopper)
* <i>Cochliobolus lunatus</i> (black kernel of rice)	* <i>Pythium aphanidermatum</i> (damping-off)
* <i>Commelina diffusa</i> (water grass)	* <i>Pythium irregulare</i> (cavity spot: carrot)
* <i>Coryza canadensis</i> (Canadian fleabane)	* <i>Pythium splendens</i>
* <i>Corcyra cephalonica</i> (rice meal moth)	* <i>Rhopalosiphum maidis</i> (green corn aphid)
* <i>Corticium rolfsii</i> (collar rot)	* <i>Rhopalosiphum padi</i> (grain aphid)
* <i>Cryptolestes ferrugineus</i> (rusty grain beetle)	* <i>Rhyzopertha dominica</i> (lesser grain borer)
* <i>Cryptolestes pusillus</i> (flat grain beetle)	* <i>Rotylenchulus reniformis</i> (reniform nematode)
* <i>Curvularia</i> (black grain)	* <i>Saccharum spontaneum</i> (wild sugarcane)
* <i>Cyperus rotundus</i> (coco grass)	* <i>Scirpophaga excerptalis</i> (sugarcane top borer)
* <i>Dactyloctenium aegyptium</i> (crow's foot)	* <i>Sesamia inferens</i> (Asiatic pink stem borer)
* <i>Dicladispa armigera</i> (rice hispa)	* <i>Setaria pumila</i> (cat's tail grass (Fiji))
* <i>Echinochloa crus-galli</i> (barngrass)	* <i>Sitophilus zeamais</i> (greater grain weevil)
* <i>Elasmopalpus lignosellus</i> (lesser corn stalk borer)	* <i>Spodoptera exigua</i> (beet armyworm)
* <i>Eleusine indica</i> (goose grass)	* <i>Spodoptera mauritia acronyctoides</i> (armyworm)
* <i>Euphorbia hirta</i> (asthma weed)	* <i>Thanatephorus cucumeris</i> (many names, depending on host)
* <i>Gryllotalpa africana</i> (african mole cricket)	* <i>Tribolium castaneum</i> (red flour beetle)
* <i>Haplothrips aculeatus</i> (cereal thrips)	* <i>Tribolium confusum</i> (confused flour beetle)
* <i>Helicoverpa armigera</i> (cotton bollworm)	* <i>Tribulus terrestris</i> (bendy-eye (Australia))
* <i>Hirschmanniella oryzae</i> (rice root nematode)	* <i>Tridax procumbens</i> (p.w.d. weed (Kenya))
* <i>Locusta migratoria</i> (migratory locust)	* <i>Xestia c-nigrum</i> (spotted cutworm)
* <i>Longidorus</i> (longidorids)	
* <i>Melanaphis sacchari</i> (yellow sugarcane aphid)	
* <i>Meloidogyne graminicola</i> (rice root knot nematode)	

**Table 3: Pests of wheat grain in exporting country NOT in importing country. (Potential Quarantine pests)**

*Acremonium strictum (black bundle disease: maize)	*Mycosphaerella graminicola (Septoria tritici blotch)
*Acyrtosiphon pisum (pea aphid)	*Oedaleus senegalensis (Senegal grasshopper)
*Alopecurus myosuroides (black-grass)	*Papaver rhoeas (common poppy)
Alternaria alternata (alternaria leaf spot)	Peanut clump virus
*Alternaria trititica (leaf blight of wheat)	*Phaeosphaeria nodorum (glume blotch)
*Amaranthus hybridus (green amaranth)	*Phalaris minor (canarygrass)
Anacridium rubripinum (red-spined tree locust)	*Poa annua (annual bluegrass (USA, Canada, South Africa))
*Anagallis arvensis (blue pimpernel)	*Polygonum aviculare (hogweed)
*Anguina tritici (bunted wheat)	*Polygonum hydropiper (marsh pepper)
*Argemone mexicana (Mexican poppy)	*Polygonum lapathifolium (pale persicaria)
*Aspergillus niger (Aspergillus ear rot)	*Polymyxa graminis (vector of streak mosaic: wheat)
*Asphodelus tenuifolius (asphodelus (USA))	Pratylenchus neglectus (nematode, California meadow)
*Atherigona naqvii (shootfly)	Pseudomonas syringae
*Atherigona orientalis (pepper fruit fly)	*Puccinia graminis (stem rust of cereals)
*Avena fatua (wild oat)	*Puccinia striiformis (yellow rust)
*Barley stripe mosaic virus (stripe mosaic of barley)	*Puccinia trititica (brown rust)
*Barley yellow dwarf viruses (barley yellow dwarf)	*Pyrenophora chaetomioides (leaf blotch)
*Cadra cautella (dried currant moth)	*Pyrenophora teres (net blotch)
*Capsella bursa-pastoris (shepherd's purse)	*Pythium debaryanum (damping-off)
*Cardaria draba (heart-podded hoary cress)	*Rathayibacter tritici (spike blight)
*Chenopodium album (fat hen)	*Rhopalosiphum rufiabdominale (cereal root aphid)
*Chenopodium murale (nettle-leaved goosefoot)	*Schistocerca gregaria (desert locust)
*Cirsium arvense (california thistle)	*Schizaphis graminum (greenbug)
*Cochliobolus sativus (root and foot rot)	*Sclerophthora macrospora (crazy top of maize)
*Convolvulus arvensis (bindweed)	*Sesamia cretica (corn stem borer)
*Conyza bonariensis (Argentine fleabane)	*Setaria verticillata (bristly foxtail)
*Datura stramonium (jimsonweed)	*Setaria viridis (green foxtail)
*Delia platura (bean seed fly)	*Sipha maydis
*Ditylenchus destructor (potato tuber nematode)	*Sitobion avenae (English grain aphid)
*Ditylenchus dipsaci (brown ring disease of hyacinth)	*Sitotroga cerealella (grain moth)
*Diuraphis noxia (barley aphid)	*Sminthurus viridis (clover springtail)
*Elymus repens (couch grass)	*Solanum nigrum (black nightshade)
*Ephestia elutella (chocolate moth)	*Sonchus arvensis (field sowthistle)
*Euphorbia helioscopia (cat's tail)	*Sorghum halepense (aleppo grass)
*Eurygaster integriceps (sunn pest)	*Spergula arvensis (corn spurry)
*Fumaria officinalis (common fumitory)	*Stellaria media (chickweed)
*Fusarium sporotrichioides	*Thlaspi arvense (bastardcress)
*Galium aparine (cleavers)	*Thrips flavus (apple blossom thrips)
Galleria mellonella (greater wax moth)	*Tilletia indica (Karnal bunt of wheat)
*Gibberella zeae (cobweb disease)	*Tilletia laevis (common bunt)
*Glomerella graminicola (anthracnose of cereals)	*Tilletia tritici (complete bunt)
*Helicotylenchus dihystra (common spiral nematode)	*Trichodorus (paratrachodorids)
*Heliotropium europaeum (common heliotrope)	*Trogoderma granarium (beetle, khapra)
*Heterodera avenae (cereal cyst eelworm)	*Urocystis agropyri (flag smut)
*Heterodera zeae (corn cyst nematode)	*Ustilago hordei (covered smut of barley)
*Hibiscus trionum (bladder hibiscus)	*Veronica persica (bird's eye speedwell)
*Hypera postica (lucerne weevil)	*Vicia sativa (common vetch)
*Lolium multiflorum (Italian ryegrass)	*Xanthium strumarium (clotbur)
*Lolium rigidum (rigid ryegrass)	*Xanthomonas translucens pv. translucens (bacterial leaf streak)
*Lolium temulentum (darnel)	
*Melilotus indica (annual yellow sweetclover)	
Microtermes obesi	
*Monographella nivalis (foot rot: cereals)	
*Mus musculus domesticus (house mouse)	

**Table 4 . Risk analysis of pests of concern to Vietnam on wheat grain from Pakistan in Table 3.**

Pest	Present in exporting country	Present in importing country	Economic impact	Potential Qtime pest/NQ	Pathway Seed only	Entry	Establish	Spread	Risk High Med Low	Category QP NRP	Management option
<i>Avena fatua</i> L	Y	N	Y	PQP	Y	Y	N				
<i>Anguina tritici</i>	Y	N	Y	PQP	Y	Y	N				
<i>Sorghum halepense</i>	Y	N	Y	PQP	Y	Y	N				
<i>Trogoderma granarium</i>	Y	N	Y	PQP	Y	Y	Y	Y	H	PQ	Y
<i>Fusarium sporotrichioides</i>	Y	N	N	NQP							
<i>Aspergillus niger</i> Tiegh.	Y	N	N	NPQ							
<i>Tilletia indica</i>	Y	N	Y	PQP	Y	Y	Y	Y	H	PQ	Y
<i>Xanthomonas translucens</i>	Y	N	Y	PQP	Y	Y	N				
<i>Heterodera avenae</i>	Y	N	H	PQP	N						
<i>Sesamia cretica</i>	Y	N	H	PQP	N						



**Table 5.1: Technical evaluation of risk factors in Table 4.**

Pest	<i>Avena fatua L</i>
Type	Weed
Economic Importance	- High - Eight <i>A. fatua</i> plants per m <sup>2</sup> caused 14% yield reduction and 5.5% less protein content in wheat (Wimschneider et al., 1990); 100 panicles per m <sup>2</sup> reduced the yield of winter wheat by 34% and of spring wheat by 40%
Pathway (Seed, or fruit, or plant, or leaf etc)	- Seed
Entry	- Yes - Seed of <i>Avena fatua</i> can be transmitted by wheat seed and other.
Establishment	No - Germination of <i>Avena fatua</i> with an optimum around 15°C – 20°C
Spread	
Risk	
Category	NQP
Management	

**Table 5.2: Technical evaluation of risk factors in Table 4.**

Pest	<i>Anguina tritici</i>
Type	Nematode
Economic Importance	- High - Up to 100% losses have been reported in wheat, with wheat grain ears totally infected (Paruthi et al., 1987). Reddy (1983) also reported high losses (90%) in wheat seedlings; and 8.5% of sowed wheat seeds galled, resulting in 69% loss
Pathway (Seed, or fruit, or plant, or leaf etc)	Seed, leaf, seeding.
Entry	Yes, -This nematode could be transmitted by seed and plant -Ear-cockles are the only source of perpetuation of the disease.
Establishment	NO A. tritici favours cool condition, narrow host range: wheat, oat and some grass
Spread	
Risk	
Category	NQP
Management	

**Table 5.3: Technical evaluation of risk factors in Table 4.**

Pest	Aspergillus niger Tiegh.
Type	Fungi
Economic Importance	No serious
Pathway (Seed, or fruit, or plant, or leaf etc)	Yes Soil, contaminated seed and stored grain product
Entry	Yes
Establishment	Yes - Propagules of A. niger are common in the soil and air mycoflora of regions with hot climates.. - Wide host range such as
Spread	No
Risk	Non
Category	non quarantine pest
Management	

