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3. DRAFT ANNEX 4: PEST RISK ANALYSIS FOR PLANTS AS QUARANTINE PESTS, ISPM 11:2004, AND CORE TEXT CHANGES TO ISPM 11: 2004: PEST RISK ANALYSIS FOR QUARANTINE PESTS INCLUDING ANALYSIS OF ENVIRONMENTAL RISKS AND LIVING MODIFIED ORGANISMS

[2] This document contains two parts:

Part 1: Proposed draft Annex 4 (*Pest risk analysis for plants as quarantine pests*) to ISPM 11:2004

Part 2: Proposed consequential changes to ISPM 11:2004, *Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms*

[3]

PART 1: PROPOSED DRAFT ANNEX 4 TO ISPM 11:2004 - PEST RISK ANALYSIS FOR PLANTS AS QUARANTINE PESTS

[4] *Note: Part 1 of the current document results in a need to make consequential changes to ISPM 11:2004 which are proposed in Part 2. In Part 1, all references to annexes or appendixes refer to ISPM 11:2004, Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms (unless otherwise indicated).*

[5]

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[6] This annex was adopted by the [Xth] Commission on Phytosanitary Measures in [Month Year].

[7]

The annex is a prescriptive part of the standard.

[8]

Draft Annex 4: Pest risk analysis for plants as quarantine pests

[9] **Introduction**

[10] This annex provides guidance for conducting pest risk analysis (PRA) to determine if a plant is a pest of cultivated plants or wild flora, whether it should be regulated, and to identify appropriate phytosanitary measures. It focuses primarily on plants proposed for import and does not cover the unintentional introduction of plants as contaminants in commodities or conveyances.

[11] The number and diversity of plants being moved between and in countries is increasing as opportunities for trade increase and markets develop for new plants. The risk of introducing new pests with plants as a pathway has long been recognized and widely regulated. However, pest risk posed by the plant species themselves or pest risk for plants in natural and semi-natural habitats requires specific consideration.

[12] *Plants as pests*

[13] Plants as pests may affect other plants through competition for limited resources, such as space, light, nutrients and water, or through parasitism or allelopathy. Plants new to an area may also become pests by hybridizing with cultivated plants or plants in the wild flora.

[14] Thus, the protection of plants as pursued through the IPPC may include considering certain plant species as pests, and taking measures to prevent their introduction and spread. Determining which species should be deemed 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. PRA should form the basis of such determination and subsequent decisions regarding possible regulation of the plant species. It should be noted that plants having undergone such analysis may also require analysis of their potential to be pathways for other pests.

[15] 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).

[16] The IPPC is concerned with pests injurious to cultivated as well as wild plants (see Annex 1 of this standard), and therefore weeds and invasive alien plants that are injurious to other plants should be considered pests in the IPPC context. Henceforth in this annex, the terms “weed” and “invasive alien plants” are not used, but only the single term “plants as pests”¹[see paragraph 72].

[17] The remainder of the text generally follows the sequence of ISPM 11:2004 with the corresponding sections of the standard indicated in parentheses. In each section, guidance is provided regarding analytical aspects particular to plants as pests.

[18] **Stage 1: Initiation**

[19] *Pre-selection*

[20] ISPM 2:2007 describes, as part of the initiation stage, a pre-selection step intended 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

having intrinsic traits such as strong competition or propagule dispersal abilities. In most cases, consideration of these factors in Stage 1 of PRA may not be sufficient to terminate the process; however, in cases where the plant is clearly 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.

[21] **Stage 2: Pest risk assessment**

[22] *Identity of the plant* (refer to section 2.1.1)

[23] The taxonomic level considered in PRA is usually the species. However, in the case of cultivated plants, higher or lower taxonomic levels may be used. The taxonomic level appropriate for conducting the PRA for a particular plant as pest should be determined by the NPPO.

[24] Some particular considerations regarding plants as pests may include the following:

- [25] - The taxonomic identity of the plant may be unclear because it has been obscured by breeding or hybridization. This is particularly relevant for plants in the horticultural trade. 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 evidence demonstrating that differences in traits are stable and significantly affect phytosanitary status. Examples may include differences in adaptability to environmental conditions, ability to exploit resources, ability to defend against herbivory or grazing/browsing, and methods of reproduction or propagule dispersal.
- The evaluation of a hybrid should be based on information specific to that taxon where available. In the absence of such information, 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 risk is deemed unacceptable, this information may form the basis of regulatory decisions.

