Food and Agriculture Organization of the United Nations

International Plant Protection Convention

REPORT

IPPC-REGIONAL WORKSHOP FOR NENA 2023

Saudi Arabia

Al-Qassim - Buraidah City

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IPPC Secretariat

Contents

INTRODUCTION

[1] The IPPC regional workshops are one of the most important activities to both standards setting, implementation and capacity development. More information including objectives and reports are available on the following link www.ippc.int/en/core-activities/capacity-development/regional-ippc-workshops/

[2] The 2023 IPPC Regional Workshop for the Near East and North Africa region was held from 3rd to 6th of September 2023 in Saudi Arabia, Buraidah city, Al-Qassim region. The Workshop was organized in collaboration between the FAO Regional Office for the Near East and North Africa (FAO-RNE), the FAO Sub regional office for North Africa (SNE), the Near East Plant Protection Organization (NEPPO) and the Ministry of Environment Water and Agriculture of Saudi Arabia. It was funded by FAO-RNE, FAO-SNE and the IPPC Secretariat. Forty participants from thirteen Contracting Parties and representatives from FAO, NEPPO, US NPPO (APHIS/USDA) and the IPPC Secretariat, participated in the workshop (Annex 1, list of participants).

[3] The meeting was considered a unique opportunity to update the IPPC contracted members on the current activities and achievements of FAO (update on FAO projects in the region), IPPC and NEPPO by gathering opinions on the activities including the standard setting and implementation and capacity development committees. In addition, the annual meeting is also used as a tool for capacity development to train IPPC Official Contact Points on specific tools like the Online Comment System (OCS) and National Reporting Obligation (NRO), and other important related issues like evaluation of NPPO Different Activities.

The Objectives of the IPPC RW and Topics to be discussed were:

[4] The objective of IPPC RW 2023 in the NENA region is to build capacity in a range of areas related to IPPC. For the year 2023, the IPPC regional workshops focus on plant health for environmental protection.

[5] In addition, the IPPC regional workshops are an opportunity for participants to acquire skills on how to analyze draft International Standards for Phytosanitary Measures (ISPMs) and provide productive comments for draft ISPMs and recommendations for consultations in 2023, to build phytosanitary capacity and raise awareness of IPPC-related activities, and finally exchange experiences at the regional level.

[6] Draft ISPMs and recommendations to be considered for comments have been announced on the International Phytosanitary Portal (IPP) on the first of July 2023 (those included first and second consultations):

[7] www.ippc.int/en/core-activities/standards-setting/member-consultation-draft-ispms/

[8] And on the Online Comment System (OCS) webpage at: https://ocs-new.ippc.int/

[9] And the IPPC Official Contact Points were also invited to consider the resource materials on the OCS at: https:ippc.int/en/online-comment-system.

1. OPENING OF THE SESSIONs

1.1 Welcome Remarks

[10] The opening session started by opening remarks provided by Mr. Ayman bin Saad Al-Ghamdi, the Chief Executive Officer of the National Center for Plant Protection and Animal Diseases Control (WEQAA), Mr. Al-Ghamdi welcomed the participants and highlighted the Kingdom's commitment to plant protection and its efforts to improve the country's food security. He mentioned the importance of the agricultural sector in the economic development and referred to the

national vision and initiatives aimed at promoting various sectors, including agriculture, in the Kingdom of Saudi Arabia. He emphasized the importance of plant health and its role in safeguarding agricultural production and the efforts made to address the challenges through various programs and initiatives.

[11] Mr. Al-Ghamdi highlighted the significance of hosting events like the IPPC regional workshop and conferences related to plant health and expressed the Kingdom's willingness to support such initiatives both domestically and internationally. Finally, he called for successful outcomes and contributions to the development of plant health worldwide.

[12] Then he gave the floor to Mr. Thaer Yaseen, the Regional Plant Protection Officer at the Regional Office for the Near East and North Africa, Food and Agriculture Organization of the United Nations (FAO).

[13] Mr. Yaseen welcomed the participants and expressed his appreciation for holding of this workshop for the first time in Saudi Arabia. He noted that the regional workshop is an important opportunity to discuss the latest scientific, technical, and policy issues related to plant protection. Which is covering a range of topics, including the impact of climate change on plant health, the risks associated with increased international trade in plant products and new pathways for pests. In addition to the development and use of international standards and guidelines for plant protection.

[14] Mr. Yaseen gratitude the Kingdom of Saudi Arabia and noted the overall development in its agricultural sector and appreciated the country role in the regional initiatives. Then he reviewed the workshop topics and stressed on the importance of providing comments to the draft ISPMs or CPM recommendations. Furthermore, exchanging the national and regional experiences.

[15] Mr. Yaseen also emphasized the significant role of the Near East Plant Protection Organization (NEPPO) and welcomed the recently joined countries. Also welcomed the new executive director Mr. Ben Jamaa from Tunisia and thanked the former executive director Mr. Mekki Chouibani.

[16] Finally, Mr. Yaseen acknowledged the organization and hosting by Saudi Arabia and encouraged the participants to provide active participation during the workshop.

[17] Mr. Arop Deng, the IPPC Integration and Support Team Leader IPPC secretariat, started his speech by welcoming all the participants and presented the gratefulness and appreciation to the Saudi Arabia for hosting and co-organizing this significant event of the IPPC Regional Workshop 2023. Mr. Arop highlighted the workshop's overarching goal, which was to develop the phytosanitary capacities of contracting parties to effectively enforce globally harmonized standards for phytosanitary measures.

[18] Then a recording video for the welcome remarks by the Secretary of the International Plant Protection Convention Mr. Osama was played.

[19] Mr. EI-Lissy welcomed the participants and explained the particular importance of the annual IPPC regional workshops for presenting a platform for discussions and experience exchanges, in addition to supporting cooperation initiatives in the region.

[20] Mr. EI-Lissy emphasized the essential role of plant health to the global food security. He highlighted the main challenges which is facing the phytosanitary in particular climate

change and invasive plant pests which causes economic and environmental impacts. He also referred to the role of IPPC to address these challenges.

[21] Finally, Mr. EI-Lissy stressed on the importance of collaboration between all stakeholders engaged in implementation of IPPC strategic framework 2020 – 2030.

[22] In his welcome speech, Mr. Abdul Hakim Rajab Al-Waer, the FAO Assistant Director-General and Regional Representative for the Near East and North Africa emphasized the significance of this event, given its potential to effectively contribute to the dissemination of information on plant health, the implementation of up-to-date quarantine measures, and the management of invasive pests.

[23] Mr. Al-Waer clarified that FAO will continue to provide technical and financial support to member countries, at both the national and regional levels, to help them address the challenges posed by invasive pests.

[24] In his remarks, Mr. Ben Jamaa, the Executive Director of the Near East Plant Protection Organization (NEPPO) commended the Kingdom of Saudi Arabia (KSA) for joining the Near East Plant Protection Organization and expressed his gratitude for the excellent organization and warm welcome.

[25] Mr. Ben Jamaa thanked the former Executive Director, Mr. Mekki Chouibani (Morocco). and raised the importance of international standards for phytosanitary measures, and the participation of countries in the region in the review of draft ISPMs on (OCS). He stressed the importance of the participants' cooperation in order to come up with targeted recommendations.

2. Meeting Arrangements

2.1 Election of Chair & the Rapporteur

[26] Mr. Mohammed Abdullah Alkuriji - Head of Phytosanitary sector (WEQAA, KSA), was elected as Chairperson of the workshop and Mr. Ahmed Abdelmottaleb – IC Committee member - was elected as rapporteur of the workshop.

2.2 Adoption of the Agenda

[27] Morocco requested to add a brainstorming session about *Xylella fastidiosa*, the participants agreed to add it and adopted the agenda of the workshop presented by the Chair.

3. Administrative Matters

3.1 Participants *list (Annex 1)*

4. Updates on Governance and Strategic Issues

4.1 Governance and strategy (CPM, CPM Bureau)

[28] Mr. Nader Elbadry delivered the presentation on behalf of Ahmed El-Attar (CPM Bureau member). Mr. Elbadry highlighted that the IPPC governing body is the Commission on Phytosanitary Measures (CPM), which meets annually. The CPM is composed of representatives from all 184 IPPC contracting parties.

[29] The IPPC has three core activities: standard setting, implementation and capacity development, and communication and international cooperation.

[30] In 2022-23, the IPPC achieved a number of milestones, including:

- Holding an in-person CPM meeting for the first time since 2020.
- Adopting the IPPC Communication Strategy 2023-2030 and IPPC Partnership Framework.
- Adopting five new standards and approving one CPM Recommendation.
- Implementing a number of activities related to the IPPC Strategic Framework 2020-2030, including establishing a new position of program manager to coordinate,

monitor, report and mobilize funds for the program of Development Agenda Items (DAIs), developing an IPPC investment prospectus to be used to raise awareness among contracting parties and relevant international bodies and to support resource mobilization with donor countries and organizations, establishing focus groups for the DAI on global research coordination and DAI on laboratory diagnostic networking to start scoping and planning for this work, and encouraging contracting parties, NPPOs, RPPOs, stakeholders and all those linked with the IPPC community to participate actively in webinars, workshops and activities related to the impacts of climate change on plant health.

[31] The IPPC also achieved a number of communication and international cooperation milestones in 2022-23, including:
- Successfully conducting and publishing its annual report
- Publishing the International Plant Health Conference (IPHC) Report
- Producing and publishing 16 IPPC newsletters, 15 headline news and 17 announcements
- Launching a new IPPC website
- Maintaining cooperation with more than 40 international and regional partner organizations
- Establishing a Community of Practice in Communications, an online global community of communication professionals working around plant protection, sustainable agriculture, integrated pest management, and One Health.

[32] Finally, Mr. Elbadry confirmed that the IPPC is a vital organization that plays a critical role in protecting global plant resources and facilitating safe trade. Its work is essential to ensuring food security and sustainable development.

[33] ## 4.2 Update from SC

[34] Mr. Nader ElBadry/ SC Member/ delivered the presentation about the Standard Setting Unit (SSU) of the IPPC Secretariat which coordinates the processes for setting International Standards for Phytosanitary Measures (ISPMs) and Commission on Phytosanitary Measures (CPM) recommendations. The SSU also supports the Standards Committee (SC), Standards Committee Working Group (SC-7), Technical Panels (TPs), and Expert Working Groups (EWGs).

[35] The SSU has a number of planned activities for 2023, including Standards Committee May (SC May), Standards Committee Working Group (SC-7), Standards Committee November (SC November), Expert Working Groups (EWGs). Technical Panels (TPs) and CPM Focus Group on the Safe Provisions of Food and other Humanitarian Aid.

[36] In addition to participating in the 2023 IPPC Call for topics for Standards and Implementation, Sea containers international workshop on “Pest risk mitigation of sea containers and their cargoes and the facilitation of international trade - defining the way forward”

[37] In 2023, the SC will be considering a number of draft ISPMs for first and second consultation, as well as draft ISPMs for adoption by the CPM. The SC will also be discussing the term "emerging pest" and how

it should be defined in ISPM 5 (Glossary of phytosanitary terms).

[38] Other issues that the SC discussed in May 2023 included:

- Holding an additional consultation period for DPs only in January 2024
- Revising Specification TP 1 to keep it up to date
- Exploring options on how to build a database on commodity standards
- Encouraging submitters when submitting commodity standards proposals to also provide the Information Materials for Commodity Standards using the approved template

[39] Finally, Mr. Elbadry referred to the role and commitment of SSU to support the IPPC's strategic framework and to providing the tools and resources that NPPOs need to implement ISPMs.

[40] ## 4.3 Update from IC

[41] Mr. Ahmed Abdelmottaleb /IC Member/ presented the topic and provided information about The Implementation and Capacity Development Committee (IC) which is responsible for developing, monitoring, and overseeing an integrated program to support the implementation of the IPPC and strengthen the phytosanitary capacity of contracting parties.

[42] Mr. Abdemottaleb highlighted the IC's key areas of activity which are:

- Recommend priority of topics and support the development of guide and training materials
- Oversee the implementation of ICD projects
- Monitor the implementation of IPPC and ISPMs mainly through the IPPC Observatory
- Move forward on NROs as well as support the PCE processes.

[43] Mr. Abdemottaleb pointed out that the IC activities are mainly implemented through the IC Subgroup and IC Teams. The IC Subgroup on the IPPC Observatory is currently the only active IC Subgroup. It is responsible for monitoring and evaluating the work undertaken under the IPPC Observatory. He referred that the IC Teams are responsible for specific tasks, such as:

- National Reporting Obligations (NROs)
- Guides and training materials
- Phytosanitary Capacity Evaluation (PCE)
- Projects
- Contributed resources
- Fusarium TR4
- E-Commerce

[44] The IC also established three new IC Teams in May 2023:

- Third-party entities
- CPM preparation guide
- IPPC Regional Workshop guidelines

[45] The IC publishes a list of topics for guides and training materials, which is updated regularly. The IC also develops and publishes IPPC guides and training materials.

[46] In 2022-2023, the IC published three new guides:

- Emergency Preparedness: A guide for developing contingency plans for outbreaks of quarantine pests
- Prevention, preparedness and response guidelines for Fusarium Tropical Race 4 (TR4) of banana
- Guide to regulation of wood packaging material: Understanding the phytosanitary requirements for the movement of wood packaging material in international trade.

[47] Finally, Mr. Abdelmottaleb confirmed that the IC is committed to support the implementation of the IPPC and strengthening the phytosanitary capacity of contracting parties.

5. Section 1: Discuss Substantive Comments on Draft Standards and Recommendations

5.1 – 5-7 Revision of the Required Reviewing ISPM s

5.1 Reorganization and revision of pest risk analysis standards (2020-001)

[48] Mr. Nader Elbadry, SC member delivered the presentation about the draft reorganization and revision of pest risk analysis standards: pest risk analysis for quarantine pests (2020-001), He clarified that the draft aims to streamline and improve the PRA process and the revision includes a number of key changes, including:

- Combining ISPM 2, ISPM 11, and the draft ISPM on pest risk management for quarantine pests (2014-001) into one standard.
- Removing redundant and repetitive text.
- Moving generic information to the core text and stage-specific information to annexes.
- Providing revised guidance on the pest risk management stage.

[49] The revision also includes specific changes to the PRA process, such as:

- Moving the supplemental text on environmental impacts (S1) and plants as quarantine pests to Annexes 4 and 6, respectively.
- Moving the supplemental text on LMOs (S2) to Annex 5.
- Moving the subsection on probability of transfer to a suitable host from the end of the probability of entry section to the section on the probability of establishment.
- Clarifying that consequences to be considered include environmental, economic, social, and other consequences.
- Providing clearer guidance on the selection and evaluation of pest risk management options.

[50] Overall, the draft reorganization and revision of pest risk analysis standards is a well-written and informative document that will be a valuable resource for NPPOs and other stakeholders involved in PRA.

5.*2* *Draft Annex: International movement of mango (Mangifera indica) fruit to ISPM 46 (Commodity-specific standards for phytosanitary measures)- (2021-011)*

[51] Mr. Nader Elbadry, SC member delivered the presentation about the draft Annex to ISPM 46: International movement of fresh ***Mangifera indica*** fruit (2021-011) which is a proposed standard that describes the commodity, its intended use, pests associated with it, and options for phytosanitary measures. The scope of the annex is the same as described in ISPM 46, which is to identify the associated pests and related options for phytosanitary measures for a specific commodity. The annex applies to fresh whole *M. indica* fruit, with or without a small section of fruit stalk attached but without leaves or stem. It does not apply to processed fruit (e.g. sliced, dried, frozen, canned) as the pest risk is different from mangoes for consumption. The list of pests associated with fresh ***Mangifera indica*** fruit includes 58 pests regulated by at least one contracting party. The list is not exhaustive, and pests were only included in the Annex if there was a specific measure identified to manage them. The options for measures include general and pest-specific measures. General measures include those that may be relevant to all pests, for

example, PFA, PFPP. Pest-specific options are presented as codes against each pest, for example HWIT - Hot water immersion treatment, VHT - Vapour heat treatment, SA - Systems approaches and correspond to tables of schedules. The draft annex is currently in the first consultation phase, which is open to all contracting parties and regional plant protection organizations. The consultation period will close on 30 September 2023.

5.3 Draft Annex: Use of systems approaches in managing the pest risks associated with the movement of wood to ISPM39 (International movement of wood) (2015-004)

[52] Mr. Eyad Mohammed, SC member delivered the presentation about the draft Annex to ISPM 39: Use of systems approaches in managing the pest risk associated with the movement of wood (2015 -004) which is a proposed standard that provides guidance to NPPOs on the use of integrated measures to reduce the risk posed by quarantine pests associated with the international movement of wood.

[53] The Annex applies to the wood of gymnosperms and angiosperms (i.e., dicotyledons and some monocotyledons, such as palm) other than bamboo and rattan. Guidance applies to quarantine pests with wood and with specific locations within the wood. It identifies specific procedures and practices that may be applied from pre-planting to post import.

[54] Mr. Eyad mentioned that the key features of the draft Annex include:

- It provides guidance on the development, design, and implementation of systems approaches for wood commodities.
- It identifies examples of practices that may be used from pre-planting to transport and post-import.
- It outlines the responsibilities of NPPOs and participating entities.
- It provides guidance on the documentation and evaluation of systems approaches.

[55] Finally, Mr. Eyad clarified that the draft Annex is a significant step forward in the development of guidance on the use of systems approaches for wood commodities. It is expected to be a valuable resource for NPPOs, and other stakeholders involved in the international movement of wood.

5.4 2022 Amendments to ISPM 5 (Glossary on phytosanitary terms) (1994-001)

[56] Ms. Maryam Jalili, SC member delivered the presentation about the draft amendments to the ISPM 5 Glossary of phytosanitary terms. which is currently in the second consultation phase, and open to all contracting parties and regional plant protection organizations. The consultation period will close on 30 September 2023.

[57] Ms. Maryam highlighted that document includes the following:

- A list of all the proposed additions and revisions to the glossary
- A brief explanation of each proposed addition and revision
- Links to additional information on the draft amendments

[58] And some of the key changes proposed in this draft include:

- The addition of two new terms: "general surveillance" and "specific surveillance"
- A revision to the definition of "surveillance" to distinguish between general and specific surveillance
- Revisions to the definitions of "test", "phytosanitary action", and "phytosanitary procedure" to clarify their meaning and ensure consistency with other ISPMs.

5.5 Draft Annex: Criteria for evaluation of available information for determining host status of fruit to-fruit flies to ISPM 37 Determination of host status of fruit-to-fruit flies (Tephritidae) (2018-011)

[59] Mr. Nader Elbadry, SC member delivered the presentation about the draft annex to ISPM 37 which provides criteria for evaluating available information to determine the host status of fruit-to-fruit flies (Tephritidae). It is currently in the second consultation phase.

[60] The draft annex is intended to address the inconsistency in host status interpretation from the published information, which can lead to disputes between NPPOs. It also aims to provide guidance to NPPOs on how to use the criteria outlined in the annex to determine the host status of fruit.

The annex covers the following topics:

- Host terminology in the literature and alignment with the terms in ISPM 37
- Criteria for determining natural host, conditional host, and non-host from available information
- Application of host status determination in PRA
- Assessing uncertainty of host status determination

[61] Some of the key changes made to the draft annex in response to comments from the first consultation include:

- The definitions of host, conditional host, and non-host have been aligned with the core text of ISPM 37.
- The guidance for identifying host, conditional host, and non-host from available information is now more aligned with the requirements of the core text in ISPM 37.
- Uncertainty due to a quality of information is now more clearly explained as "completeness, reliability, and relevance"; more guidance is given on how uncertainty affects a determination of host status by NPPOs.
- Requirements for NPPOs to use host status are clarified when conducting a PRA for fruit commodity.

5.6 CPM Recommendation on sea containers

[62] Ms. Shaimma Ibrahim, member of CPM Sea Containers Focus Group, delivered the presentation about the draft revised CPM Recommendation 6 on Sea Containers which provides guidance on minimizing the pest risks associated with the international movement of sea containers. It was revised in 2023 by the CPM Sea Containers Focus Group and approved for the first round of consultation.

[63] The revised recommendation includes the following key points:

- It provides background information on the risks and implications of the international sea container pathway.
- It identifies the shared responsibilities of stakeholders in managing the risks.
- It describes the types of risks presented by sea containers moving in international trade and related contamination of concern.
- It encourages engagement with other regulatory bodies, such as the World Organization for Animal Health, to avoid the development of duplicating or conflicting measures.
- It includes recommended actions relating to reducing the risk of contamination of sea containers and their cargoes, visual examinations for

contamination, and the removal of contamination.

- It recommends the expanded use of steel floored containers, encourages further input from NPPOs and relevant stakeholders to gather information on pest presence and risks for provision to the IPPC, and encourages NPPOs to further raise awareness of the importance of sea container cleanliness and promote best practices.

[64] The intent of the revised recommendation is to:

- Communicate the plant health risks related to the movement of sea containers and their cargoes.
- Confirm the IPPC CPM's intent to develop long term guidance on this matter and to recommend related activities during the interim period.
- Describe the types of contamination of concern to stakeholders and the IPPC community and common methods for their removal.
- Encourage the wide-spread use of containers with steel floors to replace those that have wooden floors which provide an environment conducive to certain types of contamination and makes it difficult to detect and remove them.
- Seek input from the IPPC community and other stakeholders on effective measures to reduce contamination and risks presented by the sea container pathway, and related information.
- Communicate the next steps for IPPC community activities on sea containers to stakeholders.

[65] The revised recommendation is intended to provide a strengthened platform for minimizing the pest risks associated with the international movements of sea containers, by all responsible parties.

6. SECTION 2: Implementing and raising awareness in the framework of FAO/ RPPOs

6.1 Regional FAO Phytosanitary Capacity Development Activities.

6.1.1 FAO Regional Office FAORNE

[66] Mr. Thaer Yaseen – the Regional Plant Protection Officer at FAO, RNE – started his presentation on the regional phytosanitary development projects and activities performed or planned to be executed during 2023. The presentation provided the key achievements in 2023 which included organizing the High-level meeting on the management strategy of transboundary plant pests and diseases in NENA region from 21 to 23 June 2023 in Bari, Italy. This meeting called a Five-year Action plan for Sustainable Management of Transboundary Plant Pests and Diseases in the region. Also Mr. Yaseen referred to national, regional and global achievements in Farm Field Schools (FFS) activities. These activities related to the Red Palm Weevil (RPW), Fall Armyworm (FAW), Banana wilt Fusarium TR4 and plant certification programs.

[67] Mr. Yaseen listed all the conducted events at the national or regional levels framework of capacity development. Then presented the upcoming and running projects in the NENA region.