**Table 5.4: Technical evaluation of risk factors in Table 4.**

Pest	<i>Tilletia indica</i> (Kernel bunt of wheat)
Type	Fungi
Economic Importance	<ul style="list-style-type: none"> <li>- High</li> <li>- affect to whole plant, seed and inflorescence</li> <li>- The disease appeared in the Punjab (India) around 1930. It was epidemic there in 1953-1954 (Agarwal et al., 1976). Until 1970, sporadic outbreaks occurred every 2-3 years in the Punjab, Haryana and Uttar Pradesh regions, with a disease incidence of 0.1-10% and annual yield losses of about 0.2% (Munjil, 1976). In 1974 and 1975, the disease was epidemic in other regions (Himachal Pradesh, Tarai areas of Uttar Pradesh and the Gurudaspur area of the Punjab) with 50% infection</li> </ul>
Pathway (Seed, or fruit, or plant, or leaf etc)	<ul style="list-style-type: none"> <li>- Seed</li> <li>- T. indica can be transmitted from planted seeds to the plants grown from the seed</li> </ul>
Entry	Yes, transmitted by wheat seed, weed seed
Establishment	<p>Yes, host is wheat and some weed</p> <p>Teliospores germinate normally at 20-25<sup>o</sup>c</p> <p>On the soil surface over, teliospores germinate at 10 – 25<sup>o</sup>c and 5-40% moisture content.</p>
Spread	<p>Yes, present of host plant</p> <p>Without natural enemies</p>
Risk	<p>High</p> <p>None was capable of killing T. indica teliospores when applied to infected seeds</p>
Category	Quarantine pest
Management	<ul style="list-style-type: none"> <li>- Commodities form pest free area</li> <li>- Importation prohibition</li> </ul>

**Table 5.5: Technical evaluation of risk factors in Table 4.**

Pest	<i>Heterodera avenae</i> ( <i>Oat cyst nematode</i> )
Type	Nematode
Economic Importance	<ul style="list-style-type: none"> <li>- High</li> <li>- Reduce wheat yields is important (An initial population of two eggs per g of soil reduces wheat yields by 20%, and at four eggs per g of soil the loss is 35%)</li> <li>- Affect to whole plant</li> </ul>
Pathway (Seed, or fruit, or plant, or leaf etc)	<ul style="list-style-type: none"> <li>- Soil, root</li> <li>- There is no evidence that H. avenae is seed borne</li> </ul>
Entry	<p>Non No present in wheat seed</p>
Establishment	
Spread	
Risk	
Category	No Quarantine Pest
Management	

**Table 5.6: Technical evaluation of risk factors in Table 4.**

Pest	<i>Sesamia cretica</i>
Type	Insect
Economic Importance	<ul style="list-style-type: none"> <li>- High</li> <li>- Affect to whole plant</li> <li>- There have been few objective assessments of the economic importance of <i>S. cretica</i> but, in a general statement, Salah (1977) reported that where severe attacks develop, heavy losses of maize, sugarcane and sorghum limit cultivation of these crops. Over 60% of mature plants may be killed or badly damaged and those escaping infestation are sparsely scattered over the fields.</li> </ul>
Pathway (Seed, or fruit, or plant, or leaf etc)	Stem, leaves,
Entry	Non No present in wheat seed
Establishment	
Spread	
Risk	
Category	No QP
Management	

**Table 5.7: Technical evaluation of risk factors in Table 4.**

Pest	<i>Fusarium sporotrichioides</i>
Type	Fungi
Economic Importance	F. sporotrichioides is not important as a plant pathogen
Pathway (Seed, or fruit, or plant, or leaf etc)	Plant parts liable to carry the pest - Growing medium accompanying plants: Spores. - Flowers/inflorescences/cones/calyx: Spores, hyphae; borne internally; borne externally; invisible. - True seeds (inc. grain): Spores, hyphae; borne internally; borne externally; invisible.
Entry	Yes, transmitted by seed of the wheat.
Establishment	Yes Host range: wheat, maize, pea, and soybean....
Spread	Yes, present of host plant
Risk	Non
Category	No QP
Management	

**Table 5.8: Technical evaluation of risk factors in Table 4.**

Pest	<i>Xanthomonas translucens pv. translucens</i>
Type	Bacteria
Economic Importance	<ul style="list-style-type: none"> <li>- High, Affect to whole plant</li> <li>- Yield losses for Bacterial is important (Yield losses for bacterial streak and black chaff were estimated to be 30-40% in the most severely diseased wheat fields in Idaho (Forster and Schaad, 1988). For spring wheat in Minnesota, Shane et al. (1987) determined that 50% disease severity on the flag leaf reduced kernel weight by 8-13%, and 100% disease severity on the flag leaf resulted in a 13-34% loss. Duveiller (1992) reported a 20% average yield loss for wheat with 50% diseased leaf area.</li> <li>- Losses germination of seed</li> </ul>
Pathway (Seed, or fruit, or plant, or leaf etc)	<p>Yes</p> <p>Transmission by seed is the most likely means of long-distance dissemination and survival from year to year (Sands et al., 1986; Mehta, 1990; Mehta et al., 1992; Milus and Mirlolhi, 1995). The pathogen can remain viable in infested seeds for more than 5 years (Forster and Schaad, 1990).</p>
Entry	<p>Yes,</p> <p>Seed borne ( <i>X. translucens</i> is seed borne in wheat, barley, rye and triticale as well as some grasses (Mehta, 1990; Richardson, 1990). Schaad and Forster (1985) detected the pathogen in 15 of 19 wheat seed lots at bacterial concentrations ranging from 0.4-17,000 c.f.u./ml x 10<sup>2</sup>.</p>
Establishment	<p>Yes</p> <p>Host range: wheat, some Poaceae</p>
Spread	Yes, present of host plant
Risk	High
Category	QP
Management	Importation ban



**Table 5.9: Technical evaluation of risk factors in Table 4.**

Pest	<i>Trogoderma granarium</i>
Type	Insect
Economic Importance	- High, - T. granarium is a serious pest of cereal grain and oil seed - Damage caused a loss in weight averaging 16.36% (Girish et al., 1975). T. granarium has also been shown to decrease the mineral content of maize.
Pathway (Seed, or fruit, or plant, or leaf etc)	Seed, whole plant produce
Entry	Yes T. granarium can be transmitted through seed, grain
Establishment	Yes, Wide host range: groundnut, cotton, barley, wheat, rice...
Spread	Yes Present of many host and adaptable capability is so high
Risk	High
Category	PQ
Management	- Offshore treatment by Methyl Bromide fumigation

**Table 5.10: Technical evaluation of risk factors in Table 4.**

Pest	<i>Sorghum halepense</i> (Aleppo grass)
Type	Weed
Economic Importance	<ul style="list-style-type: none"> <li>- High,</li> <li>- <i>S. halepense</i> is one of the world's 10 worst weed</li> <li>- Crop yield reductions due to <i>S. halepense</i> are reported to be 25-59% in sugarcane (McWhorter, 1972) 12-40% in maize (Holm et al., 1977, Mikulas and Sule, 1979) and 23-42% in soybean (McWhorter and Hartwig, 1972). Losses in soybean in Argentina were reported as \$300 million per year as a result of <i>S. halepense</i> infestation (Colbert, 1979)</li> <li>- <i>S. halepense</i> is host of some pest that is vector of corn stunt disease, sugarcane mosaic virus.</li> </ul>
Pathway	Seed, rhizome
Entry	<p>Yes</p> <p>Seed of <i>S. halepense</i> can be transmitted by seed wheat and other commodity. Rhizome can be transmitted by soil.</p>
Establishment	<p>Yes</p> <p>Wide host range: wheat, maize, soybean, sugarcane.</p> <p>Rhizome production has an optimum at 30<sup>oc</sup></p>
Spread	<p>Yes,</p> <p><i>S. halepense</i> is most commonly a major problem in subtropical crops which are planted in wide rows (cotton, maize, sorghum, soybean and sugarcane).</p>
Risk	<p>High</p> <p>It can be a problem in closely spaced crops including sugar beet and wheat in warm temperate areas</p>
Category	PQ
Management	- Importation from pest free area

**Table 6.** Management of quarantine pests on wheat grain from Pakistan.

Pest		Treatment
Quarantine pests	<i>Tilletia indica</i>	<ul style="list-style-type: none"> <li>• Pest Free Area - Certification</li> <li>• Inspection</li> </ul>
Quarantine pests	<i>Trogoderma granarium</i>	<p>Pest-free area certification of premises and storage areas</p> <p>or</p> <ul style="list-style-type: none"> <li>• Offshore treatment</li> <li>• Certification of the conveyance as pest-free (ship)</li> <li>• Inspection on arrival</li> </ul>

**Group C: PRA Exercise on Rice Seed From Philippines to Myanmar for Planting**

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**A) Purpose/Objective.**

To present the outcomes of a pest risk analysis/import risk analysis of the importation of rice seed of (*Oryza sativa* L.) from country Philippines for planting, and to indicate the regulatory position of the NPPO of Myanmar.

Seeds are the part of the plant traded. Rice (*Oryza sativa*) is the botanical name and local name of the plant species. Philippines is the country of export Myanmar is the country that is doing the IRA, the country of import.

**B) Background.**

This PRA was conducted as a practical exercise in quarantine decision-making at the PRA Workshop held in Kuala Lumpur from July, 19 – 30, 2004

This particular exercise involves the possible importation of rice seeds from Philippines to Myanmar.

**C) Process.**

**Stage 1 Pest Risk Initiation.**

Lists of pests were obtained using the CABI Crop Protection Compendium

**Table 1 (246 Pests occur in Philippines in Rice Seeds)**

**Table 2. (161 Pests occur in Myanmar on Rice Seeds)**

**Table 3. (105 Pests of potential quarantine importance do not occur in Myanmar but occur in Philippines)**

## **Stage 2 Pest Risk Analysis.**

In stage 2 a technical assessment is made of the pests in **Table 3** to determine if they meet the specific requirements for a quarantine pest in accordance with the IPPC text and the ISPM #5 Glossary of Phytosanitary terms. In this exercise time does not permit the consideration of all the pests in Table 3 (Potential quarantine pests) in detail. Therefore a selection (10-12) pests of different pest types (fungi, bacteria, arthropods, virus, Mycoplasma) are selected as examples.

The criteria for their classification is categorised for each pest in **Table 5**.

The information compiled in the Pest datasheet obtained from the CABI CPC was used. This information resulted in the categorising of the pests as undertaken in **Table 5** is compiled in **Table 4**, together with an estimate of the risk they pose.

The datasheets of ten or twelve potential quarantine pests are **Annex 1** of this report.

The pests are classified in accordance with the IPPC terminology into the following categories –

### ***Quarantine pest***

#### **Non-regulated pest**

Those pests that satisfy the definition of quarantine pests require management options to be considered, these pests are identified in **Table 4**.

## **Stage 3 Pest Risk Management.**

The Quarantine pests are considered and a number of pest management options are considered as suitable, and can be conducted overseas or in your country.

Final management options are selected and listed in **Table 6**.

This table is compiled in the sequence from the point of production to the point of release in the country of destination.

## **Stage 4. Risk communication.**

The final **regulatory position** is - -allowed-----

- c. Import is permitted subject to the following conditions –
  - i. Conditions prior to Export Import permit required
  - ii. Certification at export.
  - iii. Certification on phytosanitary certificate on the potential quarantine pest on rice seeds from Philippines.

