

Part C: Additional guidance notes to fill out PRA templates 1-4

General guidance

1. Citations

Add citations for every statement you make. Throughout the rapid PRA, every statement made should be supported by providing the original sources. Direct links to websites can be embedded into the text, but it is advisable to also include them in the reference section at the end of the PRA, citing the title of the website and authors whenever possible. When providing website links in the reference list, please also provide the date when it was accessed. Reference publications (journals, book) in the text by providing the author(s) surname and year of publication immediately after the sentence, or at the end of the paragraph if the whole paragraph is based on the cited source (e.g. Stevens, 2015). Give the full reference in alphabetical order at the end of the PRA. No specific citation style is required, as long as the information is sufficient to trace the source.

2. Likelihood and confidence levels

2.1 Assessing likelihood

Each level of the risk assessment requires an assessment of “likelihood”, and this can be very subjective. Confidence in making these decisions only comes with experience, and it is unlikely that requests for PRAs on the individual Territories will be received often enough to generate that experience. Note that countries such as the UK, Australia and New Zealand have teams of people dedicated to PRAs alone, who have access to an extensive network of taxonomic experts, and also have funding to support meetings and specific research into key areas.

As a rule of thumb, a lack of available data on a pest or disease implies that the species is not of major concern; serious pests and diseases inevitably receive a lot of attention. This interpretation of sparse data should be verified by consultation with local or international experts.

Essentially, the PRAs can be divided into two categories:

- Easy: sufficient data is available, and/or there is clear evidence of the risk profile. Decisions of likelihood can be made with a relatively high level of confidence.
 - Complete the PRA as well as possible and make a recommendation
- Difficult: limited data is available in key areas, and/or there is conflicting evidence of the risk profile. There is relatively low confidence in the decisions.
 - Reject the commodity through the precautionary principle, OR
 - Contract appropriate expertise to carry out the PRA, such as Fera Science Ltd, UK

2.2 Confidence levels

Throughout the PRA templates, confidence levels (low, medium, high) should be provided for all assessment summaries. Currently there aren't any strict definitions for such confidence levels, and they're not meant to be measurable in a mathematical/statistical sense. They are solely there to provide a rough estimate as to what degree the authors of the PRA believe (based on the information)

that their assessment summaries are correct. They will, of course, always contain a level of speculation. As a rough guide, follow the bullet points below:

Low confidence

- Little background information (published or reported) is available to back up your assessment.
- Due to a lack of information, the assessment is based on species with a similar ecology but which are not very closely related to the target species.

Medium confidence

- Either some information is available that directly relates to the target species, or plenty of information regarding closely related species (whose ecology and behaviour are likely to be similar to the target species) is available.

High confidence

- Background information for your assessment is readily available.
- Available information is consistent and not contradictory.
- Clear facts increase confidence levels (example: we can say with high confidence that a frost intolerant perennial plant won't establish in a territory where winter temperatures regularly drop below freezing).

3. Stakeholders

For all PRAs (including Category 3 commodities) it is recommended that a small consultation group is formed consisting of appropriate stakeholders, who can discuss the results before a recommendation is made. Stakeholders may be, for example, representatives of government departments for agriculture, the environment or conservation, or local farmer or importer associations, etc. It is very important to involve relevant key stakeholders, as decisions made on the basis of agricultural risk only may ignore those affecting conservation values, and vice versa.

For any Category 1 or 2 commodities judged as particularly high risk, controversial or where limited data is available, consultation with a multi-sector group is also recommended.

4. Timescale

It takes time to collect all the information, consult stakeholders and complete the assessment. For the application of planned imports, it is recommended that a response is given within 6 months. This response could be:

- That the commodity may be imported, with no conditions attached;
- That the commodity may be imported, subject to specified conditions to mitigate identified risks;
- That the commodity may not be imported due to its risk profile, giving reasons;
- That the PRA for the commodity can't be completed, giving reasons, and the commodity may not be imported at the present time. Funding may need to be secured for an experienced consultant.