[68] Finally, He highlighted the initiative to develop a regional phytosanitary academy and provided the strategic framework to have sustainable plant production and sustainable management of plant pests.

6.1.2 6.1.2 FAO Sub-Regional Office FAOSNE

[69] Mr. Mohamed El Hady Sidatt, presented an overview of the activities undertaken in North African countries. He highlighted the activities conducted at the national and regional levels to address FAW, including the Pest management, FFS, and Laboratory

services. In addition to phytosanitary capacity building activities.

6.2 NEPPO activities

[70] Mr. Ben Jamaa, the Executive Director of the Near East Plant Protection Organization (NEPPO) presented an overview of the NEPPO including its structure and subsidiary bodies. Then he highlighted the conducted meetings and carried out activities.

[71] Mr. Ben Jamaa provided an information on the NEPPO objectives and emphasized on importance of supporting the organization and encouraged Non members countries to join to play active roles at the regional level in addition to benefit of the activities at the national levels.

6.3 Topics of interest for the NENA Region

6.3.1 High-Level Meeting on the Management Strategy of Transboundary Plant Pests and Diseases in the NENA Region

[72] Mr. Thaer Yaseen started his presentation by clarifying the term of transboundary plant pests and highlighted most important pests in the region. Then identified the main challenges and referred to FAO efforts to address these challenges. Mr. Yaseen provided an update on the regional strategy including its objectives, components and last activities. And encouraged the region countries to engage in such regional initiatives which providing sustainable solutions to address the phytosanitary challenges at the national and regional levels.

6.3.2 The effect of temperature and humidity instability and the exacerbation of palm and other pests during the 2022 and 2023 seasons

[73] Mr. Ibraheem AlJuboori, the former Head of Arab Society for Plant Protection, presented the main aspects of climate change which impacting plant health status. Then provided information about the main plant pests pathways. Mr. AlJuboori highlighted many of invasive pests and its impact focusing on these pests which can spread globally and the main challenges to be addressed.

6.3.3 The status of Opuntia cochineal scale in the NENA region

[74] Ms. Zinette Moussa, delivered a presentation on the importance of growing cactus plants in the Near East region and reviewed the most important invasive pests that attacked the cactus plants and caused severe impact. She also explained the current situation regarding the spread of Dactylopius opuntiae in the Near East countries and the most important recommendations to confront the spread of the pest.

6.3.4 Success story: Biological control of the invasive cactus Opuntia stricta using *Dactylopius Stricta* insect in Jazan region, Saudi Arabia

[75] Mr. Abdulaziz Ibrahim Alzamil gave an overview on invasive species, its characteristics, and its impacts. Mr. Alzamil clarified that the number of invasive plants in Saudi Arabia is about 70 species, including 4 species from family Cactaceae. Then he pointed out the components of invasive plants management which include chemical, physical and biological control. He explained how the cactus plant, Opuntia stricta, spread in the Jazan region and caused economic and environmental impacts. Mr. Alzamil presented the success story of using *Dactylopius opuntiae* var *stricta* in the biological control of *Opuntia stricta* which succeeded in eradicating 97% of this invasive plant.

6.3.5 Biological Control in Syria

[76] Mr. Eyad Mohamed reviewed the historical background of biological control activities in Syria and the establishment of the production and release centers for biological agents. He also provided an overview of the most important enemies currently produced in these centers, their characteristics, and the targeted hosts.

7. Section 3: Moving together from ideas to action (facilitated session).

[77] This section consisted of presentations followed by discussion and questions from the participants, and it included the followings:

*7.*1 The IPPC ePhyto Solution

[78] Ms. Yosra Ahmed delivered a presentation on the e-Phyto Solution, outlining its key components and provided updates and some figures on the e-Phyto Solution such as participating countries and exchanged certificates. Ms. Yosra also provided an overview on the current enhancements and future plans in addition to focusing on importance of collaboration at the national, regional and global levels to apply a sustainable solution.

7.2 New IPPC Guides and e-learning courses

[79] Mr. Ahmed Abdelmottaleb delivered this topic as IC member, he emphasized that the International Plant Protection Convention (IPPC) has published new guides and training materials, including:

- Guide to regulation of wood packaging material (published in 2023)
- Emergency Preparedness: A guide for developing contingency plans for outbreaks of quarantine pests (published in 2023)
- Prevention, preparedness and response guidelines for Fusarium Tropical Race 4 (TR4) of banana (published in 2023)
- Four e-learning courses published in 2022:
  - o Pest Risk Analysis (PRA)
  - o Phytosanitary Export Certification System
  - o Phytosanitary Inspection
  - o Surveillance and reporting obligations

[80] Mr. Abdelmottaleb mentioned that the IPPC is also looking for collaborators to translate the guides into other languages and to proofread the translated guides.

[81] Finally, he encouraged the NPPOs to raise awareness of the new products, increase their usage, and having active participation in the development of future products.

7.3 Regulation of wood packaging material in international trade (new IPPC Guide to support the implementation of ISPM 15)

[82] Mr. Ahmed Abdelmottaleb provided a summary of the new IPPC guide “Regulation of wood packaging material” and clarified its purpose and importance to support the implementation of ISPM 15. In addition to case studies included in the guide.

[83] The presentation included interactive exercises such as brainstorming session on the key challenges in implementing ISPM 15 at the national levels and the participants were engaged positively in this session. They highlighted some of challenges such as capacity building and collaboration with stakeholders. The presentation also included exercise on practical application of the ISPM 15.

[84] Finally, Mr. Abdelmottaleb encouraged the participants to use the guide and provide their feedback.

7.4. e-Commerce Guide for plants, plant products, and other regulated articles in international trade

[85] Mr. Ahmed Abdelmottaleb delivered this topic as IC member, he mentioned that the IPPC is working to address the phytosanitary risks posed by e-Commerce and the postal and express carrier pathways. This is one of eight key development agendas in the IPPC Strategic Framework (2020-2030).

[86] The key challenges faced by national plant protection organizations (NPPOs) include:

- The growth in e-Commerce, which has resulted in an unprecedented number of small parcels moving across borders by mail and courier.
- The rapid growth in digital technologies, which may have outpaced the development and implementation of relevant legislation to effectively regulate e-Commerce trade.
- The increased volume of small parcels, which puts pressure on the normal components of a phytosanitary import system.
- Identifying regulated articles in the mail and courier pathway.

[87] Mr. Abdelmottaleb emphasized that the desired outcomes of the IPPC's work on e-Commerce include:

- NPPOs understanding the phytosanitary risks posed by e-commerce.
- NPPOs having appropriate legislation and authorities in place.
- Lists of regulated and prohibited articles being readily available to stakeholders.
- Buyers, sellers, and other stakeholders being aware of regulatory requirements, risks, and responsibilities associated with cross-border e-commerce.
- Risk management measures being used to screen and intercept e-Commerce consignments that present a phytosanitary risk, while facilitating legitimate e-Commerce trade.
- NPPOs collaborating with trading partners, other national border agencies, and other organizations involved in the e-Commerce supply chain.
- NPPOs gathering data and monitoring e-Commerce non-compliances and regulatory activities.
- There being a measurable reduction in non-compliances associated with e-Commerce trade.

[88] Mr. Abdelmottaleb listed the IPPC steps to address the challenges of e-Commerce, including:

- Developing an e-Commerce Guide, which will be published soon.
- Holding a webinar to launch the new IPPC guide in October.
- Producing a video and fact sheet to raise awareness about e-Commerce and the phytosanitary risks associated with buying and selling plants, plant products, and other regulated articles online.
- Continuing to collaborate with key international organizations such as the World Customs

Organization (WCO) and the Universal Postal Union (UPU).

- The new IPPC e-Commerce Guide will include several case studies that highlight how some countries are approaching the challenges associated with e-Commerce.
- The IPPC is also conducting a survey in 2023-2024 to establish a baseline for measuring the key e-Commerce outcomes specified in the Implementation Plan for the IPPC Strategic Framework (CPM-17, 2023).

7.5 Draft Specification for new IPPC guide: Audits in the phytosanitary context (2021-009)

[89] Mr. Ahmed Abdelmottaleb as IC member, briefed participants about the IPPC guide which will cover the following topics:

- Purpose, benefits, and use of phytosanitary audits
- Triggers for phytosanitary audits
- Scope, purpose, and procedures for internal audits, audits of authorized entities, and remote audits
- Similarities and differences between systems audits and focused audits
- Roles and responsibilities of the NPPO, the auditor, and the auditee
- Role of the NPPO in providing oversight of entities authorized to carry out phytosanitary audits on behalf of the NPPO.
- Steps and procedures for planning, preparing, undertaking, and reporting the outcome of an audit.
- Selecting auditors, establishing the audit frequency, settling disputes over audit findings, and agreeing to financial arrangements
- Roles and responsibilities of the different members of an audit team and the minimum skills, expertise, and training required by each.
- Essential elements of an audit checklist and a sample template
- Types of non-conformities and appropriate follow-up activities
- Auditing best practices
- Recommended supplemental national or regional resources.
- Case studies

[90] Mr. Abdelmottaleb encouraged the NPPOs to participate in the consultation and help developing a comprehensive and useful guide on phytosanitary audits.

7.6. Benefits of conducting Phytosanitary Capacity Evaluations (PCE) and the latest developments

[91] Mr. Ben Jamaa Mohamed Habib, presented this topic, he provided information about the Phytosanitary Capacity Evaluation (PCE) process which helps countries evaluate their phytosanitary capacities. And emphasized that it is a fully comprehensive, NPPO-led, facilitator-enabled, IPPC Secretariat-supported process of multiple phases.

[92] Mr. Ben Jamaa clarified that the benefits of conducting a PCE include:

- Building confidence among importing NPPOs
- Creating a donor-focused strategic plan
- Empowering and building capacities of individuals and institutions
- Enabling dialogue on phytosanitary issues with relevant stakeholders

- Promoting ownership of changes in phytosanitary systems
- Strengthening linkages among border protection agencies

[93] Mr. Ben Jamaa mentioned the procedure for requesting access to conduct the PCE and gave examples of success stories from previous conducted PCEs.

7.7. National Reporting Obligations

[94] Mr. Ahmed Abdelmottaleb, IC member, delivered this topic. He gave an overview on the objectives of the National Reporting Obligations and listed its public and bilateral types.

[95] Mr. Abdelmottaleb emphasized that the official IPPC contact point is responsible for ensuring that their country's information on the IPP is up to date and accurate. They also play a key role in facilitating information exchange between countries and the IPPC Secretariat.

[96] Finally, he mentioned that the NROs are important for ensuring that all countries have access to the information they need to protect their plants and plant products from pests and diseases.

7.8. Emerging pests (Cases of FAW and Fusarium TR4)

[97] Ms. Yosra Ahmed presented a background on the emerging pests – Pest Outbreak Alert and Response Systems (POARS).
She showed an overview of activities of FAW and Fusarium Tropical Race 4 (TR4) included the global Action Plan and Prevention, preparedness and response guidelines, the workshop Series on TR4 and emergency preparedness: a guide for developing contingency plans for outbreaks of quarantine pests.

7.9. 2023 IPPC Call for Topics: Standards and Implementation

[98] Mr. Nader El Badry, SC member, delivered this topic. He presented an overview on the overall process of submitting standards and implementation topics.

[99] Mr. El Badry mentioned the key elements to apply a successful submission and emphasized on the importance of having active participation from the region countries in the upcoming calls.

[100] Mr. Ahmed Abdelmottaleb, IC member, collaborated with Mr. Nader to manage a discussion session supported by Mr. Thaer Yaseen and Mr. Ben Jamaaa. The participants were active and addressed some of considered topics to be suggested and recommended.

7.10. IDPH 2023 and Look Ahead to 2024

[101] Mr. Arop Deng, IPPC Secretariat, delivered this topic. He presented an overview on general UN international days and focused on the objectives of the International Day of Plant Health.

[102] Mr. Deng presented the IDPH 2023 observances around the world and mentioned the High-level event conducted on 12 May.

[103] Finally, Mr. Deng encouraged the NPPOs to get engaged in the 2024 IDPH activities at the national and regional levels.

8. Conclusion of the workshop/ Date and Venue of the Next Meeting

8.1 Conclusion of the workshop

IPPC Regional Workshop for NENA region (2023) – Draft recommendations

[104] Encouraging CPs to participate in the call for topics, Algeria proposed initiating process to submit topic regarding

reviewing ISPM No. 31 "Methodologies for sampling consignments". A regional meeting could be a good opportunity to coordinate this work. It is proposed to submit another topic to add the terms

Proposed date for the workshop 2024	July or August
Proposed venue for PPC workshop 2024	Morocco

"host" and "host status" to ISM 5. (Algeria in 2024).

[105] Recommendation to organize a regional workshop on *Xylella fastidiosa*. (Morocco – end of 2023 or 2024).

[106] Saudi Arabia offered to provide an in-kind contribution to support the translation of IPPC products (manuals and training materials) into Arabic, (Follow up is required).

[107] The importance of electronic certificates and the necessity of finding a permanent solution for funding, a recommendation to organize a regional workshop on e-Phyto in 2024.

[108] Organizing national meetings/seminars at national levels with all stakeholders to raise awareness of the regional initiative "Strategy of Transboundary Plant Pests and Diseases in the NENA Region". (All CPs – any update should be shared).

[109] Encouraging current members of the NEPPO to actively participate during the organizations' regular meetings. and other non-members to consider joining NEPPO as a requirement stated and preferred by the IPPC and WTO. More support (financially and technically) is necessary for an active regional organization in the region.

[110] Encourage Contracting Parties to make an in-kind contribution to the work of NEPPO and the IPPC (e.g., translation and interpretation of the meetings and recruitment of staff).

[111] Support NEPPO in submitting the draft standard for RPW. (By 15 Sep. 2023)

[112] Encouraging countries to engage in organizing activities for the International Day of Plant Health (IDPH) and share these activities with the plant health community at regional and international levels.

8.2 Date and Venue of the Next Meeting

9. Online survey: go to the following link

https://forms.office.com/pages/responsepage.aspx?id=aMQ6Frir0ESB_dnbFeOvlilikqx5SIhCm-4MbcqocZlUOFM5WUhWTDdPM1E0T09PRDREMjRCT1FBTS4u

10 Adoption of the Report (Procedure to be decided)

[113] The participants agreed on the submitted comments mentioned in Annex 2.

11. Closing of the meeting

[114] Host country collaborated with the co-organizers to conduct the workshop wrap up and souvenir shields has been delivered to the participants.

12. Technical Visits

[115] On Tuesday 5th September, the host country arranged field visit to various sites as following:

Time	Topic
05:00 AM to 08:00 AM	Dates Market
10:00 AM to 01:00 PM	National Center for Organic Agriculture and biological Control and Bumblebee Production Center
02:00 PM to 04:00 PM	Al-Aqilat Museum
04:00 PM to	Local Farm

06:00 PM	

Annex 1: LIST OF PARTICIPANTS

IPPC Regional Workshop in the Near East and North Africa Region

3-6 September, 2023
Al Qaseem, Kingdom of Saudi Arabia

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Annex 2: AGENDA

1 4Z 083 E 20APR 6 SHOJNB OO1 1120 1225 E
2 ET 808 U 20APR 6 JNBADD OO1 B 1430 2045 E
3 ET 730 U 21APR 7 ADDVIE OO1 2 0035 0555 E
4 ET 725 T 27APR 6 VIEADD OO1 2205 0525+1 E
5 ET 809 T 28APR 7 ADDJNB OO1 2 0840 1305 E
6 4Z 086 E 28APR 7 JNBSHO OO1 B 1620 1710 E

Annex 3: Comments on Draft ISPMs

DRAFT ANNEX TO ISPM 46: International movement of fresh *Mangifera indica* fruit (2021-011)

Status box

This is not an official part of the standard and it will be modified by the IPPC Secretariat after adoption.	
Date of this document	2023-05-18
Document category	Draft annex to ISPM 46
Current document stage	*To* first consultation
Major stages	2021-04 CPM-16 added topic Annex *International movement of mango (*Mangifera indica*) fruit* (2021-011) to ISPM 46 (*Commodity-specific standards for phytosanitary measures*) to the work programme, priority 1. 2022-11 SC approved Specification 73. 2023-01 Technical Panel on Commodity Standards (TPCS) drafted. 2023-02 TPCS revised and recommended to SC for approval for consultation. 2023-05 SC revised and approved for first consultation.
Steward history	2022-05 SC Joanne WILSON (NZ, Lead Steward) 2022-05 SC Hernando MORERA-GONZÁLEZ (CR, Assistant Steward)
Notes	2023-02 Edited 2023-05 Edited As per new FAO style, references cited in tables are listed below tables rather than in References.

Adoption

[Text to this paragraph will be added following adoption.]

1. Scope

This commodity standard clearly describes the commodity (including, when relevant, the botanical name and part of the plant as well as its intended use) for which a list of associated pests and related options for phytosanitary measures are identified.

2. Description of the commodity and its intended use

This commodity standard provides guidance for national plant protection organizations on options for phytosanitary measures for the international movement of fresh *Mangifera indica* (mango) fruit.

The commodity standard applies to the fruit of all cultivars and varieties of *M. indica*. It applies to fresh whole *M. indica* fruit, with or without a small section of fruit stalk attached but without leaves or stem. The standard applies to fresh fruit that has been produced for trade and is intended for consumption or processing; it does not apply to processed fruit (e.g. sliced, dried, frozen, canned).

3. Pests associated with fresh *Mangifera indica* fruit

The pests included in Table 1 are known to be associated with *M. indica* and are regulated by at least one contracting party. The list of pests is not intended to be exhaustive.

Inclusion of a pest in Table 1 does not constitute technical justification for its regulation. When determining whether to regulate a pest listed in this commodity standard, an importing country should base its decision on technical justification using either a pest risk analysis or, where applicable, another comparable examination and evaluation of available scientific information.

Table 1. Pests associated with fresh *Mangifera indica* fruit

Pest group	Family	Species
Weevils (Coleoptera)	Curculionidae	*Sternochetus frigidus* (Fabricius, 1787)
		Sternochetus mangiferae (Fabricius, 1775)
		Sternochetus olivieri (Faust, 1892)
Fruit flies (Diptera)	Tephritidae	*Anastrepha distincta* Greene, 1934
		Anastrepha fraterculus (Wiedemann, 1830)
		Anastrepha ludens (Loew, 1873)
		Anastrepha obliqua (Macquart, 1835)
		Anastrepha serpentina (Wiedemann, 1830)
		Anastrepha striata Schiner, 1868
		Bactrocera aquilonis (May, 1965)
		Bactrocera carambolae Drew & Hancock, 1994
		Bactrocera caryeae (Kapoor, 1971)
		Bactrocera correcta (Bezzi, 1916)
		Bactrocera curvipennis (Froggatt, 1909)
		Bactrocera dorsalis (Hendel, 1912)
		Bactrocera facialis (Coquillett, 1909)
		Bactrocera frauenfeldi (Schiner, 1868)
		Bactrocera jarvisi (Tryon, 1927)
		Bactrocera kirki (Froggatt, 1911)
		Bactrocera melanotus (Coquillett, 1909)
		Bactrocera neohumeralis (Hardy, 1951)
		Bactrocera occipitalis (Bezzi, 1919)
		Bactrocera passiflorae (Froggatt, 1911)
		Bactrocera psidii (Froggatt, 1899)
		Bactrocera tryoni (Froggatt, 1897)
		Bactrocera tuberculata (Bezzi, 1916)
		Bactrocera xanthodes (Broun, 1904)
		Bactrocera zonata (Saunders, 1842)
		Ceratitis capitata (Wiedemann, 1824)
		Ceratitis cosyra (Walker, 1849)
		Ceratitis rosa Karsch, 1887
		Zeugodacus cucurbitae (Coquillett, 1899)
		Zeugodacus tau (Walker, 1849)
Mealybugs (Hemiptera)	Pseudococcidae	*Dysmicoccus neobrevipes* Beardsley, 1959

Pest group	Family	Species
		Ferrisia malvastra (McDaniel, 1962)
		Formicococcus robustus (Ezzat & McConnell, 1956)
		Maconellicoccus hirsutus (Green, 1908)
		Nipaecoccus nipae (Maskell, 1893)
		Planococcus lilacinus (Cockerell, 1905)
		Planococcus minor (Maskell, 1897)
		Pseudococcus cryptus Hempel, 1918
		Pseudococcus jackbeardsleyi Gimpel & Miller, 1996
		Pseudococcus solenedyos Gimpel & Miller, 1996
		Rastrococcus iceryoides (Green, 1908)
		Rastrococcus invadens Williams, 1986
		Rastrococcus rubellus Williams, 1989
		Rastrococcus spinosus (Robinson, 1918)
Whiteflies (Hemiptera)	Aleyrodidae	*Aleurodicus dispersus* Russell, 1965
Other hemipterans (Hemiptera)	Coreidae	*Acanthocoris scabrator* (Fabricius, 1803)
		Amblypelta nitida Stål, 1873
	Pentatomidae	*Bathycoelia thalassina* (Herrich-Schäffer, 1844)
Moths (Lepidoptera)	Crambidae	*Deanolis sublimbalis* Snellen, 1899
	Geometridae	*Biston suppressaria* (Guenée, 1858)
	Limacodidae	*Darna trima* (Moore, 1859)
Thrips (Thysanoptera)	Thripidae	*Retithrips syriacus* (Mayet, 1890)
		Rhipiphorothrips cruentatus Hood, 1919
		Scirtothrips aurantii Faure, 1929
		Thrips palmi Karny, 1925
Fungi	*Incertae sedis*	*Cytosphaera mangiferae* Died., 1916

4. Options for phytosanitary measures

This section provides options for phytosanitary measures that may be relevant for the pests listed in Table 1. The options presented are not intended to be exhaustive.

Contracting parties shall institute only phytosanitary measures that are technically justified (Article VII.2 (g) of the IPPC).

Table 2 provides some options for phytosanitary measures that may be relevant to pest(s) associated with the international movement of fresh *M. indica* fruit.

Table 3 provides some pest-specific options for phytosanitary measures that may be relevant for the pests listed in Table 1, with further details being provided in Table 4 to Table 9.

Use of methyl bromide (Table 8) should take into account the Commission on Phytosanitary Measures recommendation on the *Replacement or reduction of the use of methyl bromide as a phytosanitary measure* (R-03). Alternative treatments that are more environmentally friendly are being pursued.

Measures included in this commodity standard may be effective at managing pest risk when used as a stand-alone measure or may be effective only when used in combination with other measures as described in ISPM 14 (*The use of integrated measures in a systems approach for pest risk management*).