- iv. Import inspection [sampling methods/rates]  
Import inspection at 10% sampling of the consignment/ for trash and soil
- v. Release subject to freedom from pests/or reconsignment or destruction.
  1. Release the consignment after the conditions are met.
  2. If not, re-consign or destroy the consignment

**1. Check documentation**

- PC
- Plant import permit
- Declaration of compliance of the above documents

***Pseudomonas fuscovaginae***

- Area freedom or treatment with hot water

***Lindera crustaceae***

- Seed sampling and certification to ISTA rules.

**2. Inspection for trash, weed seed and soil**

**3. Release if consignment meets conditions**

**4. If not, re-consign or destroy**

**D) References.**

CABI (2002) Crop Protection Compendium

Annex 1 Datasheets of potential quarantine pests from CABI CPC (2003).

## Attachments

### Tables format for IRA

**Table 1: Pests of commodity Philippines in Exporting country**

*Aeschynomene indica (curly indigo)	*Corcyra cephalonica (rice meal moth)
*Ageratum conyzoides (billy goat weed)	*Corticium rolfsii (collar rot)
*Agromyza oryzae (rice leaf miner)	*Crassocephalum crepidioides
*Agrotis segetum (black cutworm)	*Criconemella (ring nematode)
*Ahasverus advena (foreign grain beetle)	*Cryptolestes pusillus (flat grain beetle)
*Alphitobius diaperinus (lesser mealworm)	*Curvularia (black grain)
*Alternanthera sessilis (creeping chaffweed)	*Cynodon dactylon (Bahama grass)
*Alternaria padwickii (black belly rice kernel)	*Cyperus compressus (annual sedge)
*Amaranthus spinosus (calaloo)	*Cyperus difformis (small-flowered nutsedge)
*Aphelenchoides besseyi (rice leaf nematode)	*Cyperus iria (grasshopper's cyperus)
*Aspergillus niger (Aspergillus ear rot)	*Cyperus rotundus (coco grass)
*Atherigona orientalis (pepper fruit fly)	*Dactyloctenium aegyptium (crow's foot)
*Atherigona oryzae (paddy seedling fly)	*Dicladispa armigera (rice hispa)
*Avena fatua (wild oat)	*Digitaria ciliaris (bamboo grass)
*Boerhavia diffusa (hogweed)	*Dimorphopterus
Brachiaria mutica (buffalo grass)	*Ditylenchus angustus (rice stem nematode)
*Brachiaria paspaloides (common signal grass)	*Earias insulana (Egyptian stem borer)
*Brevennia rehi (rice mealy bug)	*Echinochloa colona (barnyardgrass)
*Burkholderia glumae (bacterial grain rot)	*Echinochloa crus-galli (barngrass)
*Cadra cautella (dried currant moth)	*Eichhornia crassipes (water hyacinth)
Caliothrips striatopterus (black thrips of maize)	*Eleusine indica (goose grass)
*Carpophilus	*Emilia sonchifolia (consumption weed)
*Cassia obtusifolia (sicklepod)	Entyloma oryzae (leaf smut of rice)
*Celosia argentea (quailgrass)	*Erwinia carotovora subsp. carotovora (bacterial root rot of sweet potato)
*Cenchrus echinatus (bur grass)	*Erwinia chrysanthemi
*Ceratophyllum demersum (coontail)	*Erwinia chrysanthemi pv. zeae (bacterial stalk rot)
*Chilo auricilius (gold-fringed rice borer)	*Euphorbia hirta (asthmaweed)
*Chilo infuscatellus (early shoot-borer of sugarcane)	*Fimbristylis littoralis (lesser fimbristylis)
*Chilo polychrysus (dark-headed striped borer)	*Frankliniella intonsa (Taiwan flower thrips (Taiwan))
*Chilo sacchariphagus (spotted borer)	Gaeumannomyces graminis var. graminis (crown sheath rot)
*Chilo suppressalis (striped rice stem borer)	*Galinsoga parviflora (french soldier)
*Chloris barbata (peacock plumegrass)	*Gibberella fujikuroi (bakanae disease of rice)
*Chondracris rosea (citrus locust)	*Gryllotalpa africana (african mole cricket)
*Chromolaena odorata (archangel)	*Helicotylenchus multicinctus (banana spiral nematode)
*Cleome ruidosperma (consumption weed)	*Heliotropium indicum (devil weed (Pakistan))
*Cnaphalocrocis medinalis (leaf folder, rice)	*Hirschmanniella oryzae (rice root nematode)
*Cochliobolus heterostrophus (maydis leaf blight)	*Hoplolaimus seinhorsti (lance nematode)
*Cochliobolus lunatus (black kernel of rice)	*Hydrellia griseola (rice leaf miner)
*Cochliobolus miyabeanus (brown leaf spot of rice)	*Hydrellia philippina (barley leaf mining fly)
*Cochliobolus sativus (root and foot rot)	*Hydrilla verticillata (aquatic weed)
*Cofana spectra (white leafhopper)	*Hypomeces squamosus (gold-dust beetle)
Cofana unimaculata (white leafhopper)	*Imperata cylindrica (bedding grass)
*Commelina benghalensis (benghal dayflower)	*Ipomoea aquatica (water spinach)
*Commelina diffusa (water grass)	*Ischaemum rugosum (wrinkled duck-beak)
*Conyza canadensis (Canadian fleabane)	*Kyllinga brevifolia (sedge)
*Coptotermes (termites)	
*Corchorus aestuans	

- \**Laodelphax striatellus* (planthopper, smaller brown)
- \**Lasiodiplodia theobromae* (brown pod rot of cocoa)
- \**Leersia hexandra* (southern cut grass)
- \**Lemna perpusilla* (duckweed)
- \**Leptochloa chinensis* (Asian sprangletop)
- \**Leptocoris acuta* (rice seed bug)
- \**Leptocoris oratorius* (slender rice bug)
- Leptoglossus gonagra* (coreid bug)
- \**Leucopholis irrorata* (June beetle)
- \**Lindernia anagallis*
- \**Lindernia antipoda*
- \**Lindernia ciliata*
- \**Lindernia crustacea*
- \**Lindernia procumbens* (common false pimpernel)
- Liposcelis entomophila* (grain psocid)
- \**Locusta migratoria* (migratory locust)
- \**Ludwigia adscendens* (water primrose)
- \**Ludwigia hyssopifolia* (water primrose)
- \**Ludwigia octovalvis* (primrose willow)
- Macrosteles striifrons*
- \**Magnaporthe grisea* (blast of rice)
- \**Magnaporthe salvinii* (stem rot)
- \*Maize stripe virus (sorghum chlorosis virus)
- \**Marasmia exigua* (rice leaf roller)
- \**Marasmia patnalis* (rice leafroller)
- Marasmia ruralis* (rice leaf roller)
- \**Marsilea minuta* (airy pepperwort)
- \**Melanitis leda ismene* (rice butterfly)
- \**Melochia corchorifolia* (crab's eggs)
- \**Meloidogyne arenaria* (peanut root-knot nematode)
- \**Meloidogyne graminicola* (rice root knot nematode)
- \**Meloidogyne incognita* (root-knot eelworm)
- \**Meloidogyne javanica* (sugarcane eelworm)
- \**Merremia umbellata* (hogvine)
- \**Mimosa invisa* (giant sensitive plant)
- \**Mimosa pigra* (giant sensitive plant)
- \**Mimosa pudica* (action plant)
- \**Momordica charantia* (balsam apple)
- \**Monochoria vaginalis* (pickerel weed)
- \**Monographella albescens* (brown leaf blight)
- \**Mus musculus domesticus* (house mouse)
- \**Myriophyllum aquaticum* (parrot-feather)
- \**Myriophyllum spicatum* (Eurasian watermilfoil)
- \**Mythimna loreyi* (maize caterpillar)
- \**Mythimna separata* (Chinese armyworm)
- Najas graminea* (grassy naiad)
- Najas marina* (hollyleaf naiad)
- \**Naranga diffusa* (rice green caterpillar)
- \**Nectria rigidiuscula* (cushion gall disease)
- \**Nephotettix nigropictus* (rice green jassid)
- \**Nephotettix virescens* (green leafhopper (GLH))
- \**Nezara viridula* (green shield bug)
- \**Nilaparvata lugens* (brown planthopper)
- Nisia nervosa* (grey planthopper)
- \**Orseolia oryzae* (rice fly)
- \**Oryza rufipogon* (brownbeard rice)
- \**Oxalis corniculata* (creeping woodsorrel (USA))
- \**Panicum maximum* (buffalo grass)
- \**Panicum repens* (creeping panic)
- \**Paraponyx stagnalis* (rice case bearer)
- \**Paspalum conjugatum* (buffalo grass)
- \**Paspalum distichum* (couch paspalum)
- \**Passiflora foetida* (love-in-a-mist)
- \**Pelopidas mathias* (rice skipper)
- \**Peregrinus maidis* (corn delphacid)
- \**Perkinsiella saccharicida* (sugarcane delphacid)
- Phoma leveillei* (sheath blotch)
- \**Phragmites australis* (common reed)
- \**Pistia stratiotes* (Nile cabbage)
- \**Poa annua* (annual bluegrass (USA, Canada, South Africa))
- \**Polygonum barbatum* (knot grass)
- \**Polygonum hydropiper* (marsh pepper)
- \**Polygonum nepalense* (Nepal persicaria)
- \**Pomacea canaliculata* (apple snail)
- \**Portulaca oleracea* (purslane)
- \**Pratylenchus brachyurus* (meadow nematode)
- \**Pratylenchus penetrans* (Cobb's root-lesion nematode)
- \**Pratylenchus zeae* (nematode, Corn root lesion)
- \**Pseudomonas fluorescens* (biocontrol: Damping off (cotton))
- \**Pseudomonas fuscovaginae* (bacterial rot of rice sheaths)
- \**Pythium arrhenomanes* (cereals root rot)
- \**Pythium graminicola* (seedling blight of grasses)
- \**Pythium irregulare* (cavity spot: carrot)
- \**Rattus argentiventer* (rice field rat)
- \**Rattus exulans* (bush rat)
- \**Rattus rattus diardii* (Malaysian house rat)
- \**Rattus rattus mindanensis* (common Philippine field rat)
- \**Recilia dorsalis* (brown-banded rice leafhopper)
- \**Rhopalosiphum maidis* (green corn aphid)
- \**Rhopalosiphum padi* (grain aphid)
- \**Rhopalosiphum rufiabdominale* (cereal root aphid)
- \**Rhyzopertha dominica* (lesser grain borer)
- \*Rice grassy stunt virus
- \*Rice ragged stunt virus
- \*Rice tungro bacilliform virus
- Rice tungro disease (rice tungro virus)
- \*Rice tungro spherical virus
- \*rice yellow dwarf phytoplasma
- \**Rivula atimeta* (green hairy caterpillar)
- \**Rottboellia cochinchinensis* (corn grass)