Guidance to specific parts of the PRA templates

Part 1: Initiation

1.3 Source of material (only templates 1 and 2)

Each source country represents a separate pathway. Generally, this implies that for each source country, a separate PRA has to be conducted. However, under specific circumstances, a summarised PRA may be the only option. For example, if the territory wants to explore the option of importing a new, specific commodity/plant/etc. but the source country is yet to be identified, a more generic PRA can provide very valuable information: this would support a decision on whether to proceed with further steps towards the import of this commodity, or whether to reject the idea at an early stage. One example is the case study PRA on imports of palm trees to St Helena (Annex 3).

Part 2: Background

2.4 Existence of PRAs for this species (all templates)

As well as searching directly for existing PRAs for a specific species using internet search engines, there are also some useful websites to check out for existing PRAs:

- Australian Government, Department of Agriculture (<http://www.agriculture.gov.au/biosecurity/risk-analysis>)
- CABI Crop Protection Compendium (<https://www.cabi.org/cpc/> and <https://www.cabi.org/cpc/pest-risk-analysis/>) (currently more advice on conducting PRAs than a repository of PRAs)
- CABI Invasive Species Compendium (<https://www.cabi.org/isc/>)
- DEFRA (<https://planthealthportal.defra.gov.uk/data/priority-pests/pr-a-available>) (currently 140+ PRAs available)
- EPPO Platform on PRAs (<https://pra.eppo.int/>) (currently most comprehensive and up to date platform)
- Fera Science Ltd (<https://www.fera.co.uk/>) (currently more advice on PRA conduct than repository of PRAs)
- GBNNSS (<http://www.nonnativespecies.org/factsheet/index.cfm>)
- USDA (https://www.aphis.usda.gov/aphis/ourfocus/planthealth/import-information/commodity-import-approval-process/CT_Pralist)

2.6 Biology/Ecology

If information on a newly emerging invasive (e.g. *Mytilus edulis*) is sparse, information on biology, invasiveness, impact and control should draw on closely related other species, and one should collate information about these as long as there is no indication that the target species would behave significantly differently.

Part 3: Risk of accidental introduction, establishment and spread

General notes for part 3:

Please provide a short discursive description for all questions wherever possible, not only answering with 'yes' or 'no' (see example PRA for *Tuta absoluta* in Annex 3). Please note that 'human interference' mostly refers to: plants that require horticultural attendance for survival; or pests that can only survive in human assisted environments (e.g. polytunnels greenhouses etc.). It does not, however, apply to human parasites such as mosquitos.

3.1 Probability of entry/introduction

Consideration should be given to: speed and conditions of transport (including treatments performed during transport); vulnerability of the life-stages likely to be transported (for plants, the viability of seeds or other propagules; for all pests, their tolerance of low or elevated temperatures); whether the life cycle is of sufficient duration to extend beyond the time in transit; the intended use of the commodity (e.g. consumption, planting); any pre-shipment phytosanitary measures already in place that may be efficient against the pest; seasonal timing appropriate for the pest to be associated with the pathway at origin.

3.1.4 What is the probability of the pest being associated with the pathway(s) at origin? (only template 3)

With regards to association with pathways, each pathway has to be treated separately and if in doubt, maximum risk should always be assumed.

Please indicate here whether the target species is highly unlikely, unlikely, likely, or highly likely to be associated with each individual pathway. Examples are given below for different major groups:

Plants:

Pathway example: Lawn seed mixture

- Highly unlikely for plants that are only known to spread vegetatively (e.g. *Fallopia japonica*).
- Unlikely for plants having larger seeds (e.g. *Impatiens glandulifera*).
- Likely for plants with small seeds that are not typically associated with grassland habitats.
- Highly likely for typical pasture weeds that produce small seeds.