[26] *Presence or absence in PRA area* (refer to section 2.1.1.2)

[27] 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 present in locations (e.g. botanical gardens, home gardens) that are not reported in the scientific literature. Additional sources of information to be consulted may include horticultural, agricultural, forestry and aquaculture publications.

[28] *Intended use*

[29] The PRA should be conducted considering the intended use of the plants 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.

[30] Plants for planting are generally considered of the highest risk. Examples of uses, broadly in the

order of decreasing risk, are:

- [31] - planting in the open landscape without further management (e.g. for soil erosion control, waste water treatment, aquatic plants in ponds)
- planting in the open landscape with management (e.g. in forestry, agriculture including for biofuel, horticulture)
- planting outdoors in urban areas (e.g. for amenity purposes in roadsides, parks and gardens)
- planting indoors only.

[32] Other intended uses may be considered, including human consumption or animal feed, processing or combustion for energy production. For example, spillage of grain intended for processing may lead to unintended growth of plants as pests.

[33] *Habitats and intended locations*

[34] Plants imported for planting may be destined for a particular planting location (which may be termed as the “intended location”). However, the probability that the plants may spread to and establish in other unintended locations in the PRA area of the same or another habitat type should be assessed. The assessment should consider the suitability of all habitat types in the entire PRA area, and the extent of suitable habitats be determined in order to identify the endangered area.

[35] The analysis of suitable habitats is analogous to the analysis of host plants (in the rare case of parasite plants, both host and habitat need to be considered). The guidance provided in section 2.2.2 (and its subsections) of this standard can generally be used, substituting the term “host” or “host range” for “suitable habitat”.

[36] If the plant already occurs in parts of the PRA area, the locations and types of habitats where it occurs should be described, noting whether the locations are intended or unintended.

[37] *Probability of entry* (refer to section 2.2.1)

[38] For imported plants, the probability of entry need not be assessed. However, to assess the likelihood of unintended establishment and spread and to identify possible risk management options, an estimation of the volume, frequency and destinations of prospective imports may be needed.

[39] *Historical evidence of pest behaviour*

[40] The most reliable predictor of establishment, spread and potential economic consequence is the history of pest behaviour in other areas with similar habitats. Where a history of pest behaviour is documented the assessment should use this information, noting whether the habitat and climate conditions are sufficiently similar in the PRA area. However, a plant may never have been moved out of its native range where it may be controlled by naturally occurring pests. In such cases, no historical evidence exists of establishment, spread or consequences.

[41] *Probability of establishment* (refer to section 2.2.2)

[42] In all cases, the assessment of the probability of establishment, should, as for other pests, consider the suitability of the climate, other abiotic and biotic factors (see section 2.2.2.2) and cultural practices (see section 2.2.2.3) in habitats within the PRA area based on habitats in which the plant currently occurs. Subject to information availability, the following may be incorporated:

- [43] - *climate*: suitability of current and future projected climates
- *other abiotic factors*: soil characteristics, topography, hydrology, fire regime etc.
- *biotic factors*: current vegetation, degree of disturbance, presence or absence of natural enemies and competitors
- *cultural practices in crops/managed plant communities*: herbicide usage, harvesting, soil cultivation, fire etc., including side-effects such as aerial deposition of nitrogen or pesticides.

[44] The assessment should also consider intrinsic traits of the plant that may predict establishment and spread (refer to section 2.2.2.4). This is particularly important where history of pest behaviour is not well documented. Traits to be considered may include:

- [45] - *reproductive traits*: sexual and asexual mechanisms, dioecism, self-compatibility, reproduction frequency, generation time
- *adaptive potential (of individuals and populations)*: genotypic or phenotypic plasticity, hybridization potential
- *propagule attributes*: volume and viability, dormancy
- *tolerance/resistance*: response to herbicides, grazing and other actual cultural practices, drought, salinity.

[46] 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 opportunistic strategy. Disturbed habitats are common; therefore plants with such adaptations will encounter relatively more opportunities for establishment and spread.

[47] *Probability of spread* (refer to section 2.2.3)

[48] The likelihood and extent of spread from intended to unintended locations depends on natural and human-mediated factors. These factors include:

- [49] - intrinsic traits of the plant species (in particular regarding reproduction, adaptation and propagule dispersal)
- existence of natural vectors (birds and other animals, water and wind)
- existence and spatial pattern of suitable habitats and dispersal corridors connecting them.