- \**Saccharicoccus sacchari* (grey sugarcane mealybug)
- \**Saccharum spontaneum* (wild sugarcane)
- \**Salvinia molesta* (kariba weed)
- \**Sarocladium oryzae* (rice sheath rot)
- \**Schizaphis graminum* (greenbug)
- \**Scirpophaga incertulas* (yellow borer)
- \**Scirpophaga innotata* (white rice stem borer)
- \**Scirpophaga nivella* (paddy stem borer)
- \**Scirpus grossus* (greater club rush)
- \**Scirpus juncoides* (bulrush)
- \**Scirpus maritimus* (saltmarsh bulrush)
- \**Scotinophara coarctata* (black rice bug)
- Scotinophara latiuscula*
- \**Sesamia inferens* (Asiatic pink stem borer)
- Sesamia uniformis* (shoot boring caterpillar)
- \**Setaria parviflora* (knotroot bristlegrass)
- \**Setaria pumila* (cat's tail grass (Fiji))
- \**Setaria viridis* (green foxtail)
- Setomorpha rutella*
- \**Sida acuta* (broomweeds)
- \**Sitophilus zeamais* (greater grain weevil)
- \**Sitotroga cerealella* (grain moth)
- \**Sogatella furcifera* (rice planthopper)
- Sogatella vibix* (white-backed planthopper)
- \**Sorghum halepense* (aleppo grass)
- \**Sphaerulina oryzina* (cercospora leaf spot)
- \**Sphenoclea zeylanica* (gooseweed)
- \**Spodoptera exempta* (african armyworm)
- \**Spodoptera exigua* (beet armyworm)
- \**Spodoptera litura* (armyworm)
- Spodoptera mauritia* (paddy swarming caterpillar)
- \**Spodoptera mauritia acronyctoides* (armyworm)
- \**Stegobium paniceum* (biscuit beetle)
- \**Stenchaetothrips biformis* (rice leaf thrips)
- \**Striga asiatica* (cane-killing weed)
- \**Synedrella nodiflora* (Cinderella weed (Australia))
- Tagosodes pusanus*
- \**Tenebroides mauritanicus* (cadelle)
- \**Tetranychus urticae* (two-spotted spider mite)
- \**Thanatephorus cucumeris* (many names, depending on host)
- \**Thrips palmi* (melon thrips)
- \**Tilletia barclayana* (black smut of rice)
- \**Trianthema portulacastrum* (carpet weed)
- \**Tribolium castaneum* (red flour beetle)
- \**Tribulus terrestris* (bendy-eye (Australia))
- \**Tylenchorhynchus annulatus* (stunt nematode)
- \**Tyrophagus putrescentiae* (cereal mite)
- \**Ustilagoidea virens* (false smut)
- \**Utricularia aurea* (bladderwort)
- \**Xanthium strumarium* (clotbur)
- \**Xanthomonas oryzae* pv. *oryzae* (bacterial leaf blight of rice)
- \**Xanthomonas oryzae* pv. *oryzicola* (bacterial leaf streak of rice)
- \**Xiphinema americanum* (dagger nematode)

**Table 2: Pests of commodity Myanmar in Importing country**

* <i>Acanthospermum hispidum</i> (goat's head)	* <i>Eichhornia crassipes</i> (water hyacinth)
* <i>Acidovorax avenae</i> subsp. <i>avenae</i> (bacterial leaf blight)	* <i>Eleusine indica</i> (goose grass)
* <i>Aeschynomene indica</i> (curly indigo)	* <i>Emilia sonchifolia</i> (consumption weed)
* <i>Ageratum conyzoides</i> (billy goat weed)	* <i>Entyloma oryzae</i> (leaf smut of rice)
* <i>Agrotis segetum</i> (black cutworm)	* <i>Euphorbia hirta</i> (asthmaweed)
* <i>Alphitobius diaperinus</i> (lesser mealworm)	* <i>Fimbristylis littoralis</i> (lesser fimbriistylis)
* <i>Alteranthera philoxeroides</i> (alligator weed)	* <i>Gibberella fujikuroi</i> (bakanae disease of rice)
* <i>Alteranthera sessilis</i> (creeping chaffweed)	* <i>Gryllotalpa africana</i> (african mole cricket)
* <i>Alternaria padwickii</i> (black belly rice kernel)	* <i>Heliotropium indicum</i> (devil weed (Pakistan))
* <i>Amaranthus spinosus</i> (calaloo)	* <i>Hieroglyphus banian</i> (grasshopper, rice)
<i>Anomala antiqua</i> (groundnut chafer)	* <i>Hirschmanniella oryzae</i> (rice root nematode)
* <i>Aphelenchoides besseyi</i> (rice leaf nematode)	* <i>Hydrellia philippina</i> (barley leaf mining fly)
* <i>Aspergillus niger</i> ( <i>Aspergillus</i> ear rot)	* <i>Hydrilla verticillata</i> (aquatic weed)
* <i>Atherigona oryzae</i> (paddy seedling fly)	* <i>Hypomeces squamosus</i> (gold-dust beetle)
* <i>Bandicota indica</i> (greater bandicoot rat)	* <i>Hysteroneura setariae</i> (grass aphid)
* <i>Boerhavia diffusa</i> (hogweed)	* <i>Imperata cylindrica</i> (bedding grass)
* <i>Brachiaria paspaloides</i> (common signal grass)	* <i>Ischaemum rugosum</i> (wrinkled duck-beak)
* <i>Brevennia rehi</i> (rice mealy bug)	* <i>Lasioderma serricorne</i> (cigarette beetle)
* <i>Cadra cautella</i> (dried currant moth)	* <i>Latheticus oryzae</i> (longheaded flour beetle)
* <i>Callosobruchus chinensis</i> (Chinese bruchid)	* <i>Leersia hexandra</i> (southern cut grass)
* <i>Carpophilus</i>	* <i>Leptochloa chinensis</i> (Asian sprangletop)
* <i>Cassia obtusifolia</i> (sicklepod)	* <i>Leptocorisa acuta</i> (rice seed bug)
* <i>Celosia argentea</i> (quailgrass)	* <i>Leptocorisa oratorius</i> (slender rice bug)
* <i>Ceratophyllum demersum</i> (coontail)	* <i>Leptoglossus gonagra</i> (coreid bug)
* <i>Chilo auricilius</i> (gold-fringed rice borer)	* <i>Lindernia ciliata</i>
* <i>Chilo infuscatellus</i> (early shoot-borer of sugarcane)	* <i>Locusta migratoria</i> (migratory locust)
* <i>Chilo polychrysus</i> (dark-headed striped borer)	* <i>Ludwigia adscendens</i> (water primrose)
* <i>Chilo suppressalis</i> (striped rice stem borer)	* <i>Ludwigia hyssopifolia</i> (water primrose)
* <i>Cleome rutosperma</i> (consumption weed)	* <i>Ludwigia octovalvis</i> (primrose willow)
* <i>Cnaphalocrocis medinalis</i> (leaf folder, rice)	* <i>Macrophomina phaseolina</i> (ashy stem blight)
* <i>Cochliobolus heterostrophus</i> (maydis leaf blight)	* <i>Magnaporthe grisea</i> (blast of rice)
* <i>Cochliobolus miyabeanus</i> (brown leaf spot of rice)	* <i>Magnaporthe salvinii</i> (stem rot)
* <i>Cochliobolus sativus</i> (root and foot rot)	* <i>Marasmia exigua</i> (rice leaf roller)
* <i>Cofana spectra</i> (white leafhopper)	* <i>Marsilea minuta</i> (airy pepperwort)
* <i>Commelina benghalensis</i> (benghal dayflower)	* <i>Melanitis leda ismene</i> (rice butterfly)
* <i>Commelina diffusa</i> (water grass)	* <i>Melochia corchorifolia</i> (crab's eggs)
* <i>Corcyra cephalonica</i> (rice meal moth)	* <i>Meloidogyne graminicola</i> (rice root knot nematode)
* <i>Corticium rolfsii</i> (collar rot)	* <i>Meloidogyne incognita</i> (root-knot eelworm)
* <i>Crassocephalum crepidioides</i>	* <i>Meloidogyne javanica</i> (sugarcane eelworm)
* <i>Cryptolestes pusillus</i> (flat grain beetle)	* <i>Mimosa invisa</i> (giant sensitive plant)
* <i>Curvularia</i> (black grain)	* <i>Mimosa pigra</i> (giant sensitive plant)
* <i>Cynodon dactylon</i> (Bahama grass)	* <i>Mimosa pudica</i> (action plant)
* <i>Cyperus compressus</i> (annual sedge)	* <i>Monochoria vaginalis</i> (pickerel weed)
* <i>Cyperus difformis</i> (small-flowered nutsedge)	* <i>Monographella albescens</i> (brown leaf blight)
* <i>Cyperus iria</i> (grasshopper's cyperus)	* <i>Mythimna loreyi</i> (maize caterpillar)
* <i>Cyperus rotundus</i> (coco grass)	* <i>Mythimna separata</i> (Chinese armyworm)
* <i>Dactyloctenium aegyptium</i> (crow's foot)	<i>Najas graminea</i> (grassy naiad)
* <i>Dicladispa armigera</i> (rice hispa)	* <i>Naranga diffusa</i> (rice green caterpillar)
* <i>Digitaria ciliaris</i> (bamboo grass)	* <i>Nephotettix nigropictus</i> (rice green jassid)
* <i>Ditylenchus angustus</i> (rice stem nematode)	* <i>Nephotettix virescens</i> (green leafhopper (GLH))
* <i>Earias insulana</i> (Egyptian stem borer)	* <i>Nezara viridula</i> (green shield bug)
* <i>Echinochloa colona</i> (barnyardgrass)	* <i>Nilaparvata lugens</i> (brown planthopper)
* <i>Echinochloa crus-galli</i> (barngrass)	* <i>Orseolia oryzae</i> (rice fly)
	* <i>Oryza rufipogon</i> (brownbeard rice)

- \**Oryzaephilus mercator* (merchant grain beetle)
- \**Oryzaephilus surinamensis* (saw toothed grain beetle)
- Oxya* (rice field grasshopper)
- \**Panicum maximum* (buffalo grass)
- \**Panicum repens* (creeping panic)
- \**Paraponyx stagnalis* (rice case bearer)
- \**Paspalum conjugatum* (buffalo grass)
- \**Paspalum distichum* (couch paspalum)
- \**Passiflora foetida* (love-in-a-mist)
- \**Pelopidas mathias* (rice skipper)
- Phoma leveillei* (sheath blotch)
- \**Pistia stratiotes* (Nile cabbage)
- \**Portulaca oleracea* (purslane)
- Psalis pennatula* (hairy rice caterpillar)
- \**Pseudomonas syringae* pv. *zizaniae* (bacterial leaf streak)
- \**Pyrilla perpusilla* (sugarcane planthopper)
- \**Recilia dorsalis* (brown-banded rice leafhopper)
- \**Rhopalosiphum maidis* (green corn aphid)
- \*Rice tungro bacilliform virus
- \**Richardia brasiliensis* (Mexican *Richardia*)
- \**Rottboellia cochinchinensis* (corn grass)
- \**Saccharum spontaneum* (wild sugarcane)
- \**Sagittaria guyanensis* (lesser arrow-head)
- \**Scirpophaga incertulas* (yellow borer)
- \**Scirpophaga nivella* (paddy stemborer)
- \**Scirpus grossus* (greater club rush)
- \**Scirpus juncoides* (bulrush)
- \**Scirpus maritimus* (saltmarsh bulrush)
- \**Scotinophara coarctata* (black rice bug)
- \**Sesamia inferens* (Asiatic pink stem borer)
- \**Setaria parviflora* (knotroot bristlegrass)
- \**Sida acuta* (broomweeds)
- \**Sitophilus zeamais* (greater grain weevil)
- \**Sogatella furcifera* (rice planthopper)
- \**Sphaerulina oryzina* (cercospora leaf spot)
- \**Sphenoclea zeylanica* (gooseweed)
- \**Spodoptera exempta* (african armyworm)
- \**Spodoptera exigua* (beet armyworm)
- \**Spodoptera litura* (armyworm)
- Spodoptera mauritia* (paddy swarming caterpillar)
- \**Spodoptera mauritia acronyctoides* (armyworm)
- \**Stenchaetothrips biformis* (rice leaf thrips)
- \**Striga angustifolia* (witchweed)
- \**Striga asiatica* (cane-killing weed)
- \**Tenebroides mauritanicus* (cadelle)
- \**Thrips palmi* (melon thrips)
- \**Tilletia barclayana* (black smut of rice)
- \**Trianthema portulacastrum* (carpet weed)
- \**Tribolium castaneum* (red flour beetle)
- \**Trogoderma granarium* (beetle, khapra)
- \**Ustilaginoidea virens* (false smut)
- \**Utricularia aurea* (bladderwort)
- \**Xanthomonas oryzae* pv. *oryzae* (bacterial leaf blight of rice)
- \**Xanthomonas oryzae* pv. *oryzicola* (bacterial leaf streak of rice)