Terrestrial invertebrates:

Pathway example: Sterilised compost, stored openly for some time prior to shipment

- Highly unlikely for slow moving invertebrates normally not associated with soil (e.g. most scale insects).
- Unlikely for larger invertebrates not associated with soil habitats (e.g. locusts, mantis etc.).
- Likely for invertebrates associated with soil but slow moving and avoiding dry conditions (smaller snail species, springtails).
- Highly likely for fast moving invertebrates preferring to hid in dark moist places and/or associated with soil (e.g. earwigs, spiders, centipedes, millipedes).

Marines:

Pathway example: Ballast water

- Highly unlikely for species where no comparably small life stage is associated with open waters (e.g. turtles, sea snakes).
- Unlikely for species not associated with open waters and no small life stages specifically adapted to disperse through drift in open water (e.g. some fish and crustaceans of coastal habitats).
- Likely for invertebrates associated with open water but that are generally rare in areas where ballast water is taken on.
- Highly likely for the majority of marine species with small life stages that are specifically adapted to disperse by drifting in open waters (e.g. jellyfish, many small crustaceans etc.).

3.1.7 What is the probability of transfer from entry point to a suitable host or habitat? (only template 3)

At the point of entry, the environment is often hostile for many accidentally introduced species. For example, the hostile and mostly dry environment often surrounding harbour facilities is not conducive to allowing species adapted to moist forest habitats and with low dispersal rates (such as small snails) to reach suitable habitats, which only occur in the centre of the island, to establish. For marine species, a similar situation may occur when, for example, the target species requires a shallow sandy seabed for survival but this habitat is not present in the area where ballast water is discharged or where boats are anchoring.

3.1 in template 1 and 2; 3.2 in template 3 (Probability of establishment)

In order to estimate the probability of establishment of a species, reliable biological information (life cycle, host range, survival etc.) should be obtained from the areas where the pest currently occurs. The situation in the PRA area can then be compared with that in the areas of current distribution. For a pest to establish, it must find host plants or a suitable habitat. Natural hosts should be of primary concern but, if such information is lacking, plants which are recorded as hosts only under experimental conditions or accidental/very occasional hosts may also be considered. The pest must also find environmental conditions suitable for its survival, multiplication and spread, either in natural or in protected conditions. Examples of the factors to consider are:

- availability, quantity and distribution of hosts in the PRA area
- environmental suitability in the PRA area
- potential for adaptation of the pest
- reproductive strategy of the pest
- cultural practices and control measures

When the PRA is considering plants to be imported, the assessment of the probability of establishment concerns the unintended habitats.

Factors in the environment (e.g. suitability of climate, soil, pest and 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 and separate effects on the pest, its host and its vector. This needs to be recognized, in order to determine whether the interactions between these organisms will be different in the PRA area, either to the benefit or detriment of the pest. The probability of establishment in a protected environment, e.g. in glasshouses, should also be considered.

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

Other characteristics of the pest that could affect the probability of establishment include the reproductive strategy of the pests (e.g. parthenogenesis/self-crossing), genetic adaptability, and the minimum population needed for establishment. Detailed data covering such characteristics are often not available, and their assessment is beyond the scope of a rapid PRA.

As a rough guide, follow the descriptions below for the summary assessment:

- Very unlikely: A species (cultivar), which normally only survives through human intervention (many cultivars), or a pest, for which no suitable host is known from the territory; climatic conditions, which don't allow the survival of some seasons (winter frost, summer heat/dryness etc.).
- Unlikely: A species which only rarely escapes from cultivation and can only become temporarily established. As an example, the species might occasionally survive mild winters, but generally the climatic conditions wouldn't allow a long-term self-sustaining establishment.
- Moderately likely: For example, species known to frequently occur outside of cultivation, which can build up temporary populations, normally perishing again, but which, over time, may have a chance of becoming permanently established through long-term adaptation.
- Likely: At least some parts of the territory provide conditions (climate, hosts) that fall within the range of the species' ecology, and are therefore suitable for it to establish. Examples from other invaded areas with similar setups are often available.
- Very likely: Conditions and host availability matching the biological requirements of the species very well. Examples from other invaded areas with similar setups are often available.

Please make sure that the text in boxes above fit your summary assessment.