Integrated measures may also include general agricultural practices and production procedures. Examples of these include the following:

- production practices and procedures, such as:
  - orchard hygiene practices,
  - monitoring for pests, and
  - pest management;
- handling, grading and packing practices and procedures, such as:
  - pest management in the packing house,
  - packing fruit in material that is clean and either new or refurbished,
  - storing and transporting fruit in a secure manner to prevent infestation (e.g. use of insect-proof packaging), and
  - grading fruit to provide assurance that it is free from damage, symptoms of pests, and (e.g. contamination with soil or plant debris); and
- secure management of treatment facilities to prevent infestation.

Table 2. Options for phytosanitary measures that may be relevant to pest(s) associated with fresh *Mangifera indica* fruit

Options for phytosanitary measures	References
Pest free areas	ISPM 4 (*Requirements for the establishment of pest free areas*)
Pest free areas for fruit flies	ISPM 26 (*Establishment of pest fest free areas for fruit flies (Tephritidae)*)
Pest free places of production and pest free production sites	ISPM 10 (*Requirements for the establishment of pest free places of production and pest free production sites*)
Areas of low pest prevalence	ISPM 22 (*Requirements for the establishment of areas of low pest prevalence*)
Systems approaches	ISPM 14 (*The use of integrated measures in a systems approach for pest risk management*)
Inspection	ISPM 23 (*Guidelines for inspection*)
Phytosanitary certification	ISPM 7 (*Phytosanitary certification system*) ISPM 12 (*Phytosanitary certificates*)

Sources: ISPMs are available at www.ippc.int/core-activities/standards-setting/ispms.

Table 3. Pest-specific options for phytosanitary measures

Pest species	Options for phytosanitary measures
Weevils	
Sternochetus frigidus	IRDN 5; SA 1
Sternochetus mangiferae	IRDN 7; SA 1
Sternochetus olivieri	IRDN 7; SA 1
Fruit flies	
Anastrepha distincta	HWIT 2; IRDN 1
Anastrepha fraterculus	HWIT 1, 2; IRDN 4
Anastrepha ludens	HWIT 1; IRDN 1
Anastrepha obliqua	HWIT 1, 2; IRDN 1
Anastrepha serpentina	HWIT 1, 2; IRDN 2
Anastrepha striata	HWIT 1, 2; IRDN 4
Bactrocera aquilonis	IRDN 4; VHT 4, 5
Bactrocera carambolae	HWIT 4; IRDN 4; VHT 3, 6, 7
Bactrocera caryeae	HWIT 4; IRDN 4
Bactrocera correcta	HWIT 4; IRDN 4; VHT 3, 6, 7
Bactrocera curvipennis	HTFA 1; IRDN 4
Bactrocera dorsalis	HWIT 3, 4, 5; IRDN 3; MB 1; VHT 1, 3, 6, 7
Bactrocera facialis	HTFA 1; IRDN 4
Bactrocera frauenfeldi	IRDN 4; VHT 4, 5
Bactrocera jarvisi	IRDN 2; VHT 4, 5
Bactrocera kirki	HTFA 1; IRDN 4
Bactrocera melanotus	HTFA 1; IRDN 4
Bactrocera neohumeralis	IRDN 4; VHT 4, 5
Bactrocera occipitalis	IRDN 4; VHT 1
Bactrocera passiflorae	HTFA 1; IRDN 4
Bactrocera psidii	HTFA 1; IRDN 4
Bactrocera tryoni	HTFA 1; IRDN 2; VHT 4, 5
Bactrocera tuberculata	IRDN 4; VHT 3, 6, 7
Bactrocera xanthodes	HTFA 1; IRDN 4
Bactrocera zonata	HWIT 4; IRDN 4; VHT 3, 6, 7
Ceratitis capitata	HWIT 1, 2, 3, 5; IRDN 2; MB 1; VHT 2, 4
Ceratitis cosyra	HWIT 3, 5; IRDN 4; MB 1
Ceratitis rosa	HWIT 3, 5; IRDN 4, MB 1
Zeugodacus cucurbitae	IRDN 4; VHT 1; VHT 3, 6, 7

Pest species	Options for phytosanitary measures
Zeugodacus tau	IRDN 4; VHT 3, 6, 7
Mealybugs	
Dysmicoccus neobrevipes	IRDN 6; pre-export inspection*
Ferrisia malvastra	IRDN 8
Formicococcus robustus	IRDN 8
Maconellicoccus hirsutus	Official laboratory analysis†
Nipaecoccus nipae	Pre-export inspection*
Planococcus lilacinus	IRDN 6; pre-export inspection*
Planococcus minor	IRDN 6; pre-export inspection*
Pseudococcus cryptus	IRDN 8; pre-export inspection*
Pseudococcus jackbeardsleyi	IRDN 8; pre-export inspection*
Pseudococcus solenedyos	IRDN 8; pre-export inspection*
Rastrococcus iceryoides	IRDN 8; pre-export inspection*
Rastrococcus invadens	IRDN 8; pre-export inspection*
Rastrococcus rubellus	IRDN 8; pre-export inspection*
Rastrococcus spinosus	IRDN 8; pre-export inspection*
Whiteflies	
Aleurodicus dispersus	Pre-export inspection
Other hemipterans	
Acanthocoris scabrator	Pre-export inspection*
Amblypelta nitida	Pre-export inspection*
Bathycoelia thalassina	Pre-export inspection*
Moths	
Deanolis sublimbalis	IRDN 8; pre-export inspection*
Biston suppressaria	Pre-export inspection*
Darna trima	Pre-export inspection*
Thrips	
Retithrips syriacus	Pre-export inspection
Rhipiphorothrips cruentatus	Pre-export inspection*
Scirtothrips aurantii	Pre-export inspection*
Thrips palmi	Pre-export inspection*
Fungi	
Cytosphaera mangiferae	SA 1

Notes: * Pre-export inspection targeting the pest of concern and the application of a remedial action if the pest is detected.

† Samples taken during inspection are sent to an official laboratory for analysis and identified to species. If the pest is detected, a remedial action is applied to the affected consignment or the consignment is rejected for export.

HTFA, high temperature forced air (see Table 6); HWIT, hot water immersion treatment (see Table 4); IRDN, irradiation (see Table 7); MB, methyl bromide (see Table 8); SA, systems approach (see Table 9); VHT, vapour heat treatment (see Table 5).

Table 4. Schedules for hot water immersion treatment

Schedule number	Fruit weight (g)	Water temperature (°C)	Immersion time (minutes)	References*
HWIT 1	0–375 376–500 501–700	46.1 46.1 46.1	65 75 90	USDA (2016)
HWIT 2	0–425 426–650	46.1 46.1	75 90	MERCOSUR (2006) MPI (2023)
HWIT 3	0–500 501–700 701–900	46.1 46.1 46.1	75 90 110	Armstrong and Mangan (2007) DAFF (2023)
HWIT 4	0–500 501–700 701–900	48.0 48.0 48.0	60 75 90	APQA (2012, 2016) DAFF (2023)
Schedule number	**Fruit weight (g)**	**Fruit pulp temperature (°C)**	**Immersion time (minutes)**	**References**
HWIT 5	All	50.0	11	Zakariya and Alhassan (2014)

Note: * References listed in alphabetical order, not by weight of fruit.

Sources:

APQA (Animal and Plant Quarantine Agency). 2012. *Import requirement for fresh mango fruits from Pakistan into Korea* (in Korean). Republic of Korea. www.qia.go.kr/bbs/lawAnn/viewLawWebAction.do?id=190958&type=0

APQA. 2016. *Import requirement for fresh mango fruits from India into Korea* (in Korean). Republic of Korea. www.qia.go.kr/lawAnn/viewLawWebAction.do?id=190961&type=0

Armstrong, J.W. & Mangan, R.L. 2007. Commercial quarantine heat treatments. In: J. Tang, E. Mitcham, S. Wang & S. Lurie, eds. *Heat treatments for postharvest pest control – Theory and practice*, pp. 311–340. Wallingford, UK, CABI. 349 pp.

DAFF (Department of Agriculture, Fisheries and Forestry). 2023. Australian Biosecurity Import Conditions. In: *Australian Government Department of Agriculture, Fisheries and Forestry*. Canberra. [Cited 29 January 2023]. https://bicon.agriculture.gov.au/BiconWeb4.0

MERCOSUR (Southern Common Market). 2006. [*Phytosanitary requirements for* Mangifera indica *(mango), according to country of destination and origin, for MERCOSUR member states.*] MERCOSUR/GMC/RES. Nº 61/06, sub-standard 3.7.45 (in Spanish). Brasília. 9 pp. https://faolex.fao.org/docs/pdf/mrc104485.pdf

MPI (Ministry for Primary Industries). 2023. Requirement documents for importing fresh fruit and vegetables. In: *Ministry for Primary Industries*. Wellington, New Zealand Government. [Cited 1 March 2023]. www.mpi.govt.nz/import/food/fresh-fruit-vegetables/requirements

USDA (United States Department of Agriculture). 2016. *Treatment manual*, 2nd edn. Animal and Plant Health Inspection Service, USDA. 968 pp. www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf

Zakariya, A.A.-R.M. & Alhassan, N. 2014. Application of hot water and temperature treatments to improve quality of Keitt and Nam Doc Mai mango fruits. *International Journal of Scientific and Technology Research*, 3: 262–266. www.ijstr.org/final-print/sep2014/Application-Of-Hot-Water-And-Temperature-Treatments-To-Improve-Quality-Of-Keitt-And-Nam-Doc-Mai-Mango-Fruits.pdf

Table 5. Schedules for vapour heat treatment

Schedule number	Minimum pulp temperature (°C)	Minimum relative humidity (%)	Minimum exposure time (minutes)	References
VHT 1	46.0	95	10	Dohino *et al.* (2017) USDA (2016)
VHT 2	46.5	95	10	**PT 30 (Vapour heat treatment for *Ceratitis capitata* on *Mangifera indica*)**
VHT 3	46.5	95	30	APPPC (2021)
VHT 4	47.0	90	15	DAFF (2023)
VHT 5	47.0	95	15	**PT 31 (Vapour heat treatment for *Bactrocera tryoni* on *Mangifera indica*)**
VHT 6	47.0	95	20	APPPC (2021)
VHT 7	47.5	95	20	APPPC (2021)

Note: **PT**, phytosanitary treatment (annex to ISPM 28 (*Phytosanitary treatments for regulated pests*)): PTs are adopted by the Commission on Phytosanitary Measures (CPM); other treatments included in the table meet the criteria in ISPM 46 (*Commodity-specific standards for phytosanitary measures*) but are not adopted by the CPM.

Sources: ISPMs are available at www.ippc.int/core-activities/standards-setting/ispms.

APPPC (Asia and Pacific Plant Protection Commission). 2021. *International movement of fresh mango (*Mangifera indica*) fruit*. Regional Standard for Phytosanitary Measures (RSPM) 11. Bangkok, APPPC, FAO. 12 pp. www.fao.org/3/cb5357en/cb5357en.pdf

DAFF (Department of Agriculture, Fisheries and Forestry). 2023. Australian Biosecurity Import Conditions. In: *Australian Government Department of Agriculture, Fisheries and Forestry*. Canberra. [Cited 17 May 2023]. https://bicon.agriculture.gov.au/BiconWeb4.0

Dohino,T., Hallman, G.J., Grout, T.G., Clarke, A.R., Follett, P.A., Cugala, D.R., Tu, D.M. *et al*. 2017. Phytosanitary treatments against *Bactrocera dorsalis* (Diptera: Tephritidae): current situation and future prospects. *Journal of Economic Entomology*, 110(1): 67–79. https://doi.org/10.1093/jee/tow247

USDA (United States Department of Agriculture). 2016. Treatment manual, 2nd edn. Animal and Plant Health Inspection Service, USDA. 968 pp. www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf

Table 6. Schedules for high temperature forced air treatment

Schedule number	Minimum pulp temperature (°C)	Minimum exposure time (minutes)	References
HTFA 1	47.2	20	APPPC (2021) MPI (2023)

Sources:

APPPC (Asia and Pacific Plant Protection Commission). 2021. *International movement of fresh mango (*Mangifera indica*) fruit*. Regional Standard for Phytosanitary Measures (RSPM) 11. Bangkok, APPPC, FAO. 12 pp. www.fao.org/3/cb5357en/cb5357en.pdf

MPI (Ministry for Primary Industries). 2023. Requirement documents for importing fresh fruit and vegetables. In: *Ministry for Primary Industries*. Wellington, New Zealand Government. [Cited 1 March 2023]. www.mpi.govt.nz/import/food/fresh-fruit-vegetables/requirements

Table 7. Schedules for irradiation

Schedule number	Dose (Gy)	References
IRDN 1	70	**PT 1 (Irradiation treatment for *Anastrepha ludens*)** **PT 2 (Irradiation treatment for *Anastrepha obliqua*)** **PT 39 (Irradiation treatment for the genus *Anastrepha*)**
IRDN 2	100	**PT 3 (Irradiation treatment for *Anastrepha serpentina*)** **PT 4 (Irradiation treatment for *Bactrocera jarvisi*)** **PT 5 (Irradiation treatment for *Bactrocera tryoni*)** **PT 14 (Irradiation treatment for *Ceratitis capitata*)**
IRDN 3	116	**PT 33 (Irradiation treatment for *Bactrocera dorsalis*)**
IRDN 4	150	**PT 7 (Irradiation treatment for fruit flies of the family Tephritidae (generic))**
IRDN 5	165	**PT 43 (Irradiation treatment for *Sternochetus frigidus*)**
IRDN 6	231	**PT 19 (Irradiation treatment for *Dysmicoccus neobrevipes*, *Planococcus lilacinus* and *Planococcus minor*)**
IRDN 7	300	USDA (2016)
IRDN 8*	400	APPPC (2021)

Notes: * IRDN 8 treatment excludes pupae and adults of the order Lepidoptera.

PT, phytosanitary treatment (annex to ISPM 28 (*Phytosanitary treatments for regulated pests*)): PTs are adopted by the Commission on Phytosanitary Measures (CPM); other treatments included in the table meet the criteria in ISPM 46 (*Commodity-specific standards for phytosanitary measures*) but are not adopted by the CPM.

Sources: ISPMs are available at www.ippc.int/core-activities/standards-setting/ispms.

APPPC (Asia and Pacific Plant Protection Commission). 2021. *International movement of fresh mango (*Mangifera indica*) fruit*. Regional Standard for Phytosanitary Measures (RSPM) 11. Bangkok, APPPC, FAO. 12 pp. www.fao.org/3/cb5357en/cb5357en.pdf

USDA (United States Department of Agriculture). 2016. *Treatment manual*, 2nd edn. Animal and Plant Health Inspection Service, USDA. 968 pp. www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/treatment.pdf

Table 8. Schedules for methyl bromide fumigation (applied under normal atmospheric pressure)

Schedule number	Minimum temperature (°C)	Minimum dose (g/m^3)	Minimum time (hours)	Reference
MB 1	21	32	2	DAC (2003)

Source:

DAC (Department of Agriculture and Cooperation). 2003. *Plant Quarantine (Regulation of Import into India) Order, 2003.* New Delhi. 105 pp. www.ppqs.gov.in/acts

Table 9. Systems approaches based on ISPM 14 (*The use of integrated measures in a systems approach for pest risk management*)

Systems approach number	Independent measures	Reference

SA 1	*Pre-harvest control measures* (e.g. targeted field management using pest control) *Harvest control measures* (e.g. field sanitation, removal of infested fruit) *Post-harvest control measures* (e.g. washing and brushing; chemical dipping; targeted inspection and remedial action to remove external pests)	Lun (2017)

Source: ISPMs are available at www.ippc.int/core-activities/standards-setting/ispms.

Lun, V. 2017. Case study on Cambodian fresh mangos export to Korea. Presentation, 7 September 2017, Yogyakarta, Indonesia. www.unescap.org/sites/default/files/4.1%20Case%20Study%20on%20Cambodian%20Fresh%20Mango%20Export%20to%20Korea_L.%20Vanny.pdf

5. References

The present annex may refer to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at www.ippc.int/core-activities/standards-setting/ispms.

CPM R-03. 2017. *Replacement or reduction of the use of methyl bromide as a phytosanitary measure*. CPM Recommendation. Rome, IPPC Secretariat, FAO. Adopted 2008. www.ippc.int/en/publications/84230

IPPC Secretariat. 1997. *International Plant Protection Convention*. Rome, IPPC Secretariat, FAO. www.ippc.int/en/core-activities/governance/convention-text

Potential implementation issues

This section is not part of the standard. The Standards Committee in May 2016 requested the Secretariat to gather information on any potential implementation issues related to this draft. Please provide details and proposals on how to address these potential implementation issues.

Introduction to the reorganization and revision of PRA standards (not an official part of the standard)

Pest risk analysis (PRA) is a core process within the scope of the IPPC. Guidance for national plant protection organizations (NPPOs) is currently provided in ISPM 2 (*Framework for pest risk analysis*, adopted in 1995, revised in 2007) and ISPM 11 (*Pest risk analysis for quarantine pests*, adopted in 2001, revised in 2003, 2004, and 2013).

The purpose of the revision is to:

- include all the requirements of the stages in PRA in one standard; and
- provide revised guidance on the pest risk management stage.

The reorganization and revision were achieved in line with Specification 72 (*Reorganization and revision of pest risk analysis standards*) by combining, and revising where relevant, ISPM 2, ISPM 11, and the draft ISPM on *Pest risk management for quarantine pests* (2014-001) (originally drafted as a stand-alone standard) into one standard. The redundant and repetitive text was removed but the substantive guidance remained. Information on environmental risks, living modified organisms (LMOs), and PRA for plants as pests are gathered into further annexes.

Main changes from existing PRA ISPMs

Structure of revised PRA ISPM:

- Core text of the standard
- ANNEX 1: Initiation (PRA Stage 1)
- ANNEX 2: Pest risk assessment (PRA Stage 2)
- ANNEX 3: Pest risk management (PRA Stage 3)
- ANNEX 4: Environmental risks
- ANNEX 5: Living modified organisms as pests
- ANNEX 6: Pest risk analysis for plants as quarantine pests
- APPENDIX 1: Pest risk analysis flow chart

Supplements on the environmental impacts (S1) and LMOs (S2). The supplemental text on environmental impacts (S1) and the section addressing plants as quarantine pests were moved to Annexes 4 and 6, respectively. The supplemental text on LMOs (S2) was moved to Annex 5 except where it was necessary to retain it in the text.

Probability of transfer to a suitable host. This subsection was moved from the end of the probability of entry section to the section on the probability of establishment. This was because, according to ISPM 5 (*Glossary of phytosanitary terms*), "entry" is complete when a pest enters the area, whereas, in ISPM 11, entry is complete when a pest is transferred to another host. This change was aimed at improving the logical flow of the process and achieving consistency across ISPMs.

Consequences. The expert working group (EWG) agreed that consequences to be considered include environmental, economic, social and other consequences, and economic consequences do not need to be mentioned specifically. The word "consequences" (without the qualifier of "economic" or "environmental") is used, except where a special focus on "environmental" or "economical" consequences is indicated.

NOTE: Reviewers are encouraged to focus their review on new and revised text (specifically focusing on black text). General comments are encouraged on red and blue text at this stage of consultation, considering that the scope of the revision is limited by Specification 72 (www.ippc.int/en/publications/90498). Reviewers are also invited to identify implementation issues, if any.

Remarks/Colour code

- Text in black colour is new and revised text – all comments encouraged
- Text in blue colour is transcribed from ISPM 2 – general comments encouraged
- Text in red colour is transcribed from ISPM 11 – general comments encouraged

Additional information is included in the report of the EWG (www.ippc.int/en/publications/91944), and the discussion of the SC in May 2023 www.ippc.int/en/publications/92194).

DRAFT REORGANIZATION AND REVISION OF PEST RISK ANALYSIS STANDARDS: Pest risk analysis for quarantine pests (2020-001)

Status box

This is not an official part of the standard and it will be modified by the IPPC Secretariat after adoption.	
Date of this document	2022-05-17
Document category	Draft ISPM
Current document stage	*To* first consultation
Major stages	2020-07 CPM Bureau added topic *Reorganization of pest risk analysis standards* (2020-001) to the *List of topics for IPPC standards* (subsequently confirmed by CPM-15 (2021), with SC 2021/04 recommending priority 1). 2021-11 SC approved Specification 72. 2022-11 Expert working group met and drafted the standard. 2023-05 SC revised the draft and approved it for consultation.
Steward history	2020-09 SC Masahiro SAI (JP, Lead Steward) 2020-09 SC Joanne WILSON (NZ, Assistant Steward) 2020-09 SC Hernando Moreira GONZÁZALES (CR, Assistant Steward)
Notes	2018-03 Annex 3 edited (draft ISPM on *Guidance on pest risk management* (2014-001)) 2023-01 Edited (*Reorganization and revision of pest risk analysis standards* (2020-001)) 2023-05 Light edit

Adoption

[Text in this section will be added following adoption.]

INTRODUCTION

Scope

This standard describes the overall structure and concepts underlying the process of pest risk analysis (PRA) for quarantine pests within the scope of the IPPC. It covers the integrated processes of the three stages of PRA – initiation, pest risk assessment and pest risk management. Uncertainty, information gathering, documentation, pest risk communication, consistency and avoidance of undue delay are addressed. Specific guidance is also provided on the analysis of risks posed by pests to the environment and biological diversity, risks posed by plants that are living modified organisms (LMOs), and PRA for plants as quarantine pests.

This standard does not cover PRA for regulated non-quarantine pests, guidance for which is provided in ISPM 21 (*Pest risk analysis for regulated non-quarantine pests*).

References

The present standard refers to ISPMs. ISPMs are available on the International Phytosanitary Portal (IPP) at www.ippc.int/core-activities/standards-setting/ispms.

CBD. 2000. *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*. Montreal, Secretariat of the Convention on Biological Diversity.

ICPM. 2001. *Report of the Third Interim Commission on Phytosanitary Measures*, Rome, 2–6 April 2001. Rome, IPPC Secretariat, FAO. www.ippc.int/en/publications/144

ICPM. 2005. *Report of the Seventh Interim Commission on Phytosanitary Measures*, Rome, 4–7 April 2005. Rome, IPPC Secretariat, FAO. www.ippc.int/en/publications/442

IPPC Secretariat. 1997. *International Plant Protection Convention*. Rome, IPPC Secretariat, FAO. www.ippc.int/en/core-activities/governance/convention-text

WTO (World Trade Organization). 1994. *Agreement on the Application of Sanitary and Phytosanitary Measures*. Geneva.

Definitions

Definitions of phytosanitary terms used in this standard can be found in ISPM 5 (*Glossary of phytosanitary terms*).