**Table 3: Pests of commodity Phillipines in exporting country NOT in importing country. (Potential Quarantine pests)**

* <i>Agromyza oryzae</i> (rice leaf miner)	* <i>Myriophyllum aquaticum</i> (parrot-feather)
* <i>Ahasverus advena</i> (foreign grain beetle)	* <i>Myriophyllum spicatum</i> (Eurasian watermilfoil)
* <i>Atherigona orientalis</i> (pepper fruit fly)	<i>Najas marina</i> (hollyleaf naiad)
* <i>Avena fatua</i> (wild oat)	* <i>Nectria rigidiuscula</i> (cushion gall disease)
<i>Brachiaria mutica</i> (buffalo grass)	<i>Nisia nervosa</i> (grey planthopper)
* <i>Burkholderia glumae</i> (bacterial grain rot)	* <i>Oxalis corniculata</i> (creeping woodsorrel (USA))
<i>Caliothrips striatopterus</i> (black thrips of maize)	* <i>Peregrinus maidis</i> (corn delphacid)
* <i>Cenchrus echinatus</i> (bur grass)	* <i>Perkinsiella saccharicida</i> (sugarcane delphacid)
* <i>Chilo sacchariphagus</i> (spotted borer)	* <i>Phragmites australis</i> (common reed)
* <i>Chloris barbata</i> (peacock plumegrass)	* <i>Poa annua</i> (annual bluegrass (USA, Canada, South Africa))
* <i>Chondracris rosea</i> (citrus locust)	* <i>Polygonum barbatum</i> (knot grass)
* <i>Chromolaena odorata</i> (archangel)	* <i>Polygonum hydropiper</i> (marsh pepper)
* <i>Cochliobolus lunatus</i> (black kernel of rice)	* <i>Polygonum nepalense</i> (Nepal persicaria)
<i>Cofana unimaculata</i> (white leafhopper)	* <i>Pomacea canaliculata</i> (apple snail)
* <i>Conyza canadensis</i> (Canadian fleabane)	* <i>Pratylenchus brachyurus</i> (meadow nematode)
* <i>Coptotermes</i> (termites)	* <i>Pratylenchus penetrans</i> (Cobb's root-lesion nematode)
* <i>Corchorus aestuans</i>	* <i>Pratylenchus zae</i> (nematode, Corn root lesion)
* <i>Criconemella</i> (ring nematode)	* <i>Pseudomonas fluorescens</i> (biocontrol: Damping off (cotton))
* <i>Dimorphopterus</i>	* <i>Pseudomonas fuscovaginae</i> (bacterial rot of rice sheaths)
* <i>Erwinia carotovora</i> subsp. <i>carotovora</i> (bacterial root rot of sweet potato)	* <i>Pythium arrhenomanes</i> (cereals root rot)
* <i>Erwinia chrysanthemi</i>	* <i>Pythium graminicola</i> (seedling blight of grasses)
* <i>Erwinia chrysanthemi</i> pv. <i>zae</i> (bacterial stalk rot)	* <i>Pythium irregulare</i> (cavity spot: carrot)
* <i>Frankliniella intonsa</i> (Taiwan flower thrips (Taiwan))	* <i>Rattus argentiventer</i> (rice field rat)
<i>Gaeumannomyces graminis</i> var. <i>graminis</i> (crown sheath rot)	* <i>Rattus exulans</i> (bush rat)
* <i>Galinsoga parviflora</i> (french soldier)	* <i>Rattus rattus diardii</i> (Malaysian house rat)
* <i>Helicotylenchus multicinctus</i> (banana spiral nematode)	* <i>Rattus rattus mindanensis</i> (common Philippine field rat)
* <i>Hoplolaimus seinhorsti</i> (lance nematode)	* <i>Rhopalosiphum padi</i> (grain aphid)
* <i>Hydrellia griseola</i> (rice leaf miner)	* <i>Rhopalosiphum rufiabdominale</i> (cereal root aphid)
* <i>Ipomoea aquatica</i> (water spinach)	* <i>Rhyzopertha dominica</i> (lesser grain borer)
* <i>Kyllinga brevifolia</i> (sedge)	* <i>Rice grassy stunt virus</i>
* <i>Laodelphax striatellus</i> (planthopper, smaller brown)	* <i>Rice ragged stunt virus</i>
* <i>Lasiodiplodia theobromae</i> (brown pod rot of cocoa)	<i>Rice tungro disease</i> (rice tungro virus)
* <i>Lemna perpusilla</i> (duckweed)	* <i>Rice tungro spherical virus</i>
* <i>Leucopholis irrorata</i> (June beetle)	* <i>rice yellow dwarf phytoplasma</i>
* <i>Lindernia anagallis</i>	* <i>Rivula atimeta</i> (green hairy caterpillar)
* <i>Lindernia antipoda</i>	* <i>Saccharicoccus sacchari</i> (grey sugarcane mealybug)
* <i>Lindernia crustacea</i>	* <i>Salvinia molesta</i> (kariba weed)
* <i>Lindernia procumbens</i> (common false pimpernel)	* <i>Sarocladium oryzae</i> (rice sheath rot)
<i>Liposcelis entomophila</i> (grain psocid)	* <i>Schizaphis graminum</i> (greenbug)
<i>Macrosteles striifrons</i>	* <i>Scirpophaga innotata</i> (white rice stem borer)
* <i>Maize stripe virus</i> (sorghum chlorosis virus)	<i>Scotinophara latiuscula</i>
* <i>Marasmia patnalis</i> (rice leafroller)	<i>Sesamia uniformis</i> (shoot boring caterpillar)
<i>Marasmia ruralis</i> (rice leaf roller)	* <i>Setaria pumila</i> (cat's tail grass (Fiji))
* <i>Meloidogyne arenaria</i> (peanut root-knot nematode)	* <i>Setaria viridis</i> (green foxtail)
* <i>Merremia umbellata</i> (hogvine)	<i>Setomorpha rutella</i>
* <i>Momordica charantia</i> (balsam apple)	
* <i>Mus musculus domesticus</i> (house mouse)	

\**Sitotroga cerealella* (grain moth)  
*Sogatella vibix* (white-backed planthopper)  
\**Sorghum halepense* (aleppo grass)  
\**Stegobium paniceum* (biscuit beetle)  
\**Synedrella nodiflora* (Cinderella weed  
(Australia))  
*Tagosodes pusanus*  
\**Tetranychus urticae* (two-spotted spider mite)

\**Thanatephorus cucumeris* (many names,  
depending on host)  
\**Tribulus terrestris* (bendy-eye (Australia))  
\**Tylenchorhynchus annulatus* (stunt  
nematode)  
\**Tyrophagus putrescentiae* (cereal mite)  
\**Xanthium strumarium* (clotbur)  
\**Xiphinema americanum* (dagger nematode)

Table 4 . Risk analysis of pests of concern to [Myanmar] on rice seed from Philippines in Table 3.

Pest	Present in exporting country	Present in importing country	Economic impact	Potential Qtime pest/NQ	Pathway seed,	Entry	Establish	Spread	Risk High Med Low	Category QP NRP	Management option
<i>Burkholderia glumae</i>	Y	N	N?	NQ	Y	Y	Y	Y	Low	NRP	
<i>Cochliobolus lunatus</i>	Y	N	Y	PQP	N					NRP	
<i>Erwinia chrysanthemi</i>	Y	N	Y	PQP	N					NRP	
<i>Lindernia crustaceae</i>	Y	N	Y	PQP	Y	Y	Y	Y	Low	QP	Yes
Maize stripe virus	Y	N	Y	PQP	N	N	N	N		NRP	
<i>Meloidygne arenaria</i>	Y	N	N	NQ						NRP	
<i>Pseudomonas fuscovaginae</i>	Y	N	Y	PQP	Y	Y	Y	Y	Medium	QP	Yes
Rice ragged stunt virus	Y	N	Y	PQP	N					NRP	
Rice tungro virus	Y	N	Y	PQP	N					NRP	
<i>Tetranychus urticae</i>	Y	N	Y	PQP	N					NRP	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<i>Burkholderia glumae</i> (bacterial grain rot)
Type	Bacteria
Economic Importance	Low - the disease was considered to be of minor importance in Japan, with limited areas affected and low crop losses. In the early 1970s, its severity increased, coinciding with wider use of the rice transplanter.  Affect leaves, seeds and spikelets.
Pathway (Seed, or fruit, or plant, or leaf etc)	Seed
Entry	Yes, seed.
Establishment	Yes, <i>B. glumae</i> can be transmitted through seeds, leaves and spikelets. Wide host range of rice.
Spread	Yes, present of host plant, seedling stage, vegetative growing stage, flowering stage, and fruiting stage.
Risk	low
Category	None Quarantine Pest
Management	

Table 5: Technical evaluation of risk factors in Table 4.