3.2.1 (template 1); 3.3.1 (template 3) What is the potential spread in the territory, outside cultivation? In this context, spread is defined as the capacity to disperse and to establish at previously uninvaded places. It does not refer to the increase in abundance in a place where the species is already established.

Natural population spread, increasing the infested area, can result from the movement of the pest by flight (of an insect), wind or water dispersal, transport by vectors such as insects, birds or other animals (internally through the gut or externally on the fur), natural migration, rhizome growth. Consider human mediated dispersal; the presence of natural barriers; suitability of the environment (climate and habitat match). With ornamental plants, consider human aided spread within gardens throughout the territory.

Under ‘how rapidly would the organism spread by natural means?’ you should give a short discursive answer, back up with references whenever possible. For example, the answer could be phrased: “Spread is likely to be slowly/rapidly/etc., because of...”

3.2.3 If transmitted by vectors, what is the likelihood of suitable vectors being available? (only template 3)

Please only consider biological vectors for this question. In the vast majority of cases these will be insect vectors transmitting plant, animal or human diseases. Less likely is that arthropod pests such as mites need to be transported between hosts by insect vectors. Define this likelihood in the context of a broad range of different invasive species.

Part 4: Economic and environmental risks/effects of target species/product

4.1.2 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution?

Consider: Is any new animal or plant species proposed for import known to be a pest or weed anywhere else with a comparable climate, latitude and ecosystem characteristics?

4.2 to 4.5 Assessment of the potential for negative impact in the territory

Consider the presence of plants and animals known to be impacted by the pest, their extent, and importance to the island. Climatic and cultural conditions should be considered to decide whether important economic, environmental or social damage may occur.

4.2 Economic and socioeconomic impacts

Is the species known to cause economic damage? There should be clear indications that the pest is likely to have an unacceptable economic impact. Damage could be to agriculture, forestry, tourism, or fisheries.

Summary of economic and socioeconomic impacts (all templates)

Note: We are only asking for estimates in this summary section. More precise predictions, including absolute amounts of economic costs or percentage of population impacted on, referenced with evidence, would be desirable but are beyond the scope of a rapid PRA. However, if major concerns remain regarding the forecast of economic and socioeconomic impacts this can lead to a suggestion to scale up to a full PRA.

Guidance to impact levels:

- Very small: No negative impact expected at all, or a negligible level (most likely unmeasurable).
- Small: Impact would be small enough not to significantly affect people’s lifestyle or income, but impact may become noticeable or measurable over time (e.g. farmers needing to spend a small but noticeable amount of time weeding an introduced weed in their field; pest

symptoms become visible on crop plants, but there is no significant loss of yield or decrease of product quality, and no change in crop treatment is necessary).

- **Medium:** Significant negative impacts, which would lead to some small but measurable income losses and require adaptation to working procedures, such as new crop protection measures. Impact is, however, still small enough not to lead to job losses.
- **Large:** Negative impact would be large enough to significantly change traditional ways of lives (e.g. change of agricultural methods). Highly likely to lead to some job losses and some changes in the overall economy.
- **Very large:** Risk that the negative impact could threaten the economy or food security for the entire territory (change of employment rates).

4.3 Is there likely to be an impact on human health or wellbeing?

Consider if the pest is a vector for a human disease or parasite; is known to cause allergies; can reduce amenity values; can reduce aesthetic values; is a public health pest.

Summary of public health impact

Guidance to impact levels:

- **Very small:** No negative impact expected at all, or a negligible level (most likely unmeasurable).
- **Small:** Impact would be small enough not to significantly affect people's lifestyle or income, but impact may become noticeable or measurable over time (e.g. there may be a few reports of people being bitten or stung by a newly introduced arthropod, but with no risk of disease transmission or allergic reactions).
- **Medium:** Significant negative impacts, but still restricted to a new species becoming a nuisance rather than a real threat to health. For example, an overall increase of mosquito bites occurring after the introduction of a new species. Sometimes an adaptation to the current lifestyle is required to address the negative impacts (e.g. use of insect repellents, installation of fly screens etc.); rare occurrence of allergic reactions to bites or stings.
- **Large:** Negative impact would be large enough to pose a significant new threat to health, such as the regular occurrence of potentially life-threatening allergic reactions to bites/stings. Measurable increase in costs required for the control of a new pest in order to avoid negative health impacts.
- **Very large:** Threats to life are likely to occur, at least long-term. For example, the introduction of a vector of potentially life-threatening diseases, even if the disease itself hasn't arrived in the territory yet. Impact on human health, which may lead to changes to the current lifestyle (e.g. change of agricultural methods because a new weed produces allergenic pollen).