Outline of requirements

The PRA is an appropriate tool to: identify pests and pathways of potential phytosanitary concern for a specified area and evaluate their pest risk; identify endangered areas; and, if appropriate, identify pest risk management options and determine the most appropriate phytosanitary measures, commensurate with the identified risk, to reduce the risk of introduction and spread of the pests concerned. Pest risk analysis for quarantine pests consists of three stages: 1: Initiation; 2: Pest risk assessment; and 3: Pest risk management.

BACKGROUND

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

The pest risk posed by the introduction of organisms associated with a particular pathway, such as a commodity, should also be considered in a PRA. The commodity itself may not pose a pest risk but may harbour organisms that are pests. Lists of such organisms are compiled during the initiation

stage. Specific organisms may then be analysed individually, or in groups where individual species share common biological characteristics.

Less commonly, the commodity itself may pose a pest risk. When organisms imported as commodities (such as plants for planting, biological control agents and other beneficial organisms, and LMOs) are deliberately introduced and established in intended habitats in new areas, there is a risk that they may accidentally spread to unintended habitats, causing injury to plants or plant products. Such risks may also be analysed using the PRA process.

The PRA process is applied to pests of cultivated plants and wild flora, in accordance with the scope of the IPPC. It does not cover the analysis of risks beyond the scope of the IPPC.

Provisions of other international agreements may address risk assessment (e.g. the Convention on Biological Diversity and the Cartagena Protocol on Biosafety to that convention (CBD, 2000)).

The principles of necessity, managed risk, minimal impact, transparency harmonization, non-discrimination, technical justification, cooperation, and equivalence, as described in ISPM 1 (*Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade*) and the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) (WTO, 1994), are all essential considerations in pest risk analysis.

IMPACTS ON BIODIVERSITY AND THE ENVIRONMENT

The standard provides guidance on how to determine whether a pest satisfies the criteria to be considered a quarantine pest and pest risk management options to manage the associated pest risk. The identification of these options takes account of the degree of uncertainty and the options are designed in proportion to the risk. The process includes analysis of risks to biodiversity and the environment posed by pests. The resulting phytosanitary measures may help protect the environment and preserve biodiversity by managing the pest risk posed by commodities that are moved internationally, while avoiding phytosanitary actions that are not technically justified.

REQUIREMENTS

1. Framework for PRA

The PRA process may be used for organisms not previously recognized as pests (such as plants, biological control agents and other beneficial organisms, and LMOs), recognized pests, pathways, and review of phytosanitary policy. The process can be summarized as follows:

- The PRA process is initiated in Stage 1, which involves identifying the pest (or pests) and pathways that are of potential concern and that should be considered for pest risk assessment in relation to the identified PRA area. If no pests are identified in this stage, the analysis may stop.
- Stage 2 (pest risk assessment) begins with the categorization of individual pests to determine whether the criteria for a quarantine pest are satisfied. If no pests meet the criteria, the analysis may stop. Pest risk assessment continues with an evaluation of the probability of pest entry, establishment and spread, and of their potential consequences.

- Stage 3 (pest risk management) involves identification, evaluation and selection of appropriate phytosanitary measures to reduce the pest risk posed by the quarantine pests identified at Stage 2.

Pest risk analysis, however, is not necessarily a linear process because, in conducting the entire analysis, it may be necessary to go back and forth between various stages. Information gathering, documentation and pest risk communication are carried out throughout the PRA process.

General requirements for the PRA process and aspects common to all PRA stages (e.g. information, gathering, documentation, pest risk communication) are provided in the core text of this standard and detailed guidance on each stage of PRA is given in Annexes 1, 2 and 3, respectively. Detailed guidance on environmental risks, LMOs and plants as pests is given in Annexes 4, 5 and 6, respectively.

An overview of the full PRA process is illustrated in Appendix 1.

This standard is not a detailed operational or methodological guide for assessors.

2. Aspects common to all PRA stages

2.1 Information gathering

Throughout the process, information should be gathered and analysed as required to reach recommendations and conclusions. Scientific publications as well as technical information such as data from surveys and interceptions may be relevant. As the analysis progresses, information gaps may be identified necessitating further enquiries or research. Where information is insufficient or inconclusive, expert judgement may be used if appropriate.

Cooperation in the provision of information and responding to requests for information made via the official contact point are IPPC obligations (Articles VIII.1(c) and VIII.2). When requesting information from other contracting parties, requests should be as specific as possible and limited to information essential to the analysis. Other agencies may be approached for information appropriate to the analysis.

2.2 Uncertainty

Uncertainty is a component of risk and therefore it is important to recognize and document uncertainty when performing PRAs. Sources of uncertainty with a particular PRA may include missing, incomplete, inconsistent or conflicting data; natural variability of biological systems; subjectiveness of analysis; and sampling randomness. Symptoms of uncertain causes and origin and asymptomatic carriers of pests may pose particular challenges.

The nature and degree of uncertainty in the analysis should be documented and communicated, and the use of expert judgement should be clearly indicated. If adding or strengthening of phytosanitary measures is recommended to compensate for uncertainty, this should be recorded. Documentation of uncertainty contributes to transparency and may also be useful for the identification of research needs or priorities.

As uncertainty is an inherent part of PRA, it is appropriate to monitor the phytosanitary situation resulting from the regulation based on any particular PRA and to re-evaluate previous decisions.

2.3 Documentation

The principle of transparency requires that contracting parties should, on request, make available the technical justification for phytosanitary import requirements. Thus, the PRA should be sufficiently documented. This may be achieved by documenting PRA at two levels:

- documenting the general PRA process; and
- documenting each analysis made.

2.3.1 Documenting the general PRA process

Each national plant protection organization (NPPO) may document the procedures and criteria of its general PRA process.

2.3.2 Documenting each specific PRA

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

The main elements that should be documented are:

- purpose of the PRA;
- identity of the organism;
- PRA area;
- biological attributes of the organism and evidence of ability to cause injury;
- pest, pathways, endangered area;
- sources of information;
- nature and degree of uncertainty and measures envisaged to compensate for uncertainty;
- commodity description and categorized pest list (in the case of pathway-initiated analysis);
- evidence of economic impact, which includes environmental impact;
- conclusions of pest risk assessment (probabilities and consequences);
- decisions and justifications to stop the PRA process;
- phytosanitary measures identified, evaluated and recommended from pest risk management; and
- date of completion and the NPPO responsible for the analysis, including (if appropriate) names of authors, contributors and reviewers.

Other aspects to be documented may include:

- any particular need for monitoring the efficacy or effectiveness of proposed phytosanitary measures; and

- potential dangers identified that are outside the scope of the IPPC and are to be communicated to other authorities (e.g. biological control agents).[1]

2.4 Pest risk communication

Pest risk communication is important throughout each stage of PRA. It is generally recognized as an interactive process allowing exchange of information between the NPPO that has conducted the PRA and stakeholders. It is not simply a one-way movement of information or about making stakeholders understand the risk situation, but is meant to reconcile the views of scientists, stakeholders, politicians and so on, in order to:

- achieve a common understanding of the pest risk;
- develop credible pest risk management options;
- develop credible and consistent regulations and policies to deal with pest risk; and
- promote awareness of the phytosanitary issues under consideration.

At the end of the PRA, evidence supporting the PRA, the proposed mitigations and the uncertainties should be communicated to the affected NPPOs and may be communicated to other interested parties, including other contracting parties, regional plant protection organizations and NPPOs, as appropriate.

If, subsequent to the PRA, phytosanitary import requirements or prohibitions are adopted, the contracting party shall immediately publish these and notify contracting parties that it believes may be directly affected (according to IPPC Article VII.2(b)) and on request make the rationale available to any contracting party (according to IPPC Article VII.2(c)).

If, subsequent to the PRA, phytosanitary import requirements or prohibitions are not adopted, contracting parties may make this information available.

National plant protection organizations are encouraged to communicate evidence of dangers other than pest risk (such as to animals or human health) to the appropriate authorities.

2.5 Consistency in PRA

National plant protection organizations should strive for consistency in their conduct of PRAs. Consistency offers numerous benefits, including:

- promotion of the principles of non-discrimination and transparency;
- improved familiarity with the PRA process;
- increased efficiency in completing PRAs and managing related data; and
- improved comparability between PRAs conducted on similar products or pests, which in turn aids the development and application of similar or equivalent management measures.

Consistency may be assured through, for example, the elaboration of generic decision criteria and procedural steps, training of individuals conducting PRA, and review of draft PRAs.

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[1] ISPM 3 (*Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms*) lists additional documentation requirements in relation to biological control agents and other beneficial organisms.

2.6 Avoidance of undue delay

Where other contracting parties are directly affected by the outcome of an individual PRA, the NPPO conducting the PRA should, on request, supply information about the completion of it, and if possible the anticipated time frame, taking into account avoidance of undue delay (see ISPM 1).

3. Scope of PRA

The range of pests covered by the IPPC extends beyond pests directly affecting cultivated plants. Pests may also include pests indirectly affecting cultivated plants, pests affecting non-cultivated plants, LMOs, and plants as pests.

3.1 Environmental risks

The IPPC applies to the protection of wild and cultivated plants. Therefore, pests affecting all types of plants, directly or indirectly, are within the scope of the IPPC. Information on the scope of the IPPC with regard to environmental risks is provided in Annex 4.

3.2 Living modified organisms

This standard is generally concerned with phenotypic characteristics rather than genotypic characteristics. However, genotypic characteristics may need to be considered when assessing the pest risk posed by an LMO. Information on the scope of the IPPC with regard to PRA for LMOs, together with the factors to consider when determining the potential for an LMO to be a pest, are provided in Annex 5.

3.3 Plants as pests

The number and diversity of plants being moved between and within countries is increasing as opportunities for trade increase and markets develop for new plants. Movements of plants may imply two types of pest risk: the plant (as a pathway) may carry pests, or the plant itself may be a pest. The risk of introducing pests with plants as a pathway has long been recognized and widely regulated. However, the pest risk posed by plants as pests requires specific consideration. Information on the scope of the IPPC with regard to PRA for plants as pests is provided in Annex 6.

This annex is a prescriptive part of the standard.

ANNEX 1: Initiation (PRA Stage 1)

1. Introduction

The purpose of the PRA initiation is to identify pests and pathways that may potentially be considered quarantine pests or pathways for quarantine pests in relation to the identified PRA area.

A PRA process may be triggered in the following situations:

- a request is made to consider a pathway that may require phytosanitary measures;
- a pest is identified that may justify phytosanitary measures;
- a decision is made to review or revise phytosanitary measures or policies; or
- a request is made to determine whether an organism is a pest.

The initiation stage involves four steps:

- determining whether an organism is a pest (section 3 of this annex);
- defining the PRA area (section 4 of this annex);
- evaluating any previous PRA (section 6 of this annex); and
- conclusion (section 7 of this annex).

When the PRA process has been triggered by a request to consider a pathway, the above steps are preceded by assembling a list of organisms of possible regulatory concern because they are likely to be associated with the pathway.

At this stage, information is necessary to identify the organism and its potential economic impact, which includes environmental impact.[2] Other useful information on the organism may include its geographical distribution, host plants, habitats and association with commodities. For pathways, information about the commodity, including modes of transport, and its intended use, is essential.

2. Initiation points

2.1 PRA initiated by the identification of a pathway

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

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

[2] Further information on this aspect is provided in Supplement 2 (Guidelines on the understanding of "potential economic importance" and related terms including reference to environmental considerations) to ISPM 5.

These are situations where the commodity itself is not a pest. When the commodity itself may be a pest, it should also be considered under section 2.4 of this annex.

A list of organisms likely to be associated with the pathway should be assembled, including organisms

that have not yet been clearly identified as pests. When a PRA is carried out for a commodity for which trade already exists, records of actual pest interceptions should be used as the basis for the listing of associated pests.

2.2 PRA initiated by the identification of a pest

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

- an infestation or an outbreak of a new pest is discovered within an area (which may be in the exporting country or in another country or countries);
- an emergency arises on discovery of an established infestation or an outbreak of a new pest within a PRA area (see ISPM 1);
- a pest is newly identified by scientific research;
- a pest is reported to be more injurious than previously known;
- an organism is identified as a vector for other recognized pests;
- a pest is introduced into a PRA area;
- there is a change in the status or incidence of a pest in a PRA area;
- a pest that is new to a PRA area is intercepted on an imported commodity;
- a pest is repeatedly intercepted at import;
- a pest is proposed to be imported for research or other purpose; or
- an organism is genetically altered in a way which clearly identifies its potential as a pest (LMO).[3]

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

2.3 Review of phytosanitary policies

The need for a new or revised PRA may arise from situations such as when:

- a national review of phytosanitary regulations, requirements or operations is undertaken;
- a proposal made by another country or by an international organization (e.g. a regional plant protection organization, the Food and Agriculture Organization of the United Nations) is reviewed;
- an evaluation of a regulatory proposal of another country or international organization is undertaken;
- a new system, process or procedure is introduced or new information made available that could influence a previous decision (e.g. results of monitoring; a new treatment or withdrawal of a treatment; new diagnostic methods);
- a dispute arises concerning phytosanitary measures; or

[3] "Genetically altered" organisms in this context are understood to include organisms obtained through the use of modern biotechnology.

- the phytosanitary situation in a country changes, a new country is created, or political boundaries are changed.

In these situations, pests will already have been identified and this fact should be recorded in preparation for PRA Stage 2.

For existing trade, no new phytosanitary measures should be applied until the revision or new PRA has been completed, unless this is warranted by new or unexpected phytosanitary situations that may necessitate emergency measures.

2.4 Identification of an organism not previously known to be a pest

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

- a proposal is made to import a new plant species or variety for cropping, amenity or environmental purposes;
- a proposal is made to import or release a biological control agent or other beneficial organism;
- an emergency arises on interception of a new organism on an imported commodity;
- an organism is found that has not yet been fully named or described or is difficult to identify;
- a proposal is made to import an organism for research, analysis or other purpose; or
- a proposal is made to import or release an LMO.

In these situations, it is necessary to determine if the organism is a pest and thus subject to PRA Stage 2. Section 3 of this annex provides further guidance on this matter.

3. Determining whether an organism is a pest

The initiation points frequently refer to “pests”. The IPPC defines a pest as “any species, strain or biotype of plant, animal or pathogenic agent, injurious to plants or plant products”. When applying these initiation points to the specific case of plants as pests, it is important to note that the plants concerned should satisfy this definition. Pests directly affecting plants satisfy this definition. In addition, many organisms indirectly affecting plants also satisfy this definition (e.g. plants as pests, such as weeds or non-indigenous plants). The fact that they are injurious to plants may be based on evidence of their impact obtained in an area in which they are present. In cases where there is insufficient evidence that they affect plants indirectly, it may nevertheless be appropriate to assess – on the basis of available pertinent information – whether they are potentially injurious in the PRA area by using a clearly documented, consistently applied and transparent system. This is particularly important for plant species or cultivars that are imported for planting.

“Preselection” or “screening” are terms sometimes used to cover the early step of determining whether an organism is a pest or not.

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

The taxonomic level for organisms considered in PRA is generally the species. The use of a higher or lower taxonomic level should be supported by a scientifically sound rationale. In cases where the

level used is below the species, this rationale should include evidence of reported significant variation in factors such as virulence, pesticide resistance, environmental adaptability, host range or its role as a vector.

Predictive indicators of an organism are characteristics that, if found, would suggest the organism may be a pest. The information on the organism should be checked against such indicators, and if none are found, it may be concluded that the organism is not a pest, and the analysis may be ended by recording the basis of that decision.

The following are examples of indicators that may be considered:

- previous history of successful establishment in new areas;
- phytopathogenic characteristics;
- phytophagous characteristics;
- presence detected in connection with observations of injury to plants or to beneficial organisms before any clear causal link has been established;
- belonging to taxa (family or genus) commonly containing known pests;
- capability to act as a vector for known pests; and
- adverse effects on non-target organisms beneficial to plants (such as pollinators or predators of pests).

Particular cases for analysis include plant species, biological control agents and other beneficial organisms (see ISPM 3 (*Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms*)), organisms which have not yet been fully named or described, or are difficult to identify, intentionally imported organisms and LMOs. The potential of plants as pests should be determined as outlined in Annex 6. The potential of LMOs as pests should be determined as outlined in Annex 5.

3.1 Biological control agents and other beneficial organisms

Biological control agents and other beneficial organisms are intended to be beneficial to plants. Thus, when performing a PRA, the main concern is to look for potential injury to non-target organisms.[4] Other concerns may include:

- presence of other species as contaminants of cultures of beneficial organisms, the culture thereby acting as a pathway for pests; and
- reliability of containment facilities when such are required.

3.2 Organisms not yet fully described or difficult to identify

Organisms that have not yet been fully named or described or are difficult to identify (e.g. damaged specimen, unidentifiable life stages) may be detected in imported consignments or during surveillance, in which case a decision as to whether phytosanitary action is justified and recommendations for phytosanitary measures may need to be made. These should be based on a PRA using the information available, even if very limited. It is recommended that, in such cases, specimens are deposited in an accessible reference collection for future further examination.

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[4] ISPM 3 recommends that NPPOs should conduct a PRA either before import or before release of biological control agents and other beneficial organisms.

3.3 Import of organisms for specific uses

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

4. Defining the PRA area

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

In PRA Stage 2, the endangered area is identified. In PRA Stage 3, the regulated area may, however, be designated as wider than the endangered area if technically justified and not in conflict with the principle of non-discrimination.

5. Information

Information gathering is an essential element of all stages of PRA. It should be carried out at the initiation stage in order to clarify the identity of the pest (or pests), its present distribution and association with host plants or commodities, and so on. Other information should be gathered as required to reach necessary decisions as the PRA continues.

Information for PRA may come from a variety of sources. The provision of official information necessary for PRA, to the extent that is possible, is an obligation on contracting parties under the IPPC (Article VIII.1(c)), facilitated by official contact points (Article VIII.2).

6. Previous pest risk analyses

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

The possibility of using a PRA of a similar organism, pest or pathway may also be investigated, particularly when information on the specific organism is absent or incomplete. Information assembled for other purposes, such as environmental impact assessments of the same or a closely related organism, may be useful but cannot substitute for a PRA.

7. Conclusion of initiation

At the end of PRA Stage 1, pests and pathways of concern will have been identified and the PRA area defined. Relevant information will have been collected and pests identified as candidates for further assessment, either individually or in association with a pathway.

Organisms determined not to be pests and pathways not carrying pests need not be further assessed. The decision and rationale should be recorded and communicated, as appropriate.

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

Where the PRA is specifically aimed at determining if the pest should be regulated as a quarantine pest, the process may proceed immediately to the pest categorization step of pest risk assessment (PRA Stage 2), described in Annex 2 of this standard.

This annex is a prescriptive part of the standard.

ANNEX 2: Pest risk assessment (PRA Stage 2)

1. Introduction

The process for pest risk assessment can be broadly divided into three interrelated steps:

- pest categorization;
- assessment of the probability of introduction and spread; and
- assessment of potential consequences.

In most cases, these steps will be applied sequentially in a PRA, but it is not essential to follow a particular sequence. Pest risk assessment needs to be only as complex as is technically justified by the circumstances.

2. Pest categorization

At the outset, it may not be clear which pest or pests identified in Stage 1 require a PRA. The categorization process examines, for each pest, whether the criteria in the definition of a quarantine pest are satisfied, namely that the pest:

- is not present in the PRA area or, if present, is of limited distribution and subject to official control or being considered for official control;
- has the potential to cause injury to plants or plant products in the PRA area; and
- has the potential to establish and spread in the PRA area.

In the evaluation of a pathway associated with a commodity, multiple individual PRAs may be necessary for the various pests potentially associated with the pathway. The opportunity to eliminate an organism or organisms from consideration before in-depth examination is undertaken is a valuable characteristic of the categorization process.

An advantage of pest categorization is that it can be done with relatively little information; however, information should be sufficient to adequately carry out the categorization.

2.1 Elements of categorization

The criteria for categorization of a pest as a quarantine pest consist of the following primary elements:

- identity of the pest;
- presence or absence in the PRA area;
- regulatory status;
- potential for establishment and spread in PRA area; and
- potential for consequences in the PRA area.

2.1.1 Identity of pest

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

has not yet been fully identified, then the organism should have been shown to produce consistent symptoms and to be transmissible or able to disperse.

The taxonomic unit for the pest is generally the species. The use of a higher or lower taxonomic level should be supported by a scientifically sound rationale. In cases where the level used is below the species, this rationale should include evidence demonstrating that factors such as differences in virulence, pesticide resistance, environmental adaptability, host range or vector relationships are significant enough to affect pest risk.

In cases where a vector is involved, the vector may also be considered a pest to the extent that it is associated with the causal organism and is required for transmission of the pest.

Specific guidance on the consideration of LMOs and the identity of plants as pests is provided in Annexes 5 and 6.

2.1.2 Presence or absence in PRA area

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

Specific guidance on determining the presence or absence of plants as pests is provided in Annex 6.

2.1.3 Regulatory status

A pest may be regulated if it is present but not widely distributed in the PRA area. However, it should be under official control or expected to be under official control in the near future.

2.1.4 Potential for establishment and spread in PRA area

Evidence should be available to support the conclusion that the pest could become established or spread in the PRA area. The PRA area (taking account also of protected environments such as greenhouses) should have ecological and climatic conditions suitable for the establishment and spread of the pest. Where relevant, host species (or near relatives), alternate hosts and vectors should be present in the PRA area.

2.1.5 Potential consequences in PRA area

There should be clear indications that the pest is likely to have an unacceptable impact in the PRA area.

Unacceptable economic impact is described in Supplement 2 (Guidelines on the understanding of “potential economic importance” and related terms including reference to environmental considerations) to ISPM 5.

2.2 Conclusion of pest categorization

If it has been determined that the pest has the potential to be a quarantine pest, the PRA process should continue. If a pest does not fulfil all of the criteria for a quarantine pest, the PRA process for that pest may stop. In the absence of sufficient information, the uncertainties should be identified and the PRA process should continue.

3. Assessment of the probability of introduction and spread

Pest introduction comprises both entry and establishment. To assess the probability of introduction, an analysis should be conducted of each of the pathways with which a pest may be associated from its origin to its establishment in the PRA area. In a PRA initiated by a specific pathway (usually an imported commodity), the probability of pest entry should be evaluated for the pathway in question. The probabilities for pest entry associated with other pathways should be investigated as well.

For PRAs that have been initiated for a specific pest, with no particular commodity or pathway under consideration, the potential of all probable pathways should be considered.

The assessment of probability of spread should be based primarily on biological considerations similar to those for entry and establishment.