Pest	<i>Cochliobolus lunatus</i> (black kernel of rice)
Type	Fungi
Economic Importance	High Grain mould has been classed as a high priority disease of sorghum in East Africa an occasionally important disease in the USA ). Seed infection levels as high as 86% have been reported on rice.
Pathway (Seed, or fruit, or plant, or leaf etc)	Floral structure and leaves
Entry	No, the pathogen only found in floral structure and leaves
Establishment	None
Spread	None
Risk	None
Category	None Quarantine Pest
Management	



**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Erwinia chrysanthemi</i> (Burkh.)</b>
Type	Bacteria
Economic Importance	High,-Incidences of 80-85% have been observed in natural cases and yield losses of 98.8% recorded in artificial epiphytotics A sweetcorn population grown during the 1979/80 growing season in Brasilia (Brazil) was heavily attacked by <i>E. chrysanthemi</i> ). Whole plant dead, damping off, dwarfing, wilting of the leaves, stems-stunting, soft rot.
Pathway (Seed, or fruit, or plant, or leaf etc)	Roots, bulbs, leaves, seedling and stems.
Entry	No, the bacteria is not carried by seed.
Establishment	None
Spread	None
Risk	None
Category	None Quarantine Pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b><i>Lindernia crustacea (L.) F. Muell.</i></b>
Type	Weed
Economic Importance	<p>Low - <i>L. crustacea</i> as a weed of all kinds of rice field, but of minor importance. In the Philippines, it is a common weed in open fields, rice paddies and cultivated ground. In Bangladesh, it occurs in transplanted aman rice fields at higher altitudes, along roadsides and on levees of crop fields. It occurs as a weed in transplanted rice in India, Indonesia and Vietnam, in upland rice in India, the Philippines and Vietnam, and in wet-seeded rice (sprouted seeds sown on puddled soil) in India and Malaysia. It has also been reported as a weed of lowland rice in Bangladesh and a weed of rice in Nepal and Sri Lanka.</p> <p>It is used in various ways in medicine.</p>
Pathway (Seed, or fruit, or plant, or leaf etc)	Seed.
Entry	Yes, through seed importation.
Establishment	<p>Yes, rice and taro.          Primary hosts: <i>Oryza sativa</i> (rice).          Favourable climatic condition</p>
Spread	Yes, present in host plant rice and taro.
Risk	Low because present in most rice field.
Category	Quarantine Pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	Maize stripe virus
Type	Virus
Economic Importance	High - MSpV is one of the more important components of corn stunt complex in south Florida. In the early 1980s many corn breeding and evaluation nurseries were severely damaged reaching 90% infection (theorized that the collapse of the classic Mayan civilization was partly attributed to the epidemic of MSpV.  Affect the whole plant, leaves and inflorescence
Pathway (Seed, or fruit, or plant, or leaf etc)	Flowers, leaves, seedlings, roots and stems.
Entry	No, the virus can be found in Flowers, leaves, seedlings, roots and stems
Establishment	None
Spread	None
Risk	None
Category	Non Quarantine Pest.
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Meloidogyne arenaria (Neal, 1889) Chitwood, 1949</b>
Type	Nematode
Economic Importance	Low, The average loss caused by root-knot <i>M. arenaria</i> is an economically important plant pathogen that parasitizes thousands of plant species worldwide. The peanut root-knot nematode is a pest of major food crops and significantly reduces the quantity and quality of food and fibre production. nematodes is thought to be around 5%; however, in some fields the loss can be complete. In some areas of the world, root-knot nematodes are so common that galls on roots are considered normal
Pathway (Seed, or fruit, or plant, or leaf etc)	Bulbs, root ,seedlings and soil.
Entry	None, the rice seed does not carry nematodes.
Establishment	None.
Spread	None
Risk	None
Category	Non Quarantine Pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	Bacterial rot of rice sheaths ( <i>Pseudomonas fuscovaginae</i> )
Type	Bacteria
Economic Importance	Medium - bacterial sheath brown rot attacks both the mature rice plant and the seedling, causing substantial yield losses in South America. <i>P. fuscovaginae</i> is the principal limiting factor in irrigated rice cultivation, with losses reaching 100%, especially above 1800 m. Sheath brown rot is widely distributed and considered to be the most important bacterial disease of rice in Hokkaido (Japan)
Pathway (Seed, or fruit, or plant, or leaf etc)	True seeds including grain; visible to naked eye.
Entry	Yes, true seeds.
Establishment	Yes, wide host range of rice with wheat, oat, barley and maize.
Spread	Yes, present in Graminae family.
Risk	Medium
Category	Quarantine pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<i>Rice tungro disease</i>
Type	Virus
Economic Importance	High- In south and southeast Asia, tungro, a composite disease caused by RTSV and RTBV, is a major threat to stable rice production in irrigated areas. Generally, tungro incidence is low or nil in rainfed or upland ricefields. When it reaches epidemic proportions, tungro is disastrous and damages ricefields in a huge acreage, even in rainfed or upland fields. Rice tungro disease is one of the most destructive diseases of rice in the Asian tropics. The incidence of tungro is generally high in irrigated areas, where rice is planted throughout the year. It is generally endemic but occasionally becomes epidemic and causes devastating losses over huge areas. Tungro has caused average annual losses of more than US\$ 1500 million .
Pathway (Seed, or fruit, or plant, or leaf etc)	None
Entry	No, because the virus is transmitted by leafhoppers.
Establishment	None
Spread	None
Risk	No
Category	Non Quarantine Pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	Two-spotted spider mite ( <i>Tetranychus urticae</i> )
Type	Mites
Economic Importance	None
Pathway (Seed, or fruit, or plant, or leaf etc)	None
Entry	None
Establishment	None
Spread	None
Risk	No
Category	No
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<i>Rice ragged stunt virus</i>
Type	Virus
Economic Importance	High- RRSV is sporadically a very serious problem of rice in Thailand, Malaysia, the Philippines, India and Indonesia where yields can be reduced by 50-100%. In Thailand, an outbreak in 1979 covered a total area of 42,200 hectares and resulted in a rice yield loss of up to 70%.
Pathway (Seed, or fruit, or plant, or leaf etc)	None
Entry	No, because the virus is transmitted only by the brown planthoppers <i>Nilaparvata lugens</i> .
Establishment	None
Spread	None
Risk	No
Category	Non Quarantine pest
Management	



**Table 6** Management of quarantine pests on rice seed from Philippines

Pest		Treatment
Quarantine pests	<i>Pseudomonas fuscovaginae</i>	<ul style="list-style-type: none"> <li>• Pest Free Area - Certification</li> <li>• Declaration</li> </ul> Or treatment (Hot water) and certification
Quarantine pests	<i>Lindernia crustaceae</i>	<ul style="list-style-type: none"> <li>• Seed sampling and certification (ISTA rules)</li> </ul>
Quarantine pests		
		<ul style="list-style-type: none"> <li>• Inspection on arrival for trash</li> </ul>

## **Group D: PRA Exercise on Orange Fruits From Pakistan to Philippines**

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### **A) Purpose/Objective.**

**To present the outcomes of a pest risk analysis/import risk analysis of the importation of Orange fruits of Citrus spp from Pakistan, and to indicate the regulatory position of the NPPO of Philippines**

Orange Fruits is the part of the plant traded. Citrus spp is the botanical name and local name of the plant species. Pakistan is the country of export. Philippines is the country that is doing the IRA, the country of import.

### **B) Background.**

This PRA was conducted as a practical exercise in quarantine decision-making at the PRA Workshop held in Kuala Lumpur, Malaysia on 26 July 2004.

This particular exercise involves the possible importation of Orange Fruits from Pakistan

### **C) Process.**

#### **Stage 1 Pest Risk Initiation.**

Lists of pests were obtained using the CABI Crop Protection Compendium and other sources.

**Table 1: 151 pests in Pakistan**

**Table 2: 41 pests in the Philippines**

**Table 3: 19 pests that are in the exporting country not in the importing country**

#### **Stage 2 Pest Risk Analysis.**

In stage 2 a technical assessment is made of the pests in **Table 3** to determine if they meet the specific requirements for a quarantine pest in accordance with the IPPC text and the ISPM #5 Glossary of Phytosanitary terms. In this exercise time does not permit the consideration of all the pests in Table 3 (Potential quarantine pests) in detail. Therefore a selection (10-12) pests of different pest types (fungi, bacteria, arthropods, virus, Mycoplasma) are selected as examples.

The criteria for their classification is categorised for each pest in **Table 5**.

The information compiled in the Pest datasheet obtained from the CABI CPC was used. This information resulted in the categorising of the pests as undertaken in **Table 5** is compiled in **Table 4**, together with an estimate of the risk they pose.

The datasheets of ten or twelve potential quarantine pests are **Annex 1** of this report.

The pests are classified in accordance with the IPPC terminology into the following categories –

*Quarantine pest*

*Non-regulated pest*

Those pests that satisfy the definition of quarantine pests require management options to be considered, these pests are identified in **Table 4**.

### **Stage 3 Pest Risk Management.**

The Quarantine pests are considered and a number of pest management options are considered as suitable, and can be conducted overseas or in your country.

Final management options are selected and listed in **Table 6**.

This table is compiled in the sequence from the point of production to the point of release in the country of destination.

### **Stage 4. Risk communication.**

The final **regulatory position** is -

An Import is permitted subject to the following conditions –

- i. Conditions prior to Export: An Import permit is required.
- ii. Certification at export. Consignment must be free from *Ceroplastes floridensis*, *Dialeurodes citri* and *Alternaria citri*
- iii. Import inspection upon arrival
- iv. Consignment must be free from contaminants
- v. Release subject to freedom from pests, if pests or contamination found - reconsignment or destruction. (discretionary tolerance of 0.1% contamination)
- vi. If consignment is packed with wood materials, would require additional treatment.

**Working Instruction**

1. Check documentation
  - Phytosanitary certificate,
  - plant import permit
  - declaration of compliance of the above documents
  
2. Inspection.
  - a. take 600 fruit samples for visual inspection.
  - b. in case of interception further examination and identification
  - c. if quarantine pest is present and identified the consignment must be.1. treated (fumigation) 2. destroy 3. re-export
  
3. Inspection for trash and soil
  - if the consignment is contaminated with more than 0.1% of trash and soil, clean and remove all the contaminants (responsibility of importer)
  
4. Release if consignment meets conditions.
5. If not, re-consign or destroy (notification of non-compliance where appropriate)

**D) References.**

CABI (2002) Crop Protection Compendium

Appendices.

Table 1 Pests of orange fruit in Pakistan

Table 2 Pests of orange fruit in Philippines

Table 3 Pests of orange fruit in Pakistan not in Philippines (Potential Quarantine pests)

Table 4 Risk analyses of pests of concern to Philippines on orange fruits from Pakistan

Table 5 Technical evaluations of risk factors of the potential quarantine pests in Table 3

Table 6 Management of quarantine pests.

Annex 1 Datasheets of potential quarantine pests from CABI CPC (2003).