[50] Human-mediated factors may be intentional or unintentional. The probability of intentional spread by human agency depends mainly on:

- [51] - intended use of the plants
- desirability and economic value of the plants
- ease of transport of the plants
- public awareness about the risk associated with plants as pests.
- [52] The probability of unintentional spread by human agency depends mainly on:
- [53] - probability that propagules will adhere to clothing, vehicles, machinery, tools, equipment
- probability that propagules will be a contaminant of other products or material.
- [54] There are often long time lags between an initial plant 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. Possible reasons for the time lag include:
- [55] - changes in climate (such as warmer climate or changes in precipitation patterns)
- changes in other abiotic factors (e.g. an increase in aerial deposition of nitrogen or sulphur)
- changes in the genetic profile of the plant species (through natural selection, genetic drift etc.)
- 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.
- [56] *Assessment of potential economic consequences* (refer section 2.3)
- [57] Plants as pests, like other pests, can have a variety of direct and indirect economic consequences, including environmental consequences. These may include yield losses or reduction of biodiversity and effects on other ecosystem components. Plants as pests may have broad agricultural, environmental and social consequences that may be non-specific and not readily apparent (e.g. changes of nutrient concentration in the soil). For this reason, evaluation of consequences of plants as pests may be inherently difficult because it requires consideration of consequences that are not easily quantified. It is important to consider the long-term consequences for all locations in the PRA area, including where the plants were intentionally planted.
- [58] As for establishment and spread, 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 not 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 traits that predict pest potential, such as those discussed above and in section 2.2.2.4 related to establishment and spread.
- [59] As for any type of organism, if the risk assessment determines the plant species represents an unacceptable risk, the PRA may continue with the analysis of risk management (Stage 3).

[60] **Stage 3: Pest risk management (refer to section 3.4)**

[61] Plants for planting will usually be introduced into environments suitable for their growth and establishment. In such cases, most risk management options would be counterproductive to the intended use. In general, for plants for planting that have the characteristics of quarantine pests, the most effective risk management option may be prohibition (refer to section 3.4.6). However, those plants as a commodity may at the same time have a perceived benefit that may be considered in the decision process following the PRA.

[62] For specific situations, other pest risk management options may be pursued, including:

- [63]
- requirements for growing of plants under confinement
 - requirements for harvesting of plants at a certain stage or specified time to prevent opportunities for reproduction
 - restriction of plants to particular localities, such as those that are marginally suitable
 - restrictions on the disposal of excess or waste plant material
 - other restrictions on sale, holding, transport or planting
 - codes of conduct for sale, holding, transport or planting, e.g. in the form of internal rules within the plant industry to refrain from or restrict the selling of particular plants.

[64] For plants imported for consumption or processing, risk management options may include restrictions on transport, storage, locations, sale, seasonality and requirements regarding the processing or treatments.

[65] In identifying risk management options, the suitability of control measures, ease of access to the plants, time needed for effective control and difficulty of containment should be considered. For example, plants in highly managed systems such as cropping systems are 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.

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

[67] **Aspects common to all PRA stages**

[68] *Risk communication* (refer to ISPM 2:2007)

[69] Plants intentionally introduced for planting may not be perceived as a threat by the public, or by particular stakeholders, who may perceive plants as purely beneficial. Furthermore, in some countries differing legislation or authorities may be involved in regulating various plants as pests. Therefore, risk communication may be particularly important in relation to plants as pests.

[70] Risk communication may include for example:

- [71] - consultation with importers and other governmental and non-governmental organizations (e.g. environmental protection agencies, parks departments, nurseries, landscapers) to exchange information on plants as potential pests
- publication of lists of plants as regulated pests
 - labelling of plants in commerce, e.g. explaining the pest risk the plants may pose and under which conditions the pest risk may occur.

[72] [Footnote from paragraph 16]: 1 Invasive alien plants, in the CBD sense, are plants introduced by human agency and threatening biodiversity (see ISPM 5, Appendix 1 (2009)). 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, whereas other countries use the term “noxious weed”, “landscape weed”, “environmental weed” or similar terms to distinguish from weeds affecting crops only.