3.1 Probability of entry of a pest

The probability of entry of a pest depends on the pathways from the exporting country to the destination, and the frequency and quantity of pests associated with them. The higher the number of pathways, the greater the probability of the pest entering the PRA area.

Documented pathways for the pest to enter new areas should be noted. Potential pathways, which may not currently exist, should be assessed. Pest interception data may provide evidence of the ability of a pest to be associated with a pathway and to survive in transport or storage.

Specific guidance on assessing the probability of entry for plants as pests is provided in Annex 6.

3.1.1 Identification of pathways for a PRA initiated by a pest

All relevant pathways should be considered. They can be identified principally in relation to the geographical distribution and host range of the pest. Consignments of plants and plant products moving in international trade are the principal pathways of concern and existing patterns of such trade will, to a substantial extent, determine which pathways are relevant. Other pathways, such as other types of commodities, packing materials, persons, baggage, mail, conveyances and the exchange of scientific material, should be considered where appropriate. Entry by natural means should also be assessed, as natural spread is likely to reduce the effectiveness of phytosanitary measures.

3.1.2 Probability of the pest being associated with the pathway at origin

The probability of the pest being associated, spatially or temporally, with the pathway at origin should be estimated. Factors that should be considered are:

- prevalence of the pest in the source area;
- presence of the pest in a life stage that would be associated with commodities, containers or conveyances;
- volume and frequency of movement along the pathway;
- seasonal timing; and
- pest-management, cultural and commercial procedures applied at the place of origin (application of plant-protection products, handling, culling, roguing, grading).

3.1.3 Probability of survival during transport or storage

Examples of factors that may be considered are:

- speed and conditions of transport and duration of the life cycle of the pest in relation to time in transport and storage;
- vulnerability of the life stages during transport or storage;
- prevalence of the pest likely to be associated with a consignment; and
- commercial procedures (e.g. refrigeration) applied to consignments in the country of origin, country of destination, or in transport or storage.

3.1.4 Probability of pest surviving existing pest-management procedures

Existing pest-management procedures (including phytosanitary procedures) applied to consignments against other pests from origin to end use, should be evaluated for effectiveness against the pest in question. The probability that the pest will go undetected during inspection or survive other existing phytosanitary procedures should be estimated.

3.2 Probability of establishment

To estimate the probability of establishment of a pest, reliable biological information (life cycle, host range, epidemiology, survival, etc.) should be obtained from the areas where the pest is currently present. The situation in the PRA area may then be compared with that in the areas where the pest is currently present (taking account also of protected environments such as greenhouses) and expert judgement used to assess the probability of establishment. Case histories concerning comparable pests can usefully be considered. Examples of factors that may be considered are:

- availability, quantity and distribution of hosts in the PRA area;
- probability of transfer to a suitable host;
- environmental suitability in the PRA area; and
- cultural practices and control measures.

Other characteristics of the pest may also affect the probability of establishment. In considering probability of establishment, it should be noted that a pest with the status “present: transient” (see ISPM 8 (*Determination of pest status in an area*)) may not be able to establish in the PRA area (e.g. because of unsuitable climatic conditions) but could still have unacceptable economic consequences (see IPPC Article VII.3).

Specific guidance on assessing the probability of establishment of plants as pests is provided in Annex 6.

3.2.1 Availability of suitable hosts, alternate hosts and vectors in the PRA area

Factors that should be considered are:

- whether hosts and alternate hosts are present and how abundant or widely distributed they may be;
- whether hosts and alternate hosts are present within sufficient geographical proximity to allow the pest to complete its life cycle;
- whether there are other plant species that could prove to be suitable hosts in the absence of the usual host species;

- whether a vector, if needed for dispersal of the pest, is already present in the PRA area or likely to be introduced; and
- whether another vector species is present in the PRA area.

The taxonomic level at which hosts are considered should normally be the species. The use of a higher or lower taxonomic level should be justified by a scientifically sound rationale.

3.2.2 Probability of transfer to a suitable host

Factors that should be considered are:

- dispersal mechanisms, including vectors to allow movement from the pathway to a suitable host;
- whether the imported commodity is to be sent to a few or many destination points in the PRA area;
- proximity of entry, transit and destination points to suitable hosts;
- time of year at which import takes place;
- intended use of the commodity (e.g. for planting, processing, consumption); and
- risks from by-products and waste.

Some uses are associated with a much higher probability of introduction (e.g. planting) than others (e.g. processing). The probability associated with any growth, processing or disposal of the commodity in the vicinity of suitable hosts should also be considered.

3.2.3 Suitability of environment

Factors in the environment (e.g. suitability of climate, soil, pest–host competition) that are critical to the development of the pest, its host and if applicable its vector, and to their ability to survive periods of climatic stress and complete their life cycles, should be identified. It should be noted that the environment is likely to have different effects on the pest, its host and its vector. This needs to be recognized in determining whether the interaction between these organisms in the area of origin is maintained in the PRA area to the benefit or detriment of the pest. The probability of establishment in a protected environment, such as in greenhouses, should also be considered.

Climatic modelling systems may be used to compare climatic data on the known distribution of a pest with that for the PRA area.

3.2.4 Cultural practices and control measures

Where applicable, practices employed during the production (including cultivation) of the host crops should be compared to determine if there are differences in such practices between the PRA area and the origin of the pest that may influence its ability to establish.

Pest control programmes or natural enemies already in the PRA area that reduce the probability of establishment may be considered. Pests for which control is not feasible should be considered to pose a greater pest risk than those for which treatment is easily accomplished. The availability (or lack) of suitable methods for eradication should also be considered.

3.2.5 Other characteristics

Other characteristics of the pest affecting the probability of establishment include the following:

- *Reproductive strategy of the pests and method of pest survival*. Characteristics that enable the pest to reproduce effectively in the new environment, such as parthenogenesis (i.e. self-crossing), duration of the life cycle, number of generations per year, and resting stage, should be identified.
- *Genetic adaptability*. Whether the species is polymorphic and the degree to which the pest has demonstrated the ability to adapt to conditions like those in the PRA area should be considered (e.g. host-specific races or races adapted to a wider range of habitats or to new hosts). This genotypic (and phenotypic) variability facilitates a pest's ability to withstand environmental fluctuations, to adapt to a wider range of habitats, to develop pesticide resistance and to overcome host resistance.
- *Minimum population needed for establishment*. If possible, the threshold population that is required for establishment should be estimated.

3.3 Probability of spread after establishment

A pest with a high potential for spread may also have a high potential for establishment, and possibilities for its successful containment or eradication are more limited. To estimate the probability of spread of the pest, reliable biological information should be obtained from areas where the pest is currently present. The situation in the PRA area may then be carefully compared with that in the areas where the pest is currently present (taking account also of protected environments such as greenhouses) and expert judgement may be used to assess the probability of spread. Case histories concerning comparable pests can usefully be considered. Examples of factors that may be considered are:

- suitability of the natural or managed environment for natural spread of the pest;
- presence of natural barriers;
- the potential for movement with commodities or conveyances;
- intended use of the commodity;
- potential vectors of the pest in the PRA area; and
- potential natural enemies of the pest in the PRA area.

Specific guidance on assessing the probability of spread of plants as pests is provided in Annex 6.

The information on probability of spread is used to estimate how rapidly a pest's potential economic importance may be expressed within the PRA area. This also has significance if the pest is liable to enter and establish in an area where it may be of low potential economic importance and then spread to an area where it may be of high potential economic importance. In addition, it may be important in the risk management stage when considering the feasibility of containment or eradication of an introduced pest.

Certain pests may not cause injurious effects on plants immediately after they establish, and in particular may only spread after a certain time. In assessing the probability of spread, this should be considered, based on evidence of such behaviour.

3.4 Conclusion on the probability of introduction and spread

The overall probability of introduction and spread should be expressed in terms most suitable for the data, the methods used for analysis, and the intended audience. This may be quantitative or qualitative, since either output is in any case the result of a combination of both quantitative and qualitative information. The probability of introduction and spread may be expressed as a comparison with that obtained from PRAs on other pests.

The part of the PRA area where ecological factors favour the establishment of the pest should be identified in order to help define the endangered area. This may be the whole of the PRA area or a part of the area.

4. Assessment of potential consequences

In PRA, consequences should not be interpreted to be only economic market effects. Goods and services not sold in commercial markets can have economic value, and economic analysis encompasses much more than the study of market goods and services. The use of the term "economic effects" provides a framework in which a wide variety of effects (including environmental and social effects) may be analysed. Economic analysis uses a monetary value as a measure to allow policy makers to compare costs and benefits from different types of goods and services. This does not preclude the use of other tools, such as qualitative and environmental analyses, that may not use monetary terms. Economic impact is described in Supplement 2 to ISPM 5.

4.1 Consequences

Requirements described in this step indicate what information relative to the pest and its potential host plants should be assembled, and suggest levels of economic analysis that may be carried out using that information in order to assess all the effects of the pest (i.e. the potential economic consequences). Wherever appropriate, quantitative data that will provide monetary values should be obtained. Qualitative data may also be used. Consultation with an economist may be useful.

In many instances, detailed analysis of the estimated economic consequences is not necessary if there is sufficient evidence or it is widely agreed that the introduction of a pest will have unacceptable economic consequences (including environmental consequences). In such cases, pest risk assessment may primarily focus on the probability of introduction and spread. Economic factors should, however, be examined in greater detail when the level of economic consequences is in question, or when the level of economic consequences needs to be known to evaluate the strength of measures used to manage pest risk or in assessing the cost-benefit of exclusion or control.

Specific guidance on assessing the potential economic consequences of plants as pests is provided in Annex 6.

4.1.1 Pest effects

To estimate the potential economic importance of the pest, information should be obtained from areas where the pest is present naturally or has been introduced. This information should be compared with the situation in the PRA area. Case histories concerning comparable pests can usefully be considered. The effects considered may be direct or indirect.

The basic method for estimating the potential economic importance of pests described in this section also applies to:

- pests affecting uncultivated or unmanaged plants;
- plants as pests; and
- pests affecting plants through effects on other organisms.

The environmental effects and consequences considered should be those that result from the effects of the pest on plants. Such effects on plants, however, may be less significant than the effects or consequences on other organisms or systems. For example, a plant as a pest that has only a minor impact on other plants may be significantly allergenic for humans or a minor plant pathogen may produce toxins that seriously affect livestock. However, the regulation of plants solely on the basis of their effects on other organisms or systems (e.g. on human or animal health) is outside the scope of this standard. If the PRA process reveals evidence of a potential danger to other organisms or systems, this should be communicated to the appropriate authorities that have the legal responsibility to deal with the issue.

4.1.2 Direct pest effects

For identification and characterization of the direct effects of the pest on each potential host in the PRA area, or those effects that are host-specific, the following are examples of factors that may be considered:

- known or potential host plants (in fields, under protected cultivation, or in the wild);
- types, amount and frequency of damage;
- crop losses, in yield and quality;
- biotic factors (e.g. adaptability and virulence of the pest) affecting damage and losses;
- abiotic factors (e.g. climate) affecting damage and losses;
- rate of spread of the pest;
- rate of reproduction of the pest;
- control measures (including existing measures), their efficacy or effectiveness and their cost;
- effect of the pest on existing production practices for the host plants; and
- environmental effects.

For each of the potential hosts, the total area of the crop and area potentially endangered should be estimated in relation to the elements given above.

4.1.3 Indirect pest effects

For identification and characterization of the indirect effects of the pest in the PRA area, or those effects that are not host-specific, the following are examples of factors that may be considered:

- effects on domestic and export markets, including in particular effects on export-market access;
- changes to producer costs or input demands, including control costs;
- changes to domestic or foreign consumer demand for a product resulting from quality changes;
- environmental and other undesired effects of control measures;
- feasibility and cost of eradication or containment;
- capacity to act as a vector for other pests;
- resources needed for additional research and advice; and

- social and other effects (e.g. on tourism).

When considering effects on domestic and export markets, the potential consequences for market access that may result if the pest becomes established should be estimated. This involves considering the extent of any phytosanitary regulations imposed (or likely to be imposed) by importing countries.

Effects on human and animal health (e.g. toxicity, allergenicity), water tables, tourism and so on could also be considered, as appropriate, by other agencies or authorities.

4.1.4 Assessment of non-commercial and environmental consequences

Some of the direct and indirect effects of the introduction of a pest determined in section 4.1.2 and section 4.1.3 will be of an economic nature, or affect some type of value, but not have an existing market which can be easily identified. As a result, the effects may not be adequately measured in terms of prices in established product or service markets. Examples include, in particular, environmental effects (such as ecosystem stability, biodiversity) and social effects (such as mental well-being or spiritual, religious and cultural connections) arising from a pest introduction. These impacts may be approximated with an appropriate non-market valuation method. More details on environmental effects are given below.

If quantitative measurement of such consequences is not feasible, qualitative information about the consequences may be provided. An explanation of how this information has been incorporated into decisions should also be provided.

4.2 Analysis of economic consequences

4.2.1 Time and place factors

Estimations made in the previous section could relate to a hypothetical situation where the pest is supposed to have been introduced and to be fully expressing its potential economic consequences (per year) in the PRA area. In practice, however, economic consequences are expressed with time and may concern one year, several years or an indeterminate period. Various scenarios should be considered. The total economic consequences over more than one year may be expressed as net present value of annual economic consequences, and an appropriate discount rate selected to calculate net present value.

Other scenarios could concern whether the pest is present at one, few or many points in the PRA area and the expression of potential economic consequences will depend on the rate and manner of spread in the PRA area. The rate of spread may be envisaged to be slow or rapid; in some cases, it may be supposed that spread can be prevented. Appropriate analysis may be used to estimate potential economic consequences over the period of time when a pest is spreading in the PRA area. In addition, many of the factors or effects considered above could be expected to change over time, with the consequent effects of potential economic consequences. Expert judgement and estimations may be used if appropriate.

4.2.2 Analysis of commercial consequences

As determined above, most of the direct effects of a pest, and some of the indirect effects, will be of a commercial nature or have consequences for an identified market. These effects, which may be

positive or negative, should be identified and quantified where possible. The following may usefully be considered:

- effect of pest-induced changes to producer profits that result from changes in production costs, yields or prices; and
- effect of pest-induced changes in quantities demanded or prices paid for commodities by domestic and international consumers (which could include quality changes in products or quarantine-related trade restrictions resulting from a pest introduction).

4.2.3 Analytical techniques

There are analytical techniques that may be used, in consultation with experts in economics, to analyse in more detail the potential economic effects of a quarantine pest. The analysis should incorporate all of the effects that have been identified. The following are examples of such techniques:

- *Partial budgeting.* This may be used if the economic effects, induced by the action of the pest, are generally limited to producers and are considered relatively minor.
- *Partial equilibrium.* This may be used if, under section 4.2.2, there is a significant change in producer profits, or if there is a significant change in consumer demand. Partial equilibrium analysis is necessary to measure welfare changes, or the net changes arising from the pest impacts on producers and consumers.
- *General equilibrium.* If the economic changes are significant to a national economy, and could cause changes to factors such as wages, interest rates or exchange rates, then general equilibrium analysis may be used to establish the full range of economic effects.

The use of analytical techniques is often limited by lack of data, by uncertainties in the data, and by the fact that for certain effects only qualitative information can be provided.

4.2.4 Analysis of non-commercial and environmental consequences

Application of this standard to environmental consequences requires clear categorization of environmental values and the methodologies used to assess them. The environment may be valued using various methodologies, but these methodologies are best used in consultation with experts in economics. Methodologies may include consideration of “use” and “non-use” values. “Use” values arise from consumption of an element of the environment, such as accessing clean water or fishing in a lake, and also those that are non-consumptive, such as use of forests for leisure activities. “Non-use” values may be subdivided into:

- “option values” (values for use at a later date);
- “existence values” (knowledge that an element of the environment exists); and
- “bequest values” (knowledge that an element of the environment is available for future generations).

Whether the element of the environment is being assessed in terms of use or non-use values, methodologies exist for their valuation, such as market-based approaches, surrogate markets, simulated markets, and benefit transfer. Each has advantages, disadvantages and situations where it is particularly useful.

The assessment of consequences may be either quantitative or qualitative; in many cases, qualitative data are sufficient. A quantitative method may not exist to address a situation (e.g. catastrophic

effects on a keystone species), or a quantitative analysis may not be possible (no methods available). Useful analyses can be based on non-monetary valuations (number of species affected, water quality), or expert judgement, if the analyses follow documented, consistent and transparent procedures.

4.3 Conclusion of the assessment of consequences

Wherever appropriate, the output of the assessment of consequences described in this step should be in terms of a monetary value. The consequences may also be expressed qualitatively or using quantitative measures without monetary terms. Sources of information, assumptions, uncertainty and methods of analysis should be clearly specified.

4.3.1 Identifying the endangered area

The part of the PRA area where presence of the pest will result in economically important loss should be identified.

5. Degree of uncertainty

Estimation of the probability of introduction of a pest and of its consequences involves many uncertainties. In particular, this estimation is an extrapolation from the situation where the pest is present to the hypothetical situation in the PRA area. The areas of uncertainty and the degree of uncertainty in the assessment should be documented, as should any use of expert judgement. This is important for the purposes of transparency and may also be useful for the identification and prioritization of research needs.

6. Conclusion of the pest risk assessment stage

As a result of the pest risk assessment, all or some of the categorized pests may be considered appropriate for pest risk management. For each pest, all or part of the PRA area may be identified as an endangered area. A quantitative or qualitative estimate of the probability of introduction and spread of a pest or pests, and a corresponding quantitative or qualitative estimate of consequences, have been obtained and documented or an overall rating could have been assigned. These estimates, with associated uncertainties, are used in the pest risk management stage of the PRA.

This annex is a prescriptive part of the standard.

ANNEX 3: Pest risk management (PRA Stage 3)

1. Introduction

Stage 3 involves the identification and evaluation of pest risk management options, and their subsequent selection to be implemented as phytosanitary measures that alone, or in combination, reduce the risk of introduction and spread of a pest to an acceptable level.

The conclusions from pest risk assessment are used to decide whether a pest risk is acceptable or not. Since zero risk is not a reasonable option, pest risk should be managed following the guiding principle of managed risk (see ISPM 1) to achieve the appropriate level of protection that can be justified and is feasible within the limits of available options and resources.[5] The uncertainty noted in the pest risk assessments should be taken into account in the selection of a pest risk management option.

Phytosanitary measures are not justified if the pest risk is deemed to be acceptable or if they are not feasible, such as in the case of natural spread. Even in such cases, however, contracting parties may decide to maintain some monitoring or audit regarding the pest risk to detect future changes in that risk.

2. Level of pest risk

In implementing the principle of managed risk, it is recognized that contracting parties have the sovereign right to decide the level of pest risk they deem to be acceptable and they can use phytosanitary measures to provide an appropriate level of protection. Equally, contracting parties should follow the principle of minimal impact when applying phytosanitary measures (see IPPC Article VII.2(g)).

The level of pest risk deemed to be acceptable may be expressed in various ways. It may, for example:

- refer to existing phytosanitary import requirements;
- be indexed to estimated economic losses; or
- be expressed on a scale of risk tolerance.

Specific guidance on pest risk management for plants as pests is provided in Annex 6.

3. Sources of information

A variety of sources of information may be used to support the identification and subsequent selection of pest risk management options, including pest risk assessments, historical records and history of use.

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[5] The appropriate level of sanitary or phytosanitary protection is a concept found in the SPS Agreement. It refers to "the level of protection deemed appropriate by the Member establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within its territory", which many countries refer to as the "acceptable level of risk".

Pest risk assessments identify quarantine pests that may require phytosanitary measures on the assessed pathway. For the formulation of pest risk management options, the pest risk assessment provides relevant information, such as:

- the pathway;
- quarantine pests likely to follow the pathway;
- potential control points along the pathway;
- intended use of the commodity;
- historical records on pest management;
- potential negative effects of measures on commodity quality; and
- any uncertainty associated with the pest (or pests) and the pathway.
- -available international standards of IPPC and phytosanitary protocols.

4. Identification of appropriate pest risk management options

4.1 Underlying principles

The following four phytosanitary principles described in ISPM 1 should be taken into account when identifying appropriate pest risk management options:

- *Necessity*. Phytosanitary measures should be limited to what is necessary to protect plant health.
- *Minimal impact.* The IPPC (Article VII.2(g)) states that phytosanitary measures shall be consistent with the pest risk involved, and shall represent the least restrictive measures available that result in the minimum impediment to the international movement of commodities and conveyances.
- *Equivalence*. If different phytosanitary measures providing the same level of protection are identified, they should be accepted as alternatives.
- *Non-discrimination*. If the pest under consideration is established in the PRA area but is of limited distribution and under official control, the phytosanitary measures in relation to import should not be more stringent than those applied within the PRA area. Likewise, phytosanitary measures should not discriminate between exporting countries where the status of the relevant pest is the same.

4.2 Requirements

Pest risk management options should be based on the risk of the pest on a particular pathway and the intended use (further information is contained in ISPM 32 (*Categorization of commodities according to their pest risk*)). The level of risk may differ according to the pathway: for example, the presence of a pest on nursery stock may pose a very different risk from the same pest being present on fruit for consumption. Pest risk management options for the same pests may therefore vary according to the pathway. Furthermore, the types of measure identified as pest risk management options may vary according to the tolerance of the commodity to the measure.

Depending on the intended use of the commodity, the pest risk may be sufficiently reduced to an acceptable level through basic measures including commercial production, pest-control practices and inspection.

The major risk of introduction of pests is with imported consignments of plants and plant products, but (especially for a PRA performed on a particular pest) it is also necessary to consider the risk of

introduction with other types of pathways (e.g. packing materials, conveyances, travellers and their luggage, and the natural spread of a pest).

4.3 Pest risk management options

Pest risk management options should be as precise as possible as to consignment type (hosts, parts of plants) and origin so as not to act as barriers to trade by limiting the import of products where this is not justified. Available measures considered as pest risk management options may be classified into broad categories relating to the pathway and the pest status in the country of origin. Measures may include those:

- applied to ensure the area or place of production or site of production is free from the pest;
- applied to prevent or reduce original infestation in the crop;
- applied to the consignment; or
- concerning the prohibition of regulated articles.

Other options may arise in the PRA area, such as restrictions on the use of a commodity, introduction of a biological control agent, eradication and containment. Such options should also be evaluated and will apply in particular if the pest is already present but not widely distributed in the PRA area.

The strength of a measure identified as a pest risk management option (i.e. its overall effectiveness) should be consistent with the pest risk that it aims to address.[6] A stronger phytosanitary measure increases the level of confidence that the pest risk will be lowered. The level of risk reduction sought may be greater for a pest of high potential consequences compared to a pest of lower potential consequences.