## Attachments.

Tables format for IRA

**Table 1: Pests of commodity Orange fruits in Exporting country (Pakistan)**

*Adoretus versutus (Fijian cane root grub)	*Helicotylenchus multicinctus (banana spiral nematode)
*Agrotis ipsilon (black cutworm)	*Indarbela quadrinotata (bark borer)
Alternaria alternata (alternaria leaf spot)	*Lasiodiplodia theobromae (brown pod rot of cocoa)
*Alternaria citri (core rot of citrus)	*Longidorus (longidorids)
*Aonidiella aurantii (red scale)	*Nipaecoccus viridis (globular mealybug)
*Aonidiella citrina (yellow scale)	Odontotermes lokanandi
*Aphis fabae (black bean aphid)	*Parlatoria pergandii (chaff scale)
*Aphis gossypii (cotton aphid)	*Parlatoria ziziphi (black parlatoria scale)
*Aphis spiraeicola (green citrus aphid)	*Penicillium digitatum (green mould)
*Atherigona orientalis (pepper fruit fly)	*Penicillium italicum (blue mould)
*Bactrocera cucurbitae (melon fly)	*Pinnaspis strachani (lesser snow scale)
*Bactrocera dorsalis species complex (Oriental fruit fly species complex)	*Pratylenchus penetrans (Cobb's root-lesion nematode)
*Brevipalpus phoenicis (false spider mite)	*Pratylenchus vulnus (meadow nematode)
*Ceroplastes floridensis (soft scale)	*Prays citri (citrus flower moth)
*Chrysomphalus aonidum (black scale)	Pseudomonas syringae
*citrus huanglongbing (greening) disease (citrus greening)	*Riptortus pedestris
*Citrus tristeza virus (bud-union decline of citrus)	*Rotylenchulus reniformis (reniform nematode)
Coccus viridis (soft green scale)	*Sclerotinia sclerotiorum (collar rot)
*Cochliobolus lunatus (black kernel of rice)	*Spiroplasma citri (stubborn disease of citrus)
*Dialeurodes citri (citrus whitefly)	*Tetranychus urticae (two-spotted spider mite)
*Diaporthe citri (gummosis: Citrus spp.)	*Trichodorus (paratrichodorids)
*Ditylenchus destructor (potato tuber nematode)	*Trichoplusia ni (cabbage looper)
*Elsinoë fawcettii (citrus scab)	*Xanthomonas axonopodis pv. citri (citrus bacterial canker)
*Eudocima fullonia (fruit-piercing moth)	*Xestia c-nigrum (spotted cutworm)
*Glomerella cingulata (anthracnose)	*Xiphinema americanum (dagger nematode)
*Helicotylenchus dihystra (common spiral nematode)	

**Table 2: Pests of commodity Orange fruits in Importing country (Philippines)**

- \**Agrotis ipsilon* (black cutworm)
- \**Aonidiella aurantii* (red scale)
- \**Aonidiella citrina* (yellow scale)
- \**Aphis fabae* (black bean aphid)
- \**Aphis gossypii* (cotton aphid)
- \**Aphis spiraecola* (green citrus aphid)
- \**Araecerus fasciculatus* (areca nut weevil)
- \**Atherigona orientalis* (pepper fruit fly)
- \**Bactrocera cucurbitae* (melon fly)
- \**Bactrocera dorsalis* species complex (Oriental fruit fly species complex)
- \**Brevipalpus phoenicis* (false spider mite)
- \**Ceroplastes rubens* (pink wax scale)
- \**Chalara elegans* (black root rot)
- \**Chrysomphalus aonidum* (black scale)
- Chrysomphalus dictyospermi* (Spanish red scale)
- \*citrus huanglongbing (greening) disease (citrus greening)
- \**Citrus leprosis virus*
- \**Citrus tristeza virus* (bud-union decline of citrus)
- Coccus viridis* (soft green scale)
- \**Cochliobolus lunatus* (black kernel of rice)
- \**Commelina benghalensis* (benghal dayflower)
- \**Commelina diffusa* (water grass)
- \**Diaporthe citri* (gummosis: *Citrus* spp.)
- \**Elsinoë fawcettii* (citrus scab)
- \**Eudocima fullonia* (fruit-piercing moth)
- \**Glomerella cingulata* (anthracnose)
- \**Helicotylenchus multicinctus* (banana spiral nematode)
- \**Lasiodiplodia theobromae* (brown pod rot of cocoa)
- \**Longidorus* (longidorids)
- \**Nipaecoccus viridis* (globular mealybug)
- \**Parlatoria pergandii* (chaff scale)
- \**Parlatoria ziziphi* (black parlatoria scale)
- \**Phyllocoptruta oleivora* (citrus rust mite)
- \**Pinnaspis strachani* (lesser snow scale)
- \**Pratylenchus penetrans* (Cobb's root-lesion nematode)
- \**Prays citri* (citrus flower moth)
- \**Rotylenchulus reniformis* (reniform nematode)
- \**Tetranychus urticae* (two-spotted spider mite)
- \**Toxoptera citricida* (black citrus aphid)
- \**Xanthomonas axonopodis* pv. *citri* (citrus bacterial canker)
- \**Xiphinema americanum* (dagger nematode)

**Table 3: Pests of commodity of orange fruits in exporting country (Pakistan) NOT in importing country (philippines). (Potential Quarantine pests)**

- \*Adoretus versutus (Fijian cane root grub)
- Alternaria alternata (alternaria leaf spot)
- \*Alternaria citri (core rot of citrus)
- \*Ceroplastes floridensis (soft scale)
- \*Dialeurodes citri (citrus whitefly)
- \*Ditylenchus destructor (potato tuber nematode)
- \*Helicotylenchus dihystra (common spiral nematode)
- \*Indarbela quadrinotata (bark borer)
- Odontotermes lokanandi
- \*Penicillium digitatum (green mould)
- \*Penicillium italicum (blue mould)
- \*Pratylenchus vulnus (meadow nematode)
- Pseudomonas syringae
- \*Riptortus pedestris
- \*Sclerotinia sclerotiorum (collar rot)
- \*Spiroplasma citri (stubborn disease of citrus)
- \*Trichodorus (paratrachodorids)
- \*Trichoplusia ni (cabbage looper)
- \*Xestia c-nigrum (spotted cutworm)

**Table 4. Risk analysis of pests of concern to Philippines on orange fruits from Pakistan in Table 3.**

Pest	Present in exporting country	Present in importing country	Economic impact	Potential Qtime pest/NQ	Pathway Seed or leaf or fruit etc	Entry	Establish	Spread	Risk High Med Low	Category QP NRP	Management option
<i>Alternaria alternata</i>	Y	N	N								
<i>Alternaria citri</i>	Y	N	Y	PQP	Y	Y	Y	Y	High	PQ	
<i>Ceroplastes floridensis</i>	Y	N	Y	PQP	Y	Y	Y	Y	High	PQ	
<i>Dialeurodes citri</i>	Y	N	Y	PQP	Y	Y	Y	Y	High	PQ	
<i>Penicillium italicum</i>	Y	N	N								
<i>Pratylenchus vulnus</i>	Y	N	Y	PQP	N						
<i>Pseudomonas syringae</i>	Y	N	?	?	?	?	?	?	?	?	
<i>Spiroplasma citri</i>	Y	N	Y	PQP	N						
<i>Trichoplusia ni</i>	Y	N	Y	PQP	N						
<i>Xestia c-nigrum</i>	Y	N	N								



**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Ceroplastes floridensis</b>
Type	insect
Economic Importance	<p>Significant</p> <p><i>C. floridensis</i> is a major pest of Citrus in Israel (Ben-Dov, 1976; Peleg et al., 1995) and Egypt (Abbas, 1996); of jujube in China (Sun et al., 1989); of cloves in India (Vidyasagar et al., 1989) and a pest of many ornamentals in the USA (Gimpel et al., 1974; Hamon and Williams, 1984). When large populations occur, sooty mould may become a problem because of the large quantities of honeydew excreted on which the mould grows.</p> <p>Heavy infestations may result in chlorotic spotting and premature shedding of leaves, wilting and die-back of stems. Honeydew deposited on the leaves and fruit serves as a medium for the growth of black sooty moulds. The sooty mould results in a reduction of photosynthetic area and lowers the market value of ornamental plants and produce.</p>
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, stems, growing points, and fruits/pods.
Entry	Yes (high) Can be carried along with the fruits Frequent importation
Establishment	Yes (high) is highly polyphagous, attacking plant species belonging to 120 genera placed in 60 families (Ben-Dov, 1993). It attacks a wide range of crops High fecundity (284 – 800 eggs)
Spread	Yes (high) Ability to be dispersed by wind
Risk	high
Category	quarantine pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Dialeurodes citri</b>
Type	insect
Economic Importance	Significant  most important pests of Citrus spp., to which it may cause serious damage, through the extraction of large quantities of sap
Pathway (Seed, or fruit, or plant, or leaf etc)	Fruits/pods, inflorescence, leaves, and stems.
Entry	Yes (high) Can be carried along with the fruits Frequent importation Can enter by many different stages (small white winged adults, as well as eggs and nymphs).
Establishment	Yes (high) Wide host range Potential for adaptation of pest - It is polyvoltine, having several generations per year, where optimum environmental conditions occur, up to five or six generations are reported yearly.
Spread	Yes (high) Polyphagous Affecting all stages of plant Suitable environment for spread
Risk	high
Category	quarantine pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Xestia c-nigrum</b>
Type	Insect
Economic Importance	Non significant
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, stems, growing points, inflorescence, fruits/pods, and seeds.
Entry	
Establishment	
Spread	
Risk	
Category	Non regulated pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Spiroplasma citri</b>
Type	Bacteria
Economic Importance	Significant
Pathway (Seed, or fruit, or plant, or leaf etc)	Whole plant, leaves, stems, fruits/pods, and seeds.
Entry	No The pathogen only infect the plants not the fruits
Establishment	No
Spread	No
Risk	No
Category	Non regulated pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Pseudomonas syringae</b>
Type	Bacteria
Economic Importance	? Non pathogenic strain
Pathway (Seed, or fruit, or plant, or leaf etc)	?
Entry	?
Establishment	?
Spread	?
Risk	?
Category	?
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Penicillium italicum</b>
Type	Fungus
Economic Importance	No
Pathway (Seed, or fruit, or plant, or leaf etc)	Fruits/pods.
Entry	
Establishment	
Spread	
Risk	
Category	Non regulated pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Trichoplusia ni</b>
Type	Insect
Economic Importance	Yes <i>T. ni</i> populations can cause both severe yield and quality losses, especially under dry conditions
Pathway (Seed, or fruit, or plant, or leaf etc)	leaves
Entry	no
Establishment	no
Spread	no
Risk	no
Category	Non regulated pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Pratylenchus vulnus</b>
Type	nematode
Economic Importance	Yes
Pathway (Seed, or fruit, or plant, or leaf etc)	Root of the plant
Entry	No
Establishment	No
Spread	No
Risk	No
Category	Non regulated pest
Management	



**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Alternaria alternata</b>
Type	fungus
Economic Importance	Non significant
Pathway (Seed, or fruit, or plant, or leaf etc)	Fruit, stem and Leaf
Entry	
Establishment	
Spread	
Risk	
Category	Non regulated pest
Management	

**Table 5: Technical evaluation of risk factors in Table 4.**

Pest	<b>Alternaria citri</b>
Type	fungus
Economic Importance	<p>Significant</p> <p>Maharashtra state, India, during 1988-90 indicated that 43 and 47% of the total losses of mandarins in truck and train transport, respectively, were due to postharvest diseases; more than 20% of the losses were caused mainly by <i>A. citri</i> (Naqvi and Dass, 1994).</p> <p>The spores become deposited in the navel and styler end, or in any of opening including the stem end. Infection is usually dormant until maturity approaches.</p>
Pathway (Seed, or fruit, or plant, or leaf etc)	Fruit/pods and Leaf
Entry	<p>Yes (high)</p> <p>The necrotic lesions spread at the time of, fruit ripening and during transport and storage. (Pathak, 1980)</p> <p>Frequent importation</p>
Establishment	<p>Yes (high)</p> <p><i>A. citri</i> is known to grow and cause diseases especially on the fruits of lemons, oranges and other species of Citrus.</p> <p><b>Primary hosts:</b> Citrus junos (yuzu), Citrus medica (citron), Citrus reticulata (mandarin), Citrus, Citrus jambhiri (rough lemon), Citrus limon (lemon), Citrus sinensis (navel orange)</p> <p>Suitability of environment – climate</p>
Spread	<p>Yes (low)</p> <p>Chances of citrus reaching the citrus orchard is low</p>
Risk	High
Category	Quarantine pest
Management	