Summary of animal health impact

Guidance to impact levels:

- **Very small:** No negative impact expected at all, or at a negligible level (most likely unmeasurable).

- Small: Impact small enough not to significantly affect livestock or pet health, but impact may become noticeable or measurable over time (e.g. reports that livestock gets bitten or stung by a newly introduced arthropod, but with no risk of disease transmission).
- Medium: Significant negative impacts, but still restricted to a new species becoming a nuisance rather than a real threat to animal health. For example, an increase of mosquito bites after the introduction of a new species, which leads to changing behaviour of livestock, but doesn't reduce productivity. Sometimes an adaptation to the current lifestyle is required to address the negative impacts (change in pasture management; keeping pets indoors at certain times of the day etc.); rare occurrence of allergic reactions by animals to bites or stings.
- Large: Negative impact would be large enough to pose a significant new threat to animal health, such as the regular occurrence of potentially life-threatening allergic reactions to bites/stings. Measurable increase in costs required for the control of a new pest in order to avoid negative animal health impacts.
- Very large: Threats to life are likely to occur, at least long-term. For example, the introduction of a vector of potentially life-threatening diseases, even if the disease itself hasn't arrived in the territory yet. Impact on animal health, which may lead to changes to the traditional ways of lives (e.g. some livestock can't be reared, or at least not in a profitable way anymore; livestock and/or pets dying from the impact of the newly arrived species).

4.5 Environmental and ecosystem effects

Is the species known to cause environmental damage? There should be clear indications that the pest is likely to have an unacceptable environmental impact. Damage could be genetic, direct, or through habitat transformation, pest or disease introduction.

4.5.1 Are there any threats to native or endemic species? (all templates)

Please consider that the threat posed to native and endemic species not only relates to top-down impacts within a food chain (e.g. predatory invasives feeding on endemic invertebrates) but that direct competition can pose an equally significant threat. Therefore, it is important to consider the affinity of the target species to native species in your territory. The more closely related any native species is to the target species, the higher the threat of direct competition between them, and the more difficult the eradication or control efforts (e.g. biological control) will be.

4.5.2 What is the level of potential negative impact on ecosystem services in the PRA area (all templates)

In many cases it is important to consider pollination here. Will the target PRA species impact on pollination or other pollinators (via competition or predation) in natural or semi-natural ecosystems? If the target species is a pollinator itself it may have an indirect impact on introduced plant species, and in certain circumstances it could cause a specific introduced plant species to become invasive, through increased levels of seed setting. These questions may be relevant not only to species that can be accidentally introduced but also for some planned introductions (e.g. pollinators planned to be introduced for crop pollination in greenhouses). Ornamental plants planned to be introduced may impact directly on native pollinators and indirectly on the pollination of native plants by changing the behaviour of the native pollinators and attracting them away from native plants.

Summary of environmental impact

Guidance to impact levels:

- **Very small:** No negative impact expected at all, or at a negligible level (most likely unmeasurable).
- **Small:** Impact small enough not to significantly affect biodiversity or ecosystem services, but impact may become noticeable or measurable over time (e.g. reports it causes that some native species decline, but not to a degree that has knock-on effects, or that the affected species becomes threatened).
- **Medium:** Significant negative impacts, but restricted to only a single or few native species, with little or no secondary impacts on whole systems or ecosystem services. Sometimes specific measures would be required to prevent the impact becoming larger over time, and to prevent a severe decline in specific native species.
- **Large:** Negative impact would be large enough to pose a significant new threat to native or endemic species. Some species may become threatened with extinction. Significant impacts on ecosystem services is possible, posing secondary threats to other native or endemic species not directly affected by the target species. Significant costs would be required for the control of the new pest to avoid irreversible changes to local ecosystems.
- **Very large:** Threats that would irreversibly change the whole local ecosystem, with the loss of native and endemic species likely and unpreventable. Ecosystem services (water supply, pollination of crops etc.) changed negatively and irreversibly.