4.4 Specificity in relation to risk

Pest risk management options may be identified and selected on the basis of known and specific activity against a particular pest, or they may be less specific and have a broader spectrum of activity against a group of pests.

Examples of measures with known and specific activity against a particular pest are provided in the annexes to ISPM 28 (*Phytosanitary treatments for regulated pests*).

4.5 Examples of pest risk management options

The following pest risk management options are examples of the measures that are most commonly applied to regulated articles in trade. They are applied to pathways, usually consignments of a host, from a specific origin and can be stand-alone or part of a systems approach. The list of options is not exhaustive and includes measures that may already be considered as part of commercial production practices or imposed as phytosanitary measures to achieve a country's appropriate level of protection at the conclusion of the PRA process.

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[6] The strength of measures is a concept found in the the SPS Agreement. It refers to the degree to which a measure is known to reduce the incidence of a viable, regulated pest in a commodity.

4.5.1 Pre-planting options

Measures aimed at achieving pest freedom, either spatially or temporally, may be applied before planting.

Requirements for pest free areas, pest free places of production and pest free production sites are described in several ISPMs (e.g. ISPM 4 (*Requirements for the establishment of pest free areas*), ISPM 10 (*Requirements for the establishment of pest free places of production and pest free production sites*), ISPM 22 (*Requirements for the establishment of areas of low pest prevalence*), ISPM 26 (*Establishment of pest free areas for fruit flies (Tephritidae)*)).

In a pest free growing period, monitoring is carried out, based on the life cycle of the pest and the host, to verify that the pest is not detected during the growing period. Pest free growing periods are sometimes also linked to a pest-control programme.

4.5.2 Pre-harvest options

Measures may be applied during production to manage specific pests. These may include the application of agrochemicals, biological control agents, physical pest exclusion measures, mating disruption, surveillance and sanitation methods. Sanitation includes activities that are designed to remove materials that may attract or harbour quarantine pests, for example removing fallen fruit from orchards, destroying or ploughing-under crop residues, weed control or other similar activities.

Physical pest-exclusion measures may include growing in protected conditions (e.g. glasshouse, fruit bagging).

4.5.3 Options at harvest

Examples of measures that may be applied during harvesting include:

- the use of harvest and dispatch “windows” (whereby harvest and dispatch are limited to the period when the pest is seasonally absent or unable to infest the commodity or when the pest and host are asynchronous);
- harvesting at a particular stage of ripeness or maturity;
- sanitation (e.g. removal of contaminating articles, waste material, infested products);
- defining the timing of imports (whereby the importing country defines times of the year that a particular quarantine pest cannot survive (e.g. winter) as “arrival windows”, during which the import of goods that may be infested with the pest is permitted).

4.5.4 Post-harvest options

A commodity may be processed and handled after harvest to reduce the pest risk posed by certain pests. Information about processing and handling of commodities and the resulting reduction in pest risk is provided in ISPM 32. Some examples include:

- brushing, washing, disinfection or waxing;
- removal of infested and damaged fruit;
- peeling, dicing, slicing or chopping; and
- removal of leaves, stems or bark.

4.5.5 Post-entry options

Post-entry phytosanitary measures may be applied in the importing country. Examples include:

- post-entry quarantine used for plants for planting (this may be the only option for certain pests not detectable on entry);
- limits on the intended use of the commodity (e.g. limited to processing only);
- entry only permitted for research purposes in containment facilities; and
- limited distribution of the commodity to those areas that are not endangered (use of this measure requires strict enforcement).

4.5.6 Other options relevant for all steps

4.5.6.1 Testing

Some pests such as pathogens may infest a plant without producing symptoms, or symptoms may be masked, and therefore testing based on sampling may be required.

Even when symptoms are present, testing based on sampling may be required to identify or confirm the causal organism.

4.5.6.2 Treatments

Treatments maybe applied at various stages in the production cycle to mitigate pest risk. Treatments maybe applied singly or in combination with other treatments or measures.

Examples of treatments include:

- physical methods (e.g. brushing and washing);
- chemical treatments (e.g. application of fumigants, aerosols, mists, fogs, dusts, dips, granules, sprays);
- temperature treatments (e.g. hot water immersion, hot air treatment, vapour heat treatment, cold treatment);
- modified atmosphere treatments;
- irradiation (e.g. gamma, X-ray, microwave); and
- biological control.

4.5.6.4 Inspection

Inspection may be used as a phytosanitary measure or to verify the effectiveness of phytosanitary measures. The factors to consider when deciding to use inspection as a phytosanitary measure are described in ISPM 23 (*Guidelines for inspection*).

4.5.7 Systems approaches

Systems approaches offer a possible way to address the variability and uncertainty of individual measures by combining measures to meet the level of pest risk deemed to be acceptable.

ISPM 14 (*The use of integrated measures in a systems approach for pest risk management*) provides guidance on the development and evaluation of systems approaches.

ISPM 36 (*Integrated measures for plants for planting*) provides specific guidance on the use of integrated measures to manage the risk of plants for planting in international trade.

4.5.8 Additional options

Further additional phytosanitary measures may be required to provide assurance, verification, oversight, protection against infestation or contamination, or to allow for traceability.

Examples of such measures include:

- certification schemes for plants for planting;
- registered or approved places of production or production sites;
- registered or approved packing houses;
- labelling on plants in commerce, packages and so on (e.g. identifying packing and treatment facility, dates of packing and treatment, production site and field); and
- Related to phytosanitary security (of a consignment).

4.6 Prohibition

Prohibition should only be selected when no other alternative option is available. Other, less trade-restrictive options providing an appropriate level of protection should be considered before deciding on prohibition (see ISPM 20 (*Guidelines for a phytosanitary import regulatory system*)).

Import prohibitions may apply to specific commodities, specific origins, specific physiological stages (e.g. dormant plants) or only during specific seasons (e.g. during the flight period of an insect).

Prohibited articles may be required for research or other purpose and provision may be required for their import under controlled conditions including appropriate safeguards through a system of license or permit.

5. Evaluation of pest risk management options

Measures identified as pest risk management options should be evaluated based on their effectiveness in reducing the probability of introduction and spread of the pest. To be established as phytosanitary measures, measures should not only be effective but also be feasible and have minimal impact to the international movement of commodities and conveyances.

5.1 Effectiveness

Effectiveness is an expression of the extent to which a given measure reduces pest risk. A description of effectiveness includes the specification of the desired response or end-point and a measurement of that response or end-point (e.g. mortality).

When appropriate, effectiveness may be expressed in quantitative terms including the usual statistical parameters (e.g. a confidence interval). When such calculation is not possible or not feasible, effectiveness may be expressed in qualitative terms such as “high”, “medium” and “low”.

Several factors should be considered in determining the required effectiveness of a measure. These include:

- the appropriate level of protection;
- the level of pest risk posed by a given situation;

- the nature of the pest risk being addressed;
- the biology of the pest (or pests) being managed; and
- the pest distribution and prevalence.

Metrics that may be used to determine the effectiveness of a measure include:

- pest prevalence or frequency of pest outbreaks in the production area (e.g. from surveillance);
- prevalence of pests in a consignment (e.g. from inspection records); and
- proportion of pests removed or percent mortality (e.g. from dose–response curves).

Certain measures may not directly affect mortality of the pest. Considerations for their evaluation include the following:

- for surveillance and monitoring: appropriate survey methods, intensity of monitoring, ability to detect the pest (see ISPM 6 (*Surveillance*));
- for pest free concepts: see ISPM 4, ISPM 10 and ISPM 26;
- for systems approaches: see ISPM 14 and ISPM 35 (Systems approach for pest risk management of fruit flies (Tephritidae));
- for post-harvest processing and handling: see ISPM 32;
- for testing: availability and reliability of test methods, laboratory accreditation, validation of methodology (e.g. ISPM 27 (*Diagnostic protocols for regulated pests*));
- for irradiation treatments: see ISPM 18 (Requirements for the use of irradiation as a phytosanitary measure);
- for sampling: level of confidence of the detection of the pest for a given sample size (see ISPM 31 (*Methodologies for sampling of consignments*));
- for inspection: ability to detect the pest on the commodity (see ISPM 23); and
- for post-entry measures: see ISPM 36.

National plant protection organizations of importing countries may identify more than one pest risk management option, consisting of one or more measures, that could be used by an exporting country provided they are integrated measures to guarantee an acceptable level of risk.

5.2 Treatment efficacy

The required response or end-point for treatments should be specified, along with the required efficacy. Responses or end-points may include:

- mortality;
- sterility (including sterility of F1 generation);
- inactivation;
- devitalization; or
- altered behaviour.

High-mortality treatments may not be feasible or technically justified when, for example:

- the testing required to establish high-mortality efficacy is not possible based on the pest biology (e.g. some organisms are difficult to rear in large enough numbers to establish the required statistical measures) but lower mortality rates can be established or lower statistical confidence can be achieved; or
- the commodity is only tolerant to the treatment at lower efficacies (e.g. a commodity that does not tolerate a cold treatment that achieves a high mortality rate may tolerate a cold

treatment at a slightly higher temperature or shorter duration but which achieves a lower mortality rate).

Alternative treatments may be considered when high-mortality treatments are either not available or not feasible. A combination of lower-mortality treatments may be as effective as a single high-mortality treatment.

5.3 Potential impact of the measure

The potential economic, social and environmental impacts of measures should be identified and considered when evaluating them as pest risk management options. The NPPO of an importing country should discuss these with the NPPOs of exporting countries.

In general, an assessment of impacts in an exporting country may be warranted when:

- a particular measure may have significant unintended social or environmental impacts;
- the scope and magnitude of environmental impacts are unclear (as may be the case, for example, for chemical treatments);
- there may be public-health sensitivities or regulatory restrictions about a particular control technology; or
- there may be different economic impacts on different groups (producers in some areas may benefit, but producers in other areas may be disadvantaged by a particular measure).

5.4 Uncertainty

Pest risk management options may be difficult to evaluate if significant uncertainty is identified in the pest risk assessment. Even where uncertainty is identified, phytosanitary measures should not be applied unless information indicates that the pest risk is unacceptable.

Uncertainty may be addressed by adjusting the strength of measures or deeming them redundant. While measures should be appropriate to the pest risk, it may be technically justifiable to require phytosanitary measures to compensate for uncertainty. In those cases, the uncertainty should be identified (in terms of the source of uncertainty and the degree of uncertainty) and, if possible, addressed. Phytosanitary measures should subsequently be adjusted once uncertainty has been reduced.

Provisional measures may be implemented when there is uncertainty, but their application should be reviewed in a timely manner to provide technical justification for their continuance or removal.

5.5 Feasibility

In addition to being technically justified and effective, pest risk management options selected as phytosanitary measures should also be feasible.

The NPPO of the importing country should identify any available measures that could prevent the introduction of the pest. These should be considered for their feasibility in the exporting country or countries.

In determining feasibility, factors including the following should be considered:

- negative effects of treatments on the commodity (e.g. phytotoxicity, physical damage, reduction in shelf life);

- negative economic, social and environmental impacts resulting from the application of the measure;
- cost-effectiveness;
- availability of facilities and equipment;
- whether a particular treatment is approved for use; and
- operational and technical considerations (e.g. practicality, timing, available technologies).

6. Selection of appropriate phytosanitary measures

Once potential pest risk management options have been identified and evaluated based on effectiveness, feasibility and impacts, specific phytosanitary measures may be selected from these options.

Exporting countries should have the opportunity to provide proposals on equivalent phytosanitary measures to importing countries.

Depending on the effectiveness of the measures, and the appropriate level of protection, one or more phytosanitary measures may be selected.

A phytosanitary measure that is effective against one quarantine pest may also be effective against other quarantine pests. Therefore, a single phytosanitary measure may mitigate the pest risk for multiple quarantine pests.

If the NPPO of the importing country or countries identifies more than one appropriate phytosanitary measure to manage the pest risk, all these phytosanitary measures should be considered equivalent and published as options in the country's phytosanitary import requirements or shared with the NPPOs of exporting countries.

The NPPO of an exporting country should identify its preferred phytosanitary measure or measures to minimize impacts.

7. Conclusion of pest risk management

The pest risk management process concludes either with the determination that there are no appropriate pest risk management options or with the selection of one or more pest risk management options that would lower the pest risk to a level deemed acceptable.

The selected pest risk management options may form the basis of phytosanitary regulations or phytosanitary import requirements for the **regulated area**.

8. Documentation and communication

Contracting parties should be able to provide technical justification, if requested, for phytosanitary measures applied as a result of the pest risk management stage of PRA.

The main documentation elements to be provided on request by the NPPO of the importing country to the NPPO of an exporting country may include:

- the list of potential pest risk management options identified and evaluated;
- the selected phytosanitary measures; and

- the justification for selecting these, and not other, measures.

Contracting parties should be open to consultation regarding phytosanitary measures when requested and should allow the exporting country or countries an agreed time frame for submitting comments.

9. Monitoring and re-evaluation of phytosanitary measures

Phytosanitary measures may be reviewed at any stage when:

- the NPPO of an exporting country proposes equivalent measures for evaluation by the NPPO of the importing country according to ISPM 24 (*Guidelines for the determination and recognition of equivalence of phytosanitary measures*);
- there is a change in the pest status in an importing or exporting country that requires management;
- there is significant or repeated non-compliance (see ISPM 13 (Guidelines for the notification of non-compliance and emergency action)); or
- emergency measures are reviewed to provide technical justification for their continuance or removal.

The importing country may carry out monitoring of pathways to determine the effectiveness of phytosanitary measures and systems audits to verify the implementation of phytosanitary measures.

This annex is a prescriptive part of the standard.

ANNEX 4: Environmental risks

1. Introduction

The range of pests covered by the IPPC extends beyond pests directly affecting cultivated plants. The coverage of the IPPC definition of "pests" includes plants as pests and other species that have indirect effects on plants, and the convention applies to the protection of wild flora. The scope of the IPPC also extends to organisms that are pests because they fall into one or more of the following categories:

- *They directly affect uncultivated or unmanaged plants*. Introduction of these pests may have few commercial consequences, and therefore they have been less likely to have been evaluated, regulated or placed under official control. An example of this type of pest is Dutch elm disease (caused by *Ophiostoma novo-ulmi* Brasier, 1991).
- *They indirectly affect plants*. In addition to pests that directly affect host plants, there are those that affect plants primarily by other processes such as competition. Examples include most plants as pests (e.g. weeds, non-indigenous plants that establish or spread rapidly).
- *They indirectly affect plants through effects on other organisms*. Some pests may primarily affect other organisms but thereby cause deleterious effects on plant species or on plant health in habitats or ecosystems. Examples include parasites of beneficial organisms, such as biological control agents.

To protect the environment and biodiversity without creating disguised barriers to trade, environmental risks, including risks to biological diversity, should be analysed in a PRA.

2. Sources of information

For environmental risks, the variety of sources of information will generally be wider than traditionally used by NPPOs. Broader inputs may be required. These sources may include environmental impact assessments, but it should be recognized that such assessments usually do not have the same purpose as PRA and cannot substitute for PRA.

3. Regulatory status

Official control of pests posing an environmental risk may involve agencies other than the NPPO. However, it is recognized that Supplement 1 (Guidelines on the interpretation and application of the concepts of "official control" and "not widely distributed") to ISPM 5 applies, and in particular its provisions regarding NPPO authority and involvement in official control.

4. Environmental consequences of pest effects

In the case of the analysis of environmental risks, examples of **direct pest** effects on plants or their environmental consequences that may be considered include:

- reduction of plant species that are key to the ecological integrity of ecosystems;
- reduction of plant species that are major components of ecosystems (in terms of abundance or size) and endangered indigenous plant species (including effects below species level where there is evidence of such effects being significant); and
- significant reduction, displacement or elimination of other plant species.

The estimation of the area potentially endangered should relate to these effects.

In the case of the analysis of environmental risks, examples of **indirect pest** effects on plants or their environmental consequences that may be considered include:

- significant effects on plant communities;
- significant effects on designated environmentally sensitive or protected areas;
- significant change in ecological processes and the structure, stability or processes of an ecosystem (including further effects on plant species, increased erosion, water-table changes, increased risk of fire, changes to nutrient cycling);
- effects on human use of plant communities and the environment (e.g. effects on water quality, recreational uses, tourism, animal grazing, hunting, fishing); and
- costs of environmental restoration.

5. Uncertainty

It should be noted that the assessment of the probability of introduction and spread and of environmental consequences of pests of uncultivated and unmanaged plants often involves greater uncertainty than for pests of cultivated or managed plants. This is because of the lack of information, the greater complexity associated with ecosystems, and the greater variability associated with pests, hosts or habitats of uncultivated and unmanaged plants.

In considering the management of environmental risks, NPPOs should recognize that phytosanitary measures are intended to account for uncertainty and should be designed in proportion to the pest risk. Pest risk management options should be identified, taking account of the degree of uncertainty in the assessment of economic consequences, probability of introduction, and the respective technical justification of those options. In this respect, the management of risks to the environment caused by pests does not differ from the management of other pest risk.

6. Communication

Phytosanitary measures taken in relation to potential environmental consequences should, as appropriate, be notified to relevant competent authorities responsible for national biodiversity policies, strategies and action plans.

This annex is a prescriptive part of the standard.

ANNEX 5: Living modified organisms as pests

1. Introduction

The pest risk that may be posed by a living modified organism is within the scope of the IPPC and should be considered using PRA to inform decisions regarding pest risk management.

This annex includes guidance on evaluating the potential pest risk posed by an LMO. This guidance does not alter the scope of this standard but is intended to clarify issues related to the PRA of LMOs. This annex should be read in conjunction with Annexes 1, 2 and 3 of this standard.

The analysis of LMOs includes consideration of the following:

- Some LMOs may pose a pest risk and therefore warrant a PRA. However, other LMOs will not pose a pest risk beyond that posed by related non-LMOs and therefore will not warrant a complete PRA. For example, modifications to change the physiological characteristics of a plant (e.g. ripening time, storage life) may not change the pest risk posed by that plant. The pest risk that may be posed by an LMO is dependent on a combination of factors, including the characteristics of the donor and recipient organisms, the genetic alteration, and the specific new trait or traits. It may be useful, therefore, to consider the pest risk posed by an LMO in the context of the pest risk posed by the non-modified recipient or parental organisms, or similar organisms, in the PRA area. Section 2 of this annex therefore provides guidance on how to determine if an LMO is a potential pest.
- Pest risk analysis may constitute only a portion of the overall risk analysis for the import and release of an LMO. For example, countries may require the assessment of risks to human or animal health, or to the environment, beyond that covered by the IPPC. This annex only relates to the assessment and management of the risks within the scope of the IPPC. As with other organisms or pathways assessed by an NPPO, LMOs may pose other risks not falling within the scope of the IPPC. When an NPPO discovers potential for risks that are not of phytosanitary concern it may be appropriate to notify the relevant authorities.
- The pest risk posed by an LMO may result from certain traits introduced into the organism, such as those that increase the potential for establishment and spread, or from inserted gene sequences that do not alter the pest characteristics of the organism but that might act independently of the organism or have unintended consequences.
- In cases of pest risk related to gene flow, the LMO is acting more as a potential vector or pathway for introduction of a genetic construct of phytosanitary concern rather than as a pest in and of itself. Therefore, the term “pest” should be understood to include the potential of an LMO to act as a vector or pathway for introduction of a gene posing a potential pest risk.
- The risk analysis procedures of the IPPC are generally concerned with phenotypic characteristics rather than genotypic characteristics. However, genotypic characteristics may need to be considered when assessing the pest risk posed by an LMO.

2. Determining the potential for a living modified organism to be a pest

This annex is relevant for LMOs only where there is potential for the pest risk posed by an LMO to result from some characteristic or property related to the genetic modification. Other pest risk posed by the organism should be assessed under other appropriate sections or annexes of this standard or under other appropriate ISPMs.

The information requirements outlined in section 4.2 of this annex may be needed in determining the potential for an LMO to be a pest.

2.1 Potential characteristics or properties of living modified organisms that may affect pest risk

Characteristics or properties of LMOs that may potentially affect the pest risk posed by the organism include the following:

(1) changes in adaptive characteristics that may increase the potential for introduction or spread, for example alterations in:
- tolerance to adverse environmental conditions (e.g. drought, freezing, salinity),
- reproductive biology,
- dispersal ability of pests,
- growth rate or vigour,
- host range,
- pest resistance, or
- pesticide (including herbicide) resistance or tolerance;

(2) changes to gene flow or gene transfer that have adverse effects, such as:
- transfer of pesticide or pest resistance genes to compatible species,
- development of the potential to overcome existing reproductive and recombination barriers, or
- development of the potential for hybridization with existing organisms or pathogens to result in pathogenicity or increased pathogenicity;

(3) changes that have adverse effects on non-target organisms, such as:
- changes in host range of the LMO, including the cases where it is intended for use as a biological control agent or organism otherwise claimed to be beneficial,
- changes that have effects on other organisms, such as biological control agents, beneficial organisms, soil fauna and microflora, or nitrogen-fixing bacteria, that result in a phytosanitary impact (indirect effects),
- development of the capacity to vector other pests, or
- negative direct or indirect effects of plant-produced pesticides on non-target organisms beneficial to plants;

(4) genotypic and phenotypic instability, such as:
- reversion of an organism intended as a biocontrol agent to a virulent form; and

(5) changes that have other injurious effects, such as:
- pest risk resulting from new traits in organisms that do not normally pose a pest risk,
- novel or enhanced capacity for virus recombination, trans-encapsidation and synergy events related to the presence of virus sequences, or
- pest risk resulting from nucleic acid sequences (markers, promoters, terminators, etc.) present in the insert.

If there is no indication that new traits resulting from genetic modifications affect the pest risk, the LMO may require no further consideration.

It may be useful to consider the characteristics and properties contributing to the potential pest risk in the context of those associated with the non-modified recipients or parental organisms, or similar organisms, in the PRA area.

Factors that may result in the need to subject an LMO to Stage 2 of the PRA include:

- lack of knowledge about a particular modification event;
- insufficient credibility of information if it is an unfamiliar modification event;
- insufficient data on the behaviour of the LMO in environments similar to the PRA area;
- operational experience, research trials or laboratory data indicating that the LMO may pose a pest risk (see (1)–(2) above);
- expression by the LMO of characteristics that are associated with pests under Annex 2 of this standard;
- existence of conditions in the country (or PRA area) that may result in the LMO being a pest;
- existence of PRAs for similar organisms (including LMOs) or risk analyses carried out for other purposes that indicate a pest potential; and
- experience in other countries indicating a pest potential.