**Table 6: Management of quarantine pests on orange fruits from Pakistan**

Pest		Treatment
Quarantine pest	<i>Ceroplastes floridensis</i> <i>Dialeurodes citri</i> <i>Alternaria citri</i>	Offshore inspection Certification - free from those pests
Quarantine pest		
		Inspection on arrival (fumigate if necessary with methyl bromide if pests are found)

*Appendix 4a*

<b>PCE Constraints in the Region</b>	
PCE area	Bangladesh
<b>Administration</b>	
Legislation	Act amended in 1989, 1996.
Institutional issues	Lack of coordination with Customs who collect all fees.
Pest Risk Analysis	Lack of internal technical personnel, amendment of reports by external bodies.
<b>Operational</b>	
Surveillance	
Inspection	Lack of personnel at key border posts (sometimes single inspector)
Pest free areas	
Exotic pest response	No organization for this activity
Pest diagnosis	Lack of resources at point of interception at border.
<b>Information</b>	
Operational Manual	Yes, compiled hard copy
Technical info access	Yes
Public awareness	No campaign, no website
<b>Training</b>	
Inspector curriculum	Has minimum qualification (diploma in agriculture), needs more training post recruitment
<b>Facilities and equipment</b>	
<b>Points of entry</b>	At particular points of entry, limited facilities such as buildings for personnel to undertake all their activities
Fumigation	Not sufficient equipment at border post, in particular, lack of communication facilities
Other treatments	At head office, has laboratory for other treatment
Post entry quarantine	Has station at Chittagong, which services the rest of the country
	Poorly equipped inspectorate

*Appendix 4b*

<b>PCE Constraints in the Region</b>	
PCE area	Cambodia
<b>Administration</b>	
Legislation	Legislation only at decree level, not as extensive as required for effective operation.
Institutional issues	Fees are low, coordination with CAMCONTROL on inspection at borders
Pest Risk Analysis	Lack of technical resource persons.
<b>Operational</b>	
Surveillance	Not to ISPM
Inspection	
Pest free areas	
Exotic pest response	Plant protection team undertakes this activity
Pest diagnosis	
<b>Information</b>	
Operational Manual	No
Technical info access	Lack of technical information resources
Public awareness	No website
<b>Training</b>	
Inspector curriculum	Minimum is diploma in agric to degree in agric. Has one month training according to curriculum. Need more training inputs
<b>Facilities and equipment</b>	
<b>Points of entry</b>	At particular points of entry, limited facilities such as buildings for personnel to undertake all their activities
Fumigation	Done by private companies, supervised by plant quarantine inspectors. Monitoring equipment lacking
Other treatments	No
Post entry quarantine	No

*Appendix 4c*

<b>PCE Constraints in the Region</b>	
PCE area	China
<b>Administration</b>	
Legislation	Framework in place but regulations and rules are not up to date or detailed
Institutional issues	
Pest Risk Analysis	Need to maintain contact with international framework. Core group coordinates reports by part-time regional teams with varying quality.
<b>Operational</b>	
Surveillance	Ministry of Ag and SIAQ: cooperation required
Inspection	
Pest free areas	Responsibility of provincial government
Exotic pest response	Needs further work for completion of national plans.
Pest diagnosis	
<b>Information</b>	
Operational Manual	Yes
Technical info access	Has quarantine centre for technical resources
Public awareness	Has website, no public awareness campaigns
<b>Training</b>	
Inspector curriculum	Mostly bachelor and masters degree. Has regular training in specific quarantine topics such as sampling and PRA
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Ok
Fumigation	Done by private companies and supervised by plant quarantine staff
Other treatments	Cold treatment and heat treatment available
Post entry quarantine	Yes, also adjacent diagnostic laboratory with good facilities

*Appendix 4d*

<b>PCE Constraints in the Region</b>	
PCE area	Laos
<b>Administration</b>	
Legislation	Legislation only at decree level, not as extensive as required for effective operation.
Institutional issues	Financial under resourced, human resources, fees to consolidated revenue.
Pest Risk Analysis	Lack of technical staff and specialists.
<b>Operational</b>	
Surveillance	Done by Plant Protection and Plant Quarantine, supervised by Ministry of Agriculture
Inspection	Untrained inspectorate
Pest free areas	
Exotic pest response	Not in place
Pest diagnosis	
<b>Information</b>	
Operational Manual	No
Technical info access	Technical information limited
Public awareness	No website, no campaign
<b>Training</b>	
Inspector curriculum	No curriculum, no guidelines, diploma level, need for training
<b>Facilities and equipment</b>	
<b>Points of entry</b>	
Fumigation	No equipment
Other treatments	No
Post entry quarantine	No

*Appendix 4e*

<b>PCE Constraints in the Region</b>	
PCE area	Malaysia
<b>Administration</b>	
Legislation	Limitations in law restrict the application at operational level. Needs to be SPS compliant. Revision underway.
Institutional issues	Fees to CR
Pest Risk Analysis	PRA team requires support from other technical agencies to undertake all tasks.
<b>Operational</b>	
Surveillance	NPPO responsibility and in place
Inspection	Sampling methodologies
Pest free areas	Khapra beetle papaya ringspot, mango seed weevil.
Exotic pest response	In place
Pest diagnosis	Certain groups lack technical expertise.
<b>Information</b>	
Operational Manual	Yes
Technical info access	Various forms of access
Public awareness	Has website and conducts public awareness with stakeholders
<b>Training</b>	
Inspector curriculum	Minimum diploma, has training curriculum, regularly hold training courses to reinforce qualifications
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Lack of space to undertake treatment
Fumigation	Done by registered private companies and supervised by plant quarantine staff
Other treatments	Incinerator, heat treatment, irradiation,
Post entry quarantine	Yes, also adjacent diagnostic laboratory with good facilities



*Appendix 4f*

<b>PCE Constraints in the Region</b>	
PCE area	Myanmar
<b>Administration</b>	
Legislation	Regulatory level needs to be provided in detail.
Institutional issues	Limited coverage of points of entry.
Pest Risk Analysis	Limited technical resources in all areas.
<b>Operational</b>	
Surveillance	General responsibility of the Ministry of Agriculture
Inspection	Needs technical training
Pest free areas	
Exotic pest response	PP Team responsibility, national plans in place
Pest diagnosis	Lack of technical expertise
<b>Information</b>	
Operational Manual	Yes
Technical info access	Very limited
Public awareness	Has website, has public awareness campaigns, regular meetings with industry representatives
<b>Training</b>	
Inspector curriculum	Has regular training, need more training in all areas from external experts for exposure to international environment
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Limited facilities, especially diagnostic facilities
Fumigation	Done by registered private companies and supervised by plant protection division
Other treatments	No
Post entry quarantine	No

*Appendix 4g*

<b>PCE Constraints in the Region</b>	
PCE area	Pakistan
<b>Administration</b>	
Legislation	Act of 1972 is being revised, regulations are OK
Institutional issues	Misuse of discretionary powers by inspectors. Lack of rewards and punishments.
Pest Risk Analysis	PRA team in place
<b>Operational</b>	
Surveillance	Not satisfactory
Inspection	
Pest free areas	
Exotic pest response	Done by provincial government, no national plans
Pest diagnosis	Recent provision of new lab facilities.
<b>Information</b>	
Operational Manual	Yes
Technical info access	Yes
Public awareness	Yes, through public and private sectors, has website
<b>Training</b>	
Inspector curriculum	No curriculum, qualification is graduate to lower levels
<b>Facilities and equipment</b>	
<b>Points of entry</b>	
Fumigation	Done by NPPO
Other treatments	Done by private companies, including VHT
Post entry quarantine	Yes, laboratories available

*Appendix 4h*

<b>PCE Constraints in the Region</b>	
PCE area	Philippines
<b>Administration</b>	
Legislation	Act and regulations require revision to be SPS compliant
Institutional issues	Fees only 20% returned for use internally
Pest Risk Analysis	Establishment of pest database, establishment of PRA team
<b>Operational</b>	
Surveillance	
Inspection	Technical training needed
Pest free areas	Mango seed weevil
Exotic pest response	No national plan
Pest diagnosis	Lack of facilities and technically qualified persons
<b>Information</b>	
Operational Manual	Yes
Technical info access	Limited technical information
Public awareness	Has website, has awareness campaigns, has meetings with importers and exporters
<b>Training</b>	
Inspector curriculum	Min is bachelor level, then specific training, followed by on the job training. No formal curriculum for training
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Limited facilities, particularly at regional locations
Fumigation	Done by registered private companies and supervised by plant quarantine staff
Other treatments	5 VHT machines for treatment of mango and papaya
Post entry quarantine	Yes

*Appendix 4i*

<b>PCE Constraints in the Region</b>	
PCE area	Thailand
<b>Administration</b>	
Legislation	Act amended 1999, but not SPS compliant. Requires revision of some parts of Act and the regulations.
Institutional issues	Cooperation with Customs difficult, particularly when consignments are rejected by PQ and duties have already been collected.
Pest Risk Analysis	PRA Section in place and expected to expand.
<b>Operational</b>	
Surveillance	
Inspection	Technical training needed
Pest free areas	
Exotic pest response	SALB
Pest diagnosis	Lack of facilities and technically qualified persons
<b>Information</b>	
Operational Manual	Yes
Technical info access	Yes
Public awareness	Has website and regular meetings with industry and stakeholders
<b>Training</b>	
Inspector curriculum	Minimum is diploma. Training provided in general and specific subjects like inspection and fumigation. Has curriculum
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Very limited facilities at some of the points of entry
Fumigation	Only in big stations do large fumigation facilities exist, otherwise, fumigation is conducted by private companies, supervised by PQ
Other treatments	5 VHT machines and irradiation facilities
Post entry quarantine	Yes

*Appendix 4j*

<b>PCE Constraints in the Region</b>	
PCE area	Vietnam
<b>Administration</b>	
Legislation	1993 Ordinance amended 2002, but some SPS areas are not included, requires additional sections in Ordinance and Regulations.
Institutional issues	Cooperation with other agencies is good. 80% of fees returned to the service.
Pest Risk Analysis	PRA team formed, needs assistance in coverage and provision of pest database.
<b>Operational</b>	
Surveillance	
Inspection	Lack of numbers at new checkpoints and lack of technical skills
Pest free areas	
Exotic pest response	National plan in place
Pest diagnosis	Lack of technical expertise in virology and bacteriology
<b>Information</b>	
Operational Manual	Yes, only general manual
Technical info access	Yes
Public awareness	Has website, conducts client meetings on public awareness, also through TV and videos
<b>Training</b>	
Inspector curriculum	Minimum is bachelor, conducts courses with curriculum. Needs more training to conform to international standards
<b>Facilities and equipment</b>	
<b>Points of entry</b>	Very limited facilities at some of the points of entry
Fumigation	Done by both private and state companies supervised by PQ staff
Other treatments	No
Post entry quarantine	Yes, but lack of space and equipment