[73]

PART 2: PROPOSED CONSEQUENTIAL CHANGES TO ISPM 11:2004

[74] In Part 2, all references refer to ISPM 11:2004 (unless otherwise indicated) and references to Annex 4 refer to Part 1 (proposed Annex 4).

[75]

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[76]

ISPM 11: PEST RISK ANALYSIS FOR QUARANTINE PESTS INCLUDING ANALYSIS OF ENVIRONMENTAL RISKS AND LIVING MODIFIED ORGANISMS

[77]

1. In ENDORSEMENT, add at the bottom as new paragraph:

[78] Annex 4 on pest risk analysis for plants as quarantine pests, together with associated changes in the core text of the standard, was adopted by the [Xth] Commission on Phytosanitary Measures in [Month, Year].

[79]

2. In SCOPE, add at the bottom as new paragraph:

[80] More detailed guidance on PRA for plants as pests is provided in Annex 4.

[81]

3. In REFERENCES, add following references:

[82] ISPM 2. 2007. Framework for pest risk analysis. Rome, IPPC, FAO.

ICPM. 2001. Report of the Third Interim Commission on Phytosanitary Measures, Rome, 2-6 April 2001. Rome, IPPC, FAO.

ICPM. 2005. Report of the Seventh Interim commission on Phytosanitary Measures, Rome 4-7 April 2005. Rome, IPPC, FAO.

[83]

4. In Section 1.4 Conclusion of initiation, add at the bottom as new paragraph:

[84] More detailed guidance on PRA for plants as pests is provided in Annex 4.

[85]

5. In Section 1.1 Initiation points, paragraph 2, sentence 5, modify as follows:

[86] In addition, many organisms indirectly affecting plants also satisfy this definition (such as weeds/invasive plants as pests, e.g. weeds, invasive alien plants).

[87]

6. In Section 2 Stage 2: Pest Risk Assessment, add at the bottom as new paragraph:

[88] More detailed guidance on pre-selection of plants as pests is provided in Annex 4.

[89]

7. In Section 2.1.1.1 Identity of pest, after paragraph 2, add as new paragraph:

[90] More detailed guidance on the consideration of identity of plants as pests is provided in Annex 4.

[91]

8. In Section 2.1.1.2 Presence or absence in PRA area, after paragraph 1, add as new paragraph:

[92] More detailed guidance on the consideration of presence or absence of plants as pests is provided in Annex 4.

[93]

9. In Section 2.2 Assessment of the probability of introduction and spread, paragraphs 4–7, modify as follows:

[94] SI With respect to a plant being assessed as a pest with indirect effects, wherever a reference is made to a host or a host range, this should be understood to refer instead to a suitable habitat^{3[please see paragraph 132]} ~~(that is a place where the plant can grow)~~ in the PRA area.

[95] ~~SI The intended habitat is the place where the plants are intended to grow and the unintended habitat is the place where the plants are not intended to grow.~~

[96] ~~SI In the case of plants as pests to be imported, the concepts of entry, establishment and spread may have to be considered differently.~~

[97] ~~SI For pPlants for planting that are proposed for imported will enter and then, the probability of entry need not be assessed. Following import, the plants may be planted and maintained in an intended ~~habitat~~ location, probably in substantial numbers and for an indeterminate period. Accordingly, Section 2.2.1 on Entry does not apply. The risk arises because of the ~~probability~~ possibility that the plant may spread from the intended ~~habitat~~ location to unintended ~~habitats~~ locations within the PRA area, and then establish in those ~~habitats~~ there. Accordingly, section 2.2.3 may be considered before section 2.2.2. ~~Unintended habitats may occur in the vicinity of the intended habitat in the PRA area.~~~~

[98] ~~SI Imported plants not intended to be planted may be used for different purposes (e.g. used as bird seed, as fodder, or for processing). The pest risk of plants as pests proposed for import for intended uses other than planting arises because of the probability that the plants may escape or be diverted from the intended use to an unintended location ~~habitat~~ and establish there.~~

[99] More detailed guidance on the consideration of habitats and unintended locations for plants as pests is provided in Annex 4.

[100]

10. In Section 2.2.1 Probability of entry of a pest, paragraph 3, modify as follows:

[101] ~~SI The probability of entry need not be assessed for plants that are proposed for import. In the case of plants to be imported, the plants will enter and an assessment of probability of entry will not be required. Therefore this section does not apply. However, the probability of entry needs to be assessed for this section does apply to pests that may be carried by such plants (e.g. contaminating weed seeds carried with seeds imported for planting).~~

[102] More detailed guidance on the probability of entry for plants as pests is provided in Annex 4.