Factors that may lead to the conclusion that an LMO is not a potential pest or requires no further consideration under this standard include:

- evidence from a previous assessment by the NPPO (or other recognized experts or agencies) indicating that the genetic modification in similar or related organisms does not affect pest risk;
- the LMO is to be confined in a reliable containment facility and not be released;
- evidence from research trials indicating that the LMO is unlikely to be a pest under the use proposed; and
- experience in other countries indicating that there is no pest potential.

4. Initiation (PRA Stage 1)

The aim of the initiation stage is to identify LMOs that have the characteristics of a potential pest and need to be assessed further, and those which need no further assessment under this standard.

Living modified organisms are organisms that have been modified using techniques of modern biotechnology to express one or more new or altered traits. In most cases, the parent organism is not normally considered to be a pest but an assessment may need to be performed to determine if the genetic modification (i.e. gene, new gene sequence that regulates other genes, or gene product) results in a new trait or characteristic that may pose a pest risk.

A pest risk from LMOs may be posed by:

- the organism (or organisms) with the inserted gene (or genes) (i.e. the LMO);
- the combination of genetic material (e.g. gene from pests such as viruses); or
- the consequences of the genetic material moving to another organism.

4.1 Initiation points

The types of LMOs that an NPPO may be asked to assess for pest risk include:

- plants for use (1) as agricultural crops, for food and feed, ornamental plants or managed forests; (2) in bioremediation (as an organism that cleans up pollution); (3) for industrial purposes

(e.g. production of enzymes or bioplastics); (4) as therapeutic agents (e.g. pharmaceutical production);

- biological control agents modified to improve their performance in that role;
- pests modified to alter their pathogenic characteristic and thereby make them useful for biological control (see ISPM 3); and
- organisms genetically modified to improve their characteristics, such as for biofertilizer or other influences on soil, for bioremediation or for industrial uses.

In order to be categorized as a pest, an LMO has to be injurious or potentially injurious to plants or plant products under conditions in the PRA area. This damage may be in the form of direct effects on plants or plant products, or indirect effects. For guidance on the process of determining whether an LMO has the potential to be a pest, see section 2 of this annex.

4.2 Information

For LMOs, information required for a full PRA may include:

- name, identity and taxonomic status of the LMO (including any relevant identifying codes) and the risk management measures applied to the LMO in the country of export;
- taxonomic status, common name, point of collection or acquisition, and characteristics of the donor organism;
- description of the nucleic acid or the modification introduced (including genetic construct) and the resulting genotypic and phenotypic characteristics of the LMO;
- details of the transformation process;
- appropriate detection and identification methods and their specificity, sensitivity and reliability;
- intended use, including intended containment; and
- quantity or volume of the LMO to be imported.

The provision of information necessary for PRA, to the extent that is possible, is an obligation under the IPPC (Article VIII.1(c)), facilitated by official contact points (Article VIII.2). A country may have obligations to provide information about LMOs under other international agreements, such as the Cartagena Protocol on Biosafety to the Convention on Biological Diversity (CBD, 2000). The Secretariat of the Convention on Biological Diversity provide an online platform, the Biosafety Clearing-House, that may contain relevant information. Information on LMOs is sometimes commercially sensitive and applicable obligations with regard to release and handling of information should be observed.

4.3 Conclusion of initiation

At the end of Stage 1, an NPPO may decide that the LMO is either:

- a potential pest and needs to be assessed further in Stage 2; or
- not a potential pest and needs no further analysis under this standard.

5. Pest risk assessment (PRA Stage 2)

For LMOs, from this point forward in PRA, it is assumed that the LMO is being assessed as a pest, and therefore “LMO” refers to an LMO that is a potential quarantine pest because of new or altered characteristics or properties resulting from the genetic modification. The risk assessment should be

carried out on a case-by-case basis. Living modified organisms that have pest characteristics unrelated to the genetic modification should be assessed using the normal procedures.

5.1 Pest categorization

5.1.1 Identity of pest

In the case of LMOs, identification requires information regarding characteristics of the recipient or parent organism, the donor organism, the genetic construct, the gene or transgene vector and the nature of the genetic modification. Information requirements are set out under section 4.2 of this annex.

5.1.2 Regulatory status

Official control should relate to the phytosanitary measures that are applied because of the pest nature of the LMO. It may be appropriate to consider any official control measures in place for the parent organism, donor organism, transgene vector or gene vector.

5.1.3 Potential for establishment and spread in PRA area

The following should be considered:

- changes in adaptive characteristics resulting from the genetic modification that may increase the potential for establishment and spread;
- gene transfer or gene flow that may result in the establishment and spread of pests, or the emergence of new pests; and
- genotypic and phenotypic instability that could result in the establishment and spread of organisms with new pest characteristics (e.g. loss of sterility genes designed to prevent outcrossing).

5.1.4 Potential for economic consequences in PRA area

The economic impact (including environmental impact) should relate to the pest nature (injurious to plants and plant products) of the LMO.

5.2 Assessment of the probability of introduction and spread

Assessing the probability of introduction of an LMO requires an analysis of both intentional or unintentional pathways of introduction, and intended use.

5.2.1 Probability of entry of a pest

The assessment of probability of entry is not relevant to LMOs imported for intentional release into the environment.

5.2.1.1 Identification of pathways for a PRA initiated by a pest

For LMOs, all relevant intentional and unintentional pathways of introduction should be considered.

5.2.2 Probability of establishment

The survival capacity without human intervention should be considered.

Where gene flow is a concern in the PRA area, the probability of expression and establishment of a trait of phytosanitary concern should be considered.

Case histories concerning comparable LMOs or other organisms carrying the same genetic construct may be considered.

5.2.2.1 Probability of transfer to a suitable host

When there is a trait of phytosanitary concern that may be transferred, the probability of gene flow and gene transfer should be considered.

5.2.2.2 Cultural practices and control measures

For plants that are LMOs, it may be appropriate to consider specific cultural, control or management practices.

5.2.2.3 Other characteristics of the pest affecting the probability of establishment

If there is evidence of genotypic and phenotypic instability, this should be considered.

It may be appropriate to consider proposed production and control practices related to the LMO in the country of import.

5.3 Assessment of potential consequences

The impact being assessed should relate to the pest nature (injurious to plants and plant products) of the LMO.

The following evidence should be considered:

- potential economic consequences that could result from adverse effects on non-target organisms that are injurious to plants or plant products; and
- economic consequences that could result from pest properties.

6. Pest risk management (PRA Stage 3)

6.1 Identification of appropriate pest risk management options

6.1.1 Pest risk management options

Information may have been obtained concerning the risk management measures applied to the LMO in the country of export (see section 4.2 of this annex). These measures should be assessed to determine if they are appropriate for the conditions in the PRA area and, if appropriate, the intended use.

Measures may include procedures for the provision of information on the integrity of consignments (e.g. tracing systems, documentation systems, identity-preservation systems).

6.1.2 Options preventing or reducing infestation in the crop

Measures may be applied to reduce the probability that LMOs (or genetic material from LMOs) that pose a pest risk could be present in other crops. These include:

- management systems (e.g. buffer zones, refugia);
- management of trait expression;

- control of reproductive ability (e.g. male sterility); and
- control of alternative hosts.

6.1.3 Options within the importing country

The potential pest risk posed by LMO pests depends in part on the intended use. As for other organisms, certain intended uses (such as high-security contained use) may significantly manage pest risk.

Options within the country include the use of emergency measures related to the potential pest risk posed by LMOs. Any emergency measures should be consistent with Article VII.6 of the IPPC.

6.2 Phytosanitary certificates and other compliance measures

Information on phytosanitary certificates regarding LMOs (as with any other regulated articles) should only be related to phytosanitary measures (see ISPM 12 (*Phytosanitary certificates*)).

This annex is a prescriptive part of the standard.

ANNEX 6: Pest risk analysis for plants as quarantine pests

1. Introduction

This annex provides specific guidance on conducting PRA to determine if a plant is a pest of cultivated or wild plants, whether it should be regulated, and to identify phytosanitary measures that reduce the pest risk to an acceptable level. It focuses primarily on plants proposed for import, whether as plants for planting or for other intended uses. It does not cover the unintentional introduction of plants as contaminating pests in commodities or conveyances.

2. Plants as pests

Plants as pests may affect other plants through competition for space and resources, such as light, nutrients and water, or through parasitism or allelopathy. Plants introduced to a new area may also become pests by hybridizing with cultivated plants or wild plants.

Thus, the protection of plants as pursued through the IPPC may include considering certain plants as pests, and taking phytosanitary measures to prevent their introduction and spread. Determining which plants are pests is context-specific and may vary with geography, habitat, land use, time and the perceived value of the natural resources in the endangered area. Pest risk analysis should form the basis of such a determination and subsequent decisions regarding possible regulation of the plant species as a quarantine pest. It should be noted that a plant having undergone such analysis may also require assessment of its potential to be a pathway for other pests.

The governing body of the IPPC has recognized the importance of plants as pests by underscoring that the definition of "pest" includes weeds (ICPM, 2001), and by specifically including "plants that are invasive alien species" in a range of recommendations for action for those invasive alien species that are pests of plants (ICPM, 2005). This annex provides some specific guidance on how to apply these recommendations.

The IPPC is concerned with pests injurious to cultivated and wild plants, and therefore weeds and invasive plants that are injurious to other plants should be considered pests in the IPPC context. Henceforth in this annex, the terms "weed" and "invasive plants" are not used, but only the single term "plants as pests".[7]

3. Initiation (PRA Stage 1)

3.1 Initiation points

The PRA process for plants as quarantine pests will most frequently arise in situations such as when:

- a request is made to import a plant not previously imported;

[7] "Invasive plants" are often taken to mean invasive alien species in the sense used in the Convention on Biological Diversity (see ISPM 5, Appendix 1). The term "weed" usually refers to pests of cultivated plants. However, some countries use the term "weed" irrespective of whether cultivated plants or wild flora are at risk, and other countries use the term "noxious weed", "landscape weed", "environmental weed" or similar terms to distinguish them from plants only affecting crops.

- a plant already available and used in a country is suspected of posing a pest risk (e.g. because of new evidence or anticipated changes in its intended use); or
- a decision is made to review or revise phytosanitary policies.

3.2 Preselection

Annex 1 of this standard describes, as part of the initiation stage, a preselection step for determining whether or not an organism is a pest, and provides some indicators that a plant may be a pest. Particular attention is needed for plants that have proven to be pests elsewhere or that have intrinsic characteristics that are strong predictors of pest potential, such as a high propagation rate or strong competitive or propagule dispersal abilities. In most cases, consideration of these factors in Stage 1 of the PRA may not be sufficient to terminate the process; however, in cases where it is clearly determined that the plant is only suited to a specific type of habitat that does not exist in the PRA area, it may be concluded that the plant cannot become a pest in that area and the PRA process may stop at that point.

4. Pest risk assessment (PRA Stage 2)

4.1 Identity of the plant

The species is the taxonomic level usually considered in PRA. However, in the case of cultivated plants that may be pests, lower taxonomic levels may be used where there are scientifically sound rationales. The taxonomic level appropriate for conducting the PRA for a particular plant as a pest should be determined by the NPPO.

Some particular considerations regarding the identity of plants as pests may include the following:

- The taxonomic identity of the plant may be unclear because it has been obscured by breeding or hybridization or is the subject of plant breeders' rights. This is particularly relevant for horticultural plants. The NPPO should acquire the best possible information about the identity and parentage of the plant from various sources (e.g. the prospective importer, plant breeders, scientific literature).
- The use of taxonomic levels below the species (i.e. subspecies, variety, cultivar) may be justified if there is scientific evidence demonstrating that differences in characteristics are stable and may significantly affect the pest risk. Examples may include differences in adaptability to environmental conditions, ability to exploit resources, ability to defend against herbivores, and methods of reproduction or propagule dispersal.
- The evaluation of a hybrid should be based on information specific to that hybrid where available. Where such information does not exist, PRA may be conducted on the parent species to determine their pest risk. If either parent is determined to be a pest and the associated pest risk is deemed unacceptable, this information may form the basis of the pest risk assessment for the hybrid. However, as hybrids do not always express similar characteristics to their parent species, that approach may significantly increase the assessment uncertainty and should be used with caution.

4.2 Presence or absence in the PRA area

Determination of presence or absence in the PRA area is a particular challenge for NPPOs when plants are proposed for import because the plants may already be growing in locations (e.g. botanical gardens, home gardens) that may not be reported. Sources of information may include horticultural,

agricultural, forestry and aquaculture publications and databases. The NPPO may need to carry out a survey or surveys for the plant being assessed to obtain information on its presence and distribution.

The presence or absence of wild or cultivated relatives in the PRA area should also be determined in the case where there is scientific evidence that the plant may hybridize with such local relatives.

4.3 Intended use

The PRA should include consideration of the intended use (see ISPM 32) of the plant being assessed, as this may affect the probability of establishment, spread and economic consequences. However, it should also be recognized that plants, once entered, may escape or be diverted from the use for which they were originally intended.

In the case of plants for planting, significant human effort is made to ensure their continuous survival and, in some cases, successful reproduction, because of their perceived benefits. Furthermore, the plants for planting have often been selected to be well suited for growing in the importing country. This significantly increases the likelihood of establishment and spread. Therefore, plants for planting are generally considered to pose the highest pest risk. Examples of intended uses, broadly in the order of decreasing pest risk at the time of planting, are:

- planting in the open landscape without management (e.g. for soil erosion control, wastewater treatment and carbon dioxide uptake, or as aquatic plants in watercourses or ponds);
- planting in the open landscape with management (e.g. in forestry, agriculture (including for biofuel), horticulture, land reclamation and golf courses, or as cover crops);
- planting outdoors in urban areas (e.g. for amenity purposes in roadsides, parks or gardens); and
- planting indoors only.

Plants for intended uses other than planting may be considered, including for human consumption or animal feed, processing, combustion for energy production, or research.

4.4 Habitats, locations and endangered areas

Plants imported for planting may be destined for a particular geographical location of a particular habitat. However, the NPPO should assess:

- the probability that the plants could establish in habitats in the PRA area other than where they were intended to grow (i.e. to what degree other habitats are suitable for the plant); and
- the probability that the plants could spread from the location where they were intended to grow.

The overall area of suitable habitats where the presence of the plant would result in economically important loss constitutes the endangered area.

With respect to a plant being assessed as a pest with indirect effects, wherever a reference is made to a “host” or “host range”, these terms should be understood to refer to a suitable habitat in the PRA area.

The analysis of suitable habitats is analogous to the analysis of host plants for other pests (in the case of parasitic plants, both host and habitat should be considered). The guidance provided in section 3.2 of Annex 2 may be applicable, substituting the terms “host” and “host range” with “suitable habitat”.

4.5 Probability of entry

For imported plants, the assessment of probability of entry is not relevant. Nevertheless, where an estimation of the volume, frequency and destinations of prospective imports is needed in order to assess the likelihood of establishment and spread, NPPOs should consider such estimations in the pest risk assessment. In addition, the probability of entry should be assessed for pests that may be carried by these plants, such as contaminating seeds carried with seeds imported for planting.

For plants for planting proposed for import, the plants may be planted and maintained in a particular location. A pest risk may arise if there is a possibility that the plants may spread from the location where they are intended to grow and establish in the endangered area. Accordingly, the probability of spread (section 4.8 of this annex) may be considered before the probability of establishment (section 4.7 of this annex).

Imported plants not intended to be planted may be used for various purposes (e.g. as bird seed, as fodder, for processing). A pest risk may arise if there is a possibility that the plants may escape or be diverted from the intended use and establish in the endangered area.

4.6 Historical evidence of pest behaviour

The most reliable predictor of establishment, spread and potential consequences of a plant as a pest is the history of that plant as a pest when introduced into new areas with similar habitats and climate. Where such a history is documented, the assessment should use this information, comparing the habitat and climate conditions with those in the PRA area to determine if they are sufficiently similar. However, a plant may never have been moved out of its native range, where it may be controlled by naturally occurring enemies or other biotic or abiotic factors. In such cases, no historical evidence will exist of establishment, spread or consequences.

4.7 Probability of establishment

In the case of plants as pests, assessment of the probability of establishment concerns their establishment in habitats other than those in which they are intended to grow.

The assessment of the probability of establishment should consider the suitability of the climate, other abiotic and biotic factors (see section 3.2.3 of Annex 2), and cultural practices (see section 3.2.4 of Annex 2). The assessment should compare the conditions in habitats within the PRA area to the conditions in habitats in which the plant is currently present. Depending on the information available, the following may be incorporated:

- *climate:* suitability of current climates and, for long-lived plants, future projected climates;
- *other abiotic factors:* soil characteristics, topography, hydrology, natural fires, and so on;
- *biotic factors:* current vegetation, degree of disturbance, presence or absence of natural enemies and competitors; and
- *cultural practices in crops or managed plant communities:* herbicide usage, harvesting, soil cultivation, burning, and so on (including side-effects such as aerial deposition of nitrogen or pesticides).

Where the history of a particular plant as a pest is not well documented, the assessment should consider intrinsic characteristics of the plant that may predict establishment (see section 3.2.5 of

Annex 2). Although intrinsic characteristics have sometimes been shown to be poor predictors, the following may be considered:

- *reproductive characteristics:* sexual and asexual mechanisms, dioecism, duration of flowering, self-compatibility, reproduction frequency, generation time;
- *adaptive potential (of individuals and populations):* genotypic or phenotypic plasticity, hybridization potential;
- *propagule attributes:* volume and viability, dormancy; and
- *tolerance or resistance:* response to pests, herbicides, grazing and other cultural practices, drought, flooding, frost, salinity, climate changes.

Many plants as pests are opportunists with a strong potential to become established in disturbed habitats. Plants with a robust dormancy combined with a prolific reproductive ability are particularly suited for such an opportunistic strategy. Disturbed habitats are common; therefore, plants with such opportunistic adaptations may encounter many opportunities for establishment and spread.

4.8 Probability of spread

Assessment of spread concerns spread from the location where the plants are intended to grow or from the intended use to the endangered area.

The likelihood and extent of spread depends on natural and human-mediated factors. Natural factors may include:

- intrinsic characteristics of the plant species (particularly regarding reproduction, adaptation and propagule dispersal);
- existence of natural means of dispersal (e.g. birds and other animals, water, wind); or
- existence and spatial pattern of suitable habitats and dispersal corridors connecting them.

Human-mediated factors, whether intentional or unintentional, may include:

- intended use, consumer demand, economic value and ease of transport;
- the movement of propagules of contaminating pests with soil or other materials (e.g. clothing, conveyances, machinery, tools, equipment);
- the discarding of plants (e.g. after flowering or when private aquaria are emptied); or
- disposal procedures (e.g. composting) for waste that contains plants.

There are often long time lags between a plant's initial introduction and its later spread. As a consequence, even in the cases where establishment may be well documented, the potential for later spread may be less known. If evidence exists, it should be considered. This may include evidence of factors such as:

- changes in abiotic factors (e.g. an increase in aerial deposition of nitrogen or sulphur);
- changes in the genetic profile of the plant species (e.g. through natural selection, genetic drift);
- whether the plant has a long generative time or time to maturity;
- emergence of novel uses for the plant;
- relatively rare dispersal events that move propagules from suboptimal to optimal habitats;
- changes in land use or disturbance pattern (e.g. following natural floods, natural fires); and
- changes in climate (e.g. warmer climate, changes in precipitation patterns).

4.9 Assessment of potential consequences

Plants as pests may have a variety of consequences, including yield losses in agriculture, horticulture and forestry; reduction of recreational value; or reduction of biodiversity and negative effects on other parts of the ecosystem. Assessment of consequences of plants as pests may be inherently difficult because they may have broad agricultural, environmental and social consequences that may be non-specific, not readily apparent or not easily quantified (e.g. changes in the soil's nutrient profile).

The assessment should also consider the potential long-term consequences for the entire PRA area, including where the plants are intended to grow. In particular, in the case of plants for planting that may be pests, the long-term consequences for the habitat in which the plants are intended to grow may be included in the assessment because planting may affect further use of, or have a harmful effect on, that habitat.

The most reliable predictor of potential consequences is evidence of consequences elsewhere, particularly in areas with similar habitats. However, in some cases, plants have never been moved out of their native ranges and therefore may not have had an opportunity to express any potential consequences. In the absence of evidence of consequences elsewhere, consideration may be given to whether or not the plant possesses intrinsic characteristics that predict pest potential, such as those discussed in sections 4.7 and 4.8 of this annex and in section 3.2.5 of Annex 2 related to establishment and spread.

5. Pest risk management (PRA Stage 3)

Plants for planting will usually be introduced into habitats suitable for their establishment and growth. In such cases, most pest risk management options would be counterproductive to the intended use. In general, for plants for planting considered to be quarantine pests, the most effective pest risk management option is prohibition (see section 4.6 of Annex 3). However, those plants may at the same time have a perceived benefit that may be considered in the decision-making process following the PRA.

For specific situations, other pest risk management options may be pursued, such as:

- requirements for growing plants under confinement;
- requirements for harvesting plants at a certain stage or specified time to prevent opportunities for reproduction;
- restriction of plants to particular locations, such as those that are marginally suitable;
- restriction of import to specified cultivars or clones;
- restrictions on the disposal of excess or waste plant material; and
- other restrictions on planting, growing, sale, holding, transport or disposal.

In some situations, it may be appropriate for NPPOs to promote the use of codes of conduct for sale, holding, transport, planting or disposal, for example in the form of internal rules or guidelines within the plant industry to refrain from or restrict the selling of particular plants for specific intended uses.

For plants imported for consumption or processing, pest risk management options may include restrictions on transport, storage, locations of import and use, sale, waste disposal, time of year that import takes place, and requirements regarding processing or treatments (e.g. devitalization).

In identifying pest risk management options, the suitability of control measures, ease of detection, identification of and access to the plants, time needed for effective control and difficulty of eradication or containment should be considered. For example, plants in highly managed systems such as cropping systems may be more easily controlled than plants in natural or semi-natural habitats, or in private gardens. Many of the factors considered under “establishment” and “spread” also influence a plant’s response to control measures and thus the feasibility of control.