Part 5: Pest risk management

General notes:

For each pest, weed and disease identified as a concern, an assessment of the acceptability of risk is carried out in Part 5.

Identification of appropriate risk management options for each pest, weed and disease of concern, separated into pre-border, at the border and post-border options:

- **Pre-border:** production in a sterile environment, phytosanitary certificates based on pre-shipment inspections, packaging that prevents contamination, any other regulation such as pesticide treatments, heat treatments and fumigation taking place before or during shipment. *(Is the pest or are symptoms of the disease visible by inspection? Are inspections of the growing plant required, or can they be done at the point of export?)*
- **At the border:** Inspections and treatments *(Is the pest or are symptoms of the disease visible by inspection? Does the inspection take place in an environment where escape and survival of pests is of low risk? Are there any treatments (e.g. pesticide sprays, heat treatments etc.) which remove or reduce the risk of live organisms in the commodity?)*
- **Post-border:** Options for containment and eradication *(Are there any treatments (e.g. pesticide sprays) which can be done post-border? How easy is the pest, disease or weed to detect and manage?)*

Evaluation of risk management options: Consider: how reliable are the various mitigation options in reducing the risk? What is the confidence in the biosecurity systems of the exporting countries?

5.1.1 What mitigation measures can be put in place if the imported species becomes invasive and starts to impact negatively on the economy and/or environment? (templates 1 and 2)

Please keep in mind that any mitigation measures for planned introductions should include plans to address accidental introduction of associated species (or groups of ecologically similar species, such as mealybugs or thrips).

5.2.1 What species are reported to be associated with the target import?

Through literature research and/or conducting an online PRA for your target species/commodity, generate a list of associated species (mainly pests and diseases) which are not yet present in the territory, and include a list of these species in the section 5.2.1. If available, provide and reference additional information that links these species to the target commodity.

5.2.4 Are there any species listed or described in 5.2.1 which are not covered by existing prevention measures, the pathway action plan or feasible new measures as listed in 5.2.3?

List all associated species not covered by existing or feasible new biosecurity measures. If there are any, this will most likely lead to a sentence in the summary that states that current prevention measures are not sufficiently effective. This will either lead to the rejection of the import application, or a suggestion to assess the species in question in more detail through a separate rapid PRA using template 3. As a rough guide for the likelihood that control measures will be effective in preventing introduction and establishment, follow the directions/examples below for the summary assessment.

- Very unlikely: Some life-stages of the target species are so difficult to detect that inspections are not effective. Species are very commonly intercepted but only spot-check inspections are possible. Also includes species that can reach the territory unaided by humans (wind drift, driftwood etc.)
- Unlikely: For example, species that can easily be detected during inspections and that are not commonly intercepted, but only spot-check inspections are possible.
- Moderately likely: Species for which the measures in place have prevented introduction in some other countries, but not in all. Species with post-border records but with no reported establishment.
- Likely: Species with a similar ecology to similar pests, for which prevention measures have proven to work effectively. Also, species that are widespread outside the territory and are known to be invasive, but that have limited pathways which are easily restricted.
- Very likely: Species with a low likelihood of arrival in the first place; easy detection of the life stages, which can survive in the territory. Restricted to very specific pathways, which can easily be closed off. Quarantine procedures allow detection of any life stages of the target species.

Other information

You can describe here in more detail whether the PRA supports or recommends to reject any planned introductions (templates 1 and 2), or whether there should be a revision of the current pathway action plan as a consequence of the PRA.