[103]

11. In Section 2.2.2 Probability of establishment, paragraph 3, modify as follows:

[104] ~~SI In the case of plants to be imported as pests, the assessment of the probability of establishment concerns the establishment in unintended locations ~~unintended habitats~~.~~

[105] More detailed guidance on the probability of establishment, including considerations on the intended use, of plants as pests is provided in Annex 4.

[106]

12. In Section 2.2.3 Probability of spread after establishment, paragraph 2, modify as follows:

[107] *SI* In the case of plants ~~to be imported as pests~~, the assessment of spread concerns spread from the intended location ~~habitat~~ or the intended use to an unintended locations~~habitat~~, where the plant pest may establish. Further spread may then occur to other unintended ~~habitats~~ locations.

[108] More detailed guidance on probability of spread after establishment, including considerations on the intended use, of plants as pests is provided in Annex 4.

[109]

13. In Section 2.3 Assessment of potential economic consequences, after paragraph 2 add as new paragraph:

[110] More detailed guidance on potential economic impact of plants as pests is provided in Annex 4.

[111]

14. In Section 2.3.1 Pest effects, paragraph 2, modify as follows:

[112] *SI* The basic method for estimating the potential economic importance of pests in this section also applies to:

- [113] - pests affecting uncultivated/unmanaged plants
- plants as pests ~~and~~
- pests affecting plants through effects on other organisms.

[114]

15. In Section 2.3.1 Pest effects, paragraph 4, modify as follows:

[115] *SI* In the case of plants for planting ~~to be imported for planting~~ that may be pests, the long-term consequences even for the intended location ~~habitat~~ may be included in the assessment. Planting may affect further use or have a harmful effect on ~~the intended~~ that habitat~~location~~.

[116]

16. In Section 2.3.1 Pest effects, paragraph 5, sentence 3, modify as follows:

[117] For example, a ~~minor weed~~ plant that is a minor pest may be significantly allergenic for humans or a minor plant pathogen may produce toxins that seriously affect livestock.

[118]

17. In Section 3. Stage 3: Pest Risk Management, add at the bottom as new paragraph:

[119] More detailed guidance on pest risk management for plants as pests is provided in Annex 4.

[120]

18. In Section 3.4 Identification and selection of appropriate risk management options, paragraph 2, indent 2, modify as follows:

[121] - **weeds and/or invasive** plants as pests and

[122]

19. In Section 3.4.1 Options for consignments, paragraph 3, modify as follows:

[123] SI The concept of consignments of pests may be applied to the import of plants ~~considered to be~~ as pests. ~~These consignments~~ Import may be restricted to species or varieties posing less risk.

[124]

20. In Section 3.4.5 Options within the importing country, paragraph 2, modify as follows:

[125] SI For plants ~~to be imported as pests~~, where there is a high level of uncertainty regarding pest risk, it may be decided not to take phytosanitary measures at import, but only to apply surveillance or other procedures after entry (e.g. by or under the supervision of the NPPO).

[126]

21. In Section 3.6 Conclusion of pest risk management, add at the bottom as new paragraph:

[127] More detailed guidance on risk communication for plants as pests is provided in Annex 4.

[128]

22. In Annex 1 Comments on the scope of the IPPC in regard to environmental risks, paragraph 1, sentence 2, modify as follows:

[129] The coverage of the IPPC definition of pest includes ~~weeds~~ plants as pests, and other species that have indirect effects on plants, and the Convention applies to the protection of wild flora.

[130]

23. In Annex 1 Comments on the scope of the IPPC in regard to environmental risks, paragraph 1, indent 2 (“indirectly affect plants”) commentary, modify as follows:

[131] In addition to pests that directly affect host plants, there are those like most ~~weeds/invasive~~ plants as pests, which affect plants primarily by other processes such as competition (e.g. for cultivated plants: Canada thistle (*Cirsium arvense*) [~~weed of agricultural crops~~], or for uncultivated/unmanaged plants: Purple loosestrife (*Lythrum salicaria*)). [~~competitor in natural and semi-natural habitats~~].

[132] [see paragraph 94]: 3. In the case of organisms that affect plants indirectly, through effects on other organisms, the terms host/habitat will extend also to those other organisms.