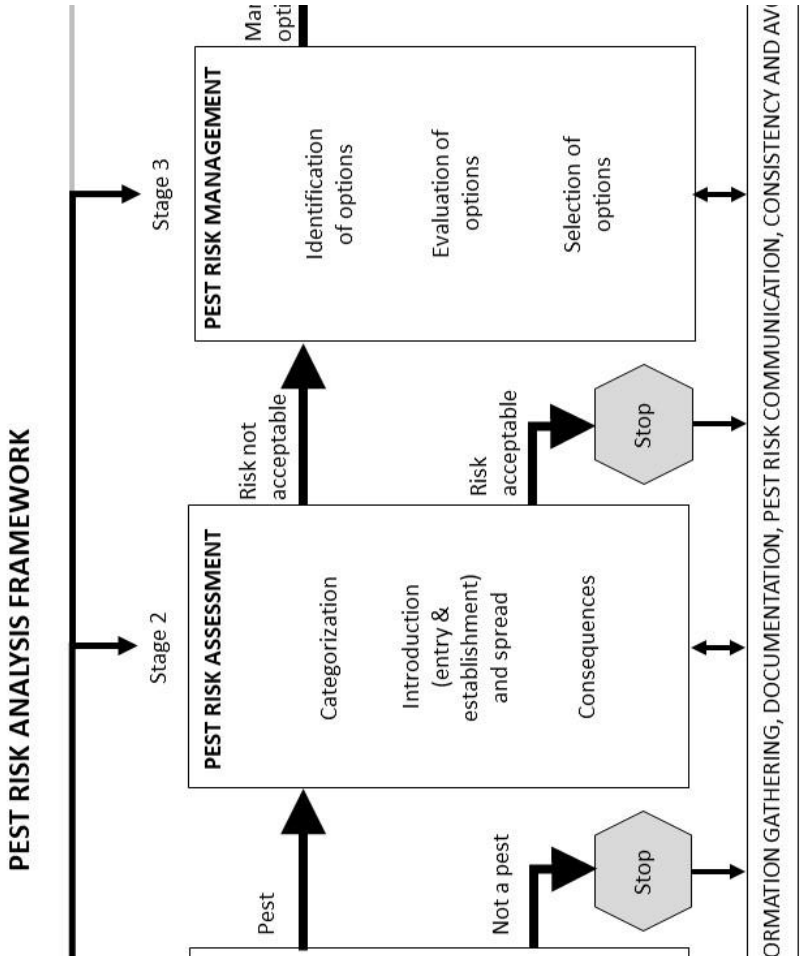
In cases where the assessed plants are present in collections (e.g. botanical gardens) and import regulation is considered, phytosanitary measures may have to be applied to those collections.

Irrespective of pest risk management options, where the import of a plant is allowed, it may be appropriate to develop post-entry systems such as surveillance in the PRA area, contingency plans, and systems to report new occurrences.

Potential implementation issues

This section is not part of the standard. The Standards Committee in May 2023 requested the secretariat to gather information on any potential implementation issues related to this draft. Please provide details and proposals on how to address these potential implementation issues.

APPENDIX 1: Pest risk analysis flow chart



Note: PRA, pest risk analysis.

DRAFT ANNEX TO ISPM 37: Criteria for evaluation of available information for determining host status of fruit to fruit flies (*Tephritidae*) (2018-011)

Status box

This is not an official part of the standard and it will be modified by the IPPC Secretariat after adoption.	
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Major stages	2019-04 CPM-14 added topic *Criteria for the determination of host status of fruit to fruit flies based on available information (Annex to ISPM 37)* (2018-011) with priority 3. 2020-11 Standards Committee (SC) approved Specification 71 (*Criteria for determining host status of fruit to fruit flies based on available information*). 2022-01 Expert working group met virtually and drafted the annex. 2022-05 SC revised and approved for first consultation. 2022-07 First consultation. 2023-05 SC-7 revised and approved for second consultation.
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Notes	This section will remain on the drafts going for consultation but deleted before adoption. 2022-02 Edited 2022-05 SC changed title to *Criteria for evaluation of available information for determining host status of fruit to fruit flies* 2022-05 Edited 2022-05 SC-7 changed title to *Criteria for evaluation of available information for determining host status of fruit to fruit flies (Tephritidae)* 2022-05 Edited

This annex was adopted by the [XXX] Session of the Commission on Phytosanitary Measures in [XXX 20XX].

This annex is a prescriptive part of the standard.

ANNEX 1: Criteria for evaluation of available information for determining host status of fruit to fruit flies (*Tephritidae*)

1. Introduction

National plant protection organizations (NPPOs) use a variety of available information (e.g. scientific literature, NPPO reports, pest records) related to the host status of fruit to fruit flies when they implement adopted ISPMs related to pest risk analysis (PRA), pest free areas, the design of import and export programmes, eradication, surveillance, pest records, and more. There is considerable inconsistency, however, in the interpretation of available information, and the terms used in such information to describe hosts do not always align with those defined in the core text of this standard, which can lead to trade disruption. This annex promotes harmonization by outlining the criteria that should be used when evaluating available information to determine the host status of fruit to fruit flies (*Tephritidae*) and provides guidance on assessing the uncertainty of the resulting host status determination. It also provides guidance to NPPOs on applying host status determinations in activities such as PRA. The annex provides guidance on interpretation of available information only in relation to undamaged fruit, based on the definitions and requirements set out in the core text of this standard.

2. Terms for the host status categories used in this standard

Many terms are used in published literature to describe the host status of fruit-to-fruit flies including “potential host”, “artificial host”, “conditional non-host”, “preferred host”, “general host”, “wild host” and “alternative host”. National plant protection organizations should, however, use one of the three host status categories described in the Definitions section of this standard: natural host, conditional host, and non-host.

3. Criteria for evaluating available information

3.1 General criteria

When determining host status based on available information, NPPOs should assess the quality (i.e. completeness, reliability and relevance) of the information by considering whether it provides the following:

- an accurate identification of the plant species (scientific name and authority) or cultivar, with supporting evidence (e.g. published keys and taxonomic publications used for plant (including cultivar) identification, verification of plant material by a specialist taxonomist, molecular identification, voucher specimens);
- a description of the sampled area (e.g. any pest-control measures applied in the area, any phytosanitary measures applied in the area, presence of other natural or conditional hosts in the area), details of location (e.g. geographic coordinates, climate, growing region, elevation) and details of collection dates (e.g. early or late season, multiple years);
- evidence of the presence of the target fruit fly, or other fruit fly species, or both, in the sampled area before and during sampling (e.g. trap records);
- details of the fruit-collection conditions (e.g. commercial or non-commercial environment, harvested from the plant or collected after falling to the ground);
- a description of the fruit-handling procedures (e.g. harvesting procedures, post-harvest processing and treatment, transportation procedures);
- a description of the fruit-sampling method (e.g. number and distribution of plants sampled and number of fruits sampled per plant);
- details of the condition of the skin or rind (e.g. rind thickness);
- details of whether the fruit is damaged or not, the cause of any damage (e.g. mechanical or natural damage), and the extent of the damage;
- details of the stage of fruit maturity (or other indicators of ripeness, such as dry matter content, colour, sugar content, standardized or objective ripeness scale);
- if used, a description of the fruit-dissection method (e.g. peeling and fruit cutting for detection of eggs or larvae);
- if used, a description of the fruit-holding method (e.g. maturity of fruits, temperature, humidity, day length, substrate for pupation including soil moisture) for determination of infestation;
- where there is infestation, a description of the fruit fly rearing method for development to adults (taking into consideration that eggs and larvae should not have been transferred from infested fruit to artificial diet for rearing);
- where there is infestation, a clear presentation of fruit fly rearing results, indicating the number of fruit fly adults reared per fruit or per weight of fruit and the total number and weight of the fruit sample under suitable conditions;
- an accurate identification of the fruit fly species (scientific name and authority) reared from the fruit together with supporting evidence (e.g. published keys and taxonomic publications used

for fruit fly species identification, verification of fruit fly species by a specialist taxonomist, photographs, molecular identification, voucher specimens); and

- in the absence of infestation, a clear presentation of fruit fly rearing results (e.g. no eggs or larvae, no pupation, no viable fruit fly adults reared from the plant species or cultivar under suitable conditions).

In addition to these general evaluation criteria, further information is required for each host status category as described in sections 3.2 to 3.4 of this annex.

3.2 Natural host

The information used to determine natural host status should contain evidence of both infestation and development to viable adults under clearly described natural conditions and evidence of development to viable adults.

National plant protection organizations should consider whether, in addition to the items listed in section 3.1 of this annex, the information available also provides details of the viability of emergent adults in terms of their size, flight ability, longevity and fecundity.

3.3 Conditional host

The information used to determine conditional host status should contain evidence of both infestation and development to viable adults from trials under semi-natural field conditions as set out in section 2 of this standard, with published methodological details and results.

National plant protection organizations should consider whether, in addition to the items listed in section 3.1 of this annex, the information available also provides details of the viability of emergent adults in terms of their size, flight ability, longevity and fecundity.

3.4 Non-host

The information used to determine non-host status should contain evidence of the absence of infestation, or of the incomplete development to viable adults, derived from field trials and/or trials conducted under semi-natural conditions as set out in section 2 of this standard, with published methodological details and results. If this information is not available, data from laboratory experiments may be used.

If the information on non-host status is derived from field surveillance by fruit sampling, NPPOs should consider whether, in addition to the items listed in section 3.1 of this annex, the information available also provides evidence of the presence of reproductively mature adults of the target fruit fly species in the sampled area before and during sampling (e.g. from trap records).

If the information on non-host status is derived from field trials or from trials conducted under semi-natural conditions, there are no further criteria for evaluation of the information other than the general evaluation criteria listed in section 3.1 of this annex.

If the information on non-host status is derived from laboratory experiments, NPPOs should consider whether, in addition to the items listed in section 3.1 of this annex, the information available also provides the following:

- details of the fruit fly colony's origin (e.g. date of collection and location of natural host for the parental line, number of generations reared by the start of the experiment (preferably not

more than five generations, unless wild types are added during the maintenance of the colony), substrate used for egg collection (preferably fruit substrate));

- a description of the fruit fly rearing method used for maintenance of the colony (e.g. artificial diet used for larvae; conditions of the rearing room, such as temperature, humidity, light);
- details of the quality of the fruit fly colony used in the experiment (e.g. developmental rates and survival, mating period, oviposition period, fecundity);
- details of the physiological condition of the fruit fly females used (e.g. mating status, age; the fruit fly adult females used should be mated and should be at the peak of their reproductive potential);
- confirmation that the plant material used was free from pesticides and other products that could have negatively affected the oviposition behaviour of the fruit fly females used;
- details of the natural infestation rate of the plant species or cultivar used in the experiment (fruit fly species identified and number of fruit fly adults emerged per fruit or per weight of fruit, as determined by incubating a sample of the fruit used in each replicate of the experiment without exposing it to the target fruit fly); and
- a description of the method used in the laboratory experiment (e.g. cages used, exposure period, presence of food and water in cages, number of females used per cage, presence of males in cages, use of a natural host as a control in separate cages to demonstrate normal oviposition behaviour, time of conduct of experiment, conditions during experiment, number of replicates using different cohorts).

4. Assessing the uncertainty of the host status determination

The available information related to the host status of plant species or cultivars to fruit flies has varying levels of quality (i.e. completeness, reliability and relevance) and this will, in turn, influence the level of uncertainty associated with the host status determination. As a general rule, the reliability of a host record diminishes with the age of the publication. Further guidance on the quality of information can be found in ISPM 6 (*Surveillance*), ISPM 8 (*Determination of pest status in an area*) and IPPC Secretariat (2021).

The quality of the information should be assessed based on the design of the method used to determine the type of host (e.g. sample size, number of replicates), the presentation of results and the expertise of the contributors.

The completeness of the information should be assessed against the criteria listed in the section on General requirements in this standard and the evaluation criteria listed in section 3 of this annex. National plant protection organizations should consider the key elements for the determination of host status to be the identification of the plant species or cultivar and the fruit fly species by a specialist taxonomist, the deposition of voucher specimens of plant and fruit fly species, and the details provided of the fruit origin and condition.

The quality of the information sources will dictate the level of uncertainty associated with the resulting host status determination: the greater the quality of information, the lower the uncertainty. A host status determination based on multiple reports from independent sources, particularly those of higher reliability, has a low level of uncertainty.

The following cases are some examples of situations where there can be particular uncertainty associated with the host status determination because of inadequate information:

- A new interception record lacks relevant information or contains unconfirmed information (e.g. life stage not mentioned, the fruit fly association with the fruit is unclear, quality of fruit not mentioned).
- A new plant species or cultivar is introduced into an area where a fruit fly species is present, or a fruit fly establishes in a new area and encounters new plant species.
- One or both parent species of a newly developed hybrid or cultivar are known natural or conditional hosts (in which case, the host status of the hybrid or cultivar should be considered for its potential as a natural or conditional host until it can be confirmed otherwise).
- here is a taxonomic change in a plant or fruit fly species. If there is a taxonomic change that splits a fruit fly species into two or more species, the host range of each valid species could potentially be different. Similarly, if two or more fruit fly species that were thought to be different are now synonymized, the singular new species is likely to have a broader host range. Therefore, particular attention should be paid to taxonomic changes when evaluating host records.

The result of an analysis of host status should be accompanied by a determination of the level and nature of the associated uncertainty. If the level of uncertainty is too high, and the NPPO cannot determine host status, appropriate field surveillance by fruit sampling or field trials should be used to determine host status (see step C in the section on General requirements in this standard).

5. Application of the host status of a fruit to a fruit fly in pest risk analysis

When conducting a PRA for a fruit commodity, the following requirements apply:

- The host status of a fruit to a fruit fly species (including the level and nature of the associated uncertainty) should be considered:
  - in the initiation stage;
  - in the evaluation of the probability of introduction and spread and in the assessment of impacts;
  - in the evaluation and selection of pest risk management options to mitigate the pest risk (e.g. inspection, phytosanitary treatment); and
  - in risk communication (e.g. consultation and sharing of information).
- When a PRA is conducted for import of fruit from a plant species or cultivar categorized as a non-host for a particular fruit fly species, that fruit fly species should be eliminated from further consideration at the initiation or pest categorization stages.
- When a PRA is conducted for import of fruit from a plant species or cultivar categorized as a conditional host, the pest risk of the conditional host should be considered as being lower than that of a natural host (when infested by the same species of fruit fly). Phytosanitary measures should be appropriate for the pest risk posed by the conditional host.
- Even if plant species or cultivars are categorized as natural hosts, they may not all pose the same pest risk. Therefore, when conducting a PRA for import of fruit from a plant species or cultivar categorized as a natural host for a particular fruit fly species, the evidence that led to the decision of natural host status should be described in detail so that phytosanitary measures can be selected that are appropriate for the level of pest risk posed.

6. References

IPPC Secretariat. 2021. *Pest status guide – Understanding the principal requirements for pest status determination*. Rome, IPPC Secretariat, FAO. xv + 77 pp. www.fao.org/documents/card/en/c/cb6103en

Potential implementation issues

This section is not part of the standard. The Standards Committee in May 2016 requested the secretariat to gather information on any potential implementation issues related to this draft. Please provide details and proposals on how to address these potential implementation issues.

DRAFT 2022 AMENDMENTS TO ISPM 5: *GLOSSARY OF PHYTOSANITARY TERMS* (1994-001)

Publication history

(This is not an official part of the standard)

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Notes	Note to Secretariat formatting this paper: formatting in definitions and explanations (strikethrough, bold, italics) needs to remain.

Introduction

The IPPC Official Contact Points are asked to consider the following proposals for revising terms and definitions to ISPM 5 *(Glossary of Phytosanitary Terms)*. A brief explanation is given for each proposal. For revision of terms and definitions, only the proposed changes are open for comments. For full details on the discussions related to the specific terms, please refer to the TPG meeting reports on the IPP.

1. REVISION

The following introduction refers to both proposals for the revision of the terms “phytosanitary action” (2020-006) and “phytosanitary procedure” (2020-007):

- In the context of discussing the term and definition of “emergency action” (2018-044), the TPG in November 2019 discussed the current definitions of “phytosanitary action” and “phytosanitary procedure” and concluded that these definitions might need a major overhaul through analyzing their inter-relations and current use in ISPMs. The Standards Committee (SC) in November 2020 agreed to the TPG conclusion and added the terms “phytosanitary action” (2020-006) and “phytosanitary procedure” (2020-007) to the TPG work programme in the *List of topics for IPPC standards*.
- The TPG in December 2021 recalled that a phytosanitary action is an official *operation*, and a phytosanitary procedure is an official *method* (i.e., a documented process or a methodology) for implementing phytosanitary measures (or taking phytosanitary action). The relationship between the three concepts may be illustrated as: a phytosanitary measure is *what to do, a phytosanitary procedure* is *how to do it*, and a phytosanitary action is actually *doing it*.
- The terms “phytosanitary action” and “phytosanitary procedure” both refer to “phytosanitary measures” in their respective definitions and are strongly interconnected. TPG discussions on the two definitions were therefore also intertwined and followed similar lines of argumentation.
- Phytosanitary measures have the purpose of preventing the introduction or spread of quarantine pests or limiting the economic impact of regulated non-quarantine pests (RNQPs). Thus, phytosanitary measures are established exclusively in relation to regulated pests, i.e., quarantine pests and RNQPs.
- A national plant protection organization (NPPO) can apply phytosanitary actions and phytosanitary procedures against pests regulated in the country itself. Furthermore, to fulfill all prerequisites for performing phytosanitary certification in export situations, the NPPO may similarly apply *phytosanitary actions* and *phytosanitary procedures* against pests regulated in other (importing) countries in order to meet the phytosanitary import requirements of those countries. Thus, the qualifier “phytosanitary” can be used, and has been widely used, in ISPMs in relation to scenarios where the NPPO of an exporting country is *applying* procedures or actions to meet phytosanitary import requirements of an importing country as established to prevent the spread of pests regulated in that importing country, but not necessarily regulated in the country of export where such application is taking place.
- Examples of such inclusive use of the concepts and terms ‘phytosanitary procedure’ and ‘phytosanitary action’ are provided below:
    - Inspection, testing, surveillance, treatment, etc., may also be conducted to support phytosanitary certification prior to export, and in such cases, the pests of concern may not be regulated pests of the country where these activities are carried out.
    - Phytosanitary actions may be applied in relation to changes in the status of an Area of Low Pest Prevalence (ALPP), and phytosanitary procedures may be followed in relation to the establishment and maintenance of a pest free area (PFA) or an ALPP. PFA and ALPP may be used in a country to exclude or control pests regulated in that country, or to exclude or control pests regulated in another country in order to enable phytosanitary certification and thereby facilitate exports to that country.
    - In ISPM 31 (*Methodologies for sampling of consignments*), the application of various phytosanitary actions may be determined by the outcome of sampling, and sampling of consignments may be performed prior to phytosanitary certification or at import.
    - According to ISPM 45 (*Requirements for national plant protection organizations if authorizing entities to perform phytosanitary actions*), NPPOs may authorize entities to

perform phytosanitary actions on their behalf, and these phytosanitary actions can be undertaken in support of import or domestic activities (against pests regulated in the actual country) or export activities (against pests regulated in another, importing country).

- Phytosanitary procedures are followed in relation to export certification as described in ISPMs 7 (*Phytosanitary certification system*) and 12 (*Phytosanitary certificates*).

- To explicitly express the full scope of 'phytosanitary action' and phytosanitary procedure', including the aspect of pests regulated in another, importing country, the proposed additional wording is "*…or to enable phytosanitary certification*", and "*…or for enabling phytosanitary certification*" (in the definitions of "phytosanitary action" and "phytosanitary procedure", respectively). This additional wording provides conceptual focus on the scenario as seen from the perspective of the NPPO *applying* the procedures and actions.

a. "phytosanitary action" (2020-006)

The following explanatory points may be considered when reviewing the proposal:

- An NPPO may apply phytosanitary actions against pests regulated in the country itself. Furthermore, to fulfill all prerequisites for performing phytosanitary certification in export situations, the NPPO may similarly apply *phytosanitary actions* against pests regulated in other (importing) countries in order to meet the phytosanitary import requirements of those countries.
- The proposed additional wording is "*…or to enable phytosanitary certification*" which describes the scenario from the perspective of the NPPO carrying out the operations. Implicitly, this wording refers to the objective of 'meeting another country's phytosanitary import requirements', because phytosanitary certification (as per definition) can only be carried out once the exporting country is able to declare that phytosanitary import requirements have been met.
- The proposed revised definition reflects the actual use of the term 'phytosanitary action' in ISPMs. It does not conflict with and therefore does not necessitate amendments to ISPM texts.

Current definition

phytosanitary action	An **official** operation, such as **inspection**, **testing**, **surveillance** or **treatment**, undertaken to implement **phytosanitary measures** [ICPM, 2001; revised ICPM, 2005]

Proposed revision

phytosanitary action	An **official** operation, such as **inspection**, **testing**, **surveillance** or **treatment**, undertaken to implement **phytosanitary measures** or to enable **phytosanitary certification**

b. "phytosanitary procedure" (2020-007)

The following explanatory points may be considered when reviewing the proposal:

- An NPPO may apply phytosanitary procedures against pests regulated in the country itself. Furthermore, to fulfill all prerequisites for performing phytosanitary certification in export situations, the NPPO may similarly apply *phytosanitary procedures* against pests regulated in other (importing) countries in order to meet the phytosanitary import requirements of those countries.

- The proposed additional wording is "*…or for enabling phytosanitary certification*" which describes the scenario from the perspective of the NPPO carrying out the operations. Implicitly, this wording refers to the objective of 'meeting another country's phytosanitary import requirements', because phytosanitary certification (as per definition) can only be carried out once the exporting country is able to declare that phytosanitary import requirements have been met.
- Given the inclusion of 'phytosanitary' in the term itself and within both elements of the definition as 'phytosanitary measures' and 'phytosanitary certification', the current phrasing 'in connection with regulated pests' is redundant and potentially confusing, as it does not provide the immediate understanding that, with the export scenario, although the pest in question is regulated in the importing country, it may not be regulated in the exporting country where the procedure is being followed. The phrasing therefore should be deleted from the definition.
- 'An' as the introductory article of the definition is consistent with far the most Glossary definitions and is more precise than the original 'Any'.
- 'including' is changed to 'such as', consistent with wording used in the definition of "phytosanitary action" and to clarify that the examples mentioned are not exhaustive.
- The proposed revised definition reflects the actual use of the term 'phytosanitary procedure' in ISPMs. It does not conflict with and therefore does not necessitate amendments to ISPM texts.

Current definition

phytosanitary procedure	Any **official** method for implementing **phytosanitary measures** including the performance of **inspections**, **tests**, **surveillance** or **treatments** in connection with **regulated pests** [FAO, 1990; revised FAO, 1995; CEPM, 1999; ICPM, 2001; ICPM, 2005]

Proposed revision

phytosanitary procedure	An~~y~~ **official** method for implementing **phytosanitary measures** or for enabling **phytosanitary certification**, such as the performance of **inspections**, **tests**, **surveillance** or **treatments** ~~in connection with regulated pests~~