

SUBSIDIARY BODY ON SCIENTIFIC,
TECHNICAL AND TECHNOLOGICAL ADVICE
Twenty-fourth meeting
Online, 3 May – 9 June 2021
Agenda item 11

INVASIVE ALIEN SPECIES

Draft recommendation submitted by the Chair

The Subsidiary Body on Scientific, Technical, and Technological Advice

1. *Notes* the outcomes of the Online Forum on Invasive Alien Species¹ and the December 2019 meeting of the Ad Hoc Technical Expert Group on Invasive Alien Species contained in the report of the Ad Hoc Technical Expert Group;²

2. *Welcomes* the work undertaken by the Inter-agency Liaison Group on Invasive Alien Species and by the World Customs Organization to address the risks of living organisms as environmentally hazardous goods in transport and cross-border e-commerce;³

3. *Encourages* Parties and invites other Governments and international organizations to collaborate to share information, technology and expertise on managing e-commerce in alien and invasive alien species to improve the ability to manage shipments for compliance verification;

4. *Encourages* Parties and invites other Governments and relevant organizations to increase the accessibility and standardization of data formats and analysis on past management activities across species and ecosystems to support evidence-based management prioritization and decision-making, updating or developing, as appropriate, standardized guidelines for vocabulary and on how to collate and report on such data (including species, management objective, cost and/or effort, area covered, and outcome of management actions), to assist in the creation of common approaches to sharing and reporting experience and information.

5. *Recommends* that the Conference of the Parties at its fifteenth meeting adopt a decision along the following lines:

The Conference of the Parties,

Noting with concern that invasive alien species is one of the main drivers of biodiversity loss worldwide, as reported by the Intergovernmental Platform on Biodiversity and Ecosystem Services, in its 2019 *Global Assessment Report*,

Noting the increasing volume of international consignments containing living organisms, as well as changes in trade patterns and consumer behaviour and habits,

Recognizing that anthropogenic changes in the environment, such as from climate change and associated natural disasters, as well as land-use changes, add further complexity and increased risk of biological invasions and consequent threats to biodiversity,

Emphasizing the need for increased collaboration among Parties, other Governments, relevant organizations and all relevant sectors, including business,

¹ CBD/IAS/AHTEG/2019/INF/1.

² [CBD/IAS/AHTEG/2019/1/3](#).

³ See CBD/SBSTTA/24/10.

Recalling decisions XII/16, XIII/13 and 14/11, and *recognizing* that guidance in relation to invasive alien species and trade in live organisms may also apply to e-commerce,

1. *Takes note* of the outcomes of the Online Forum on Invasive Alien Species⁴ and the meeting of the Ad Hoc Technical Expert Group on Invasive Alien Species including:⁵

(a) Methods for cost-benefit and cost-effectiveness analysis which best apply to the management of invasive alien species;

(b) Methods, tools and measures for the identification and minimization of additional risks associated with cross-border e-commerce in live organisms and the impacts thereof;

(c) Methods, tools and strategies for the management of invasive alien species as it relates to prevention of potential risks arising from climate change and associated natural disasters and land-use changes;

(d) Use of existing databases on invasive alien species and their impacts, to support risk communication;

(e) Additional advice and guidance on invasive alien species management;

2. *Requests* the Executive Secretary to organize a peer-review process to solicit advice, pursuant to decision 14/11, on annexes I to VI below, [taking into account the earlier decisions of the Conference of the Parties, multilaterally agreed rules and specific circumstances in different regions,] to convene a moderated open-ended online forum on the results of the peer-review process and to make the outcomes available for consideration by the Subsidiary Body on Scientific, Technical and Technological Advice, with a view to making recommendations to the Conference of the Parties at its sixteenth meeting;

3. *Invites* Parties, other Governments and relevant organizations to more explicitly include diverse social and cultural values of biodiversity across communities at the national and/or subnational levels, including those of indigenous peoples and local communities, women, youth and the elderly, taking into account rights and obligations derived from relevant multilateral agreements, when assessing the costs, benefits and prioritization of management of invasive alien species, and to build on existing processes (for example, the Socio-economic Impact Classification of Alien Taxa (SEICAT)) and international best practices for engagement of relevant actors, in order to feed effectively into multi-criteria decision-making processes based on scientific evidence and risk assessments;

4. *Welcomes* the inclusion of invasive alien species by the World Customs Organization in the Technical Specifications under its Framework of Standards on Cross-border E-Commerce;

5. *Encourages* Parties and *invites* other Governments and relevant organizations to develop national, regional or international open access portals or other websites directed to the general public, to raise awareness and understanding of the threats of invasive alien species to biodiversity and offering practical help for identification and management of invasive alien species, as well as to enlist the help of the public in reporting occurrences and in controlling invasive alien species;

6. *Reaffirms* that, when considering methods, such as engineered gene drives, to manage invasive alien species, the precautionary approach described in the preamble of the Convention and the Cartagena Protocol should be applied, recalling paragraph 11 of decision 14/19;

7. *Urges* Parties and other Governments to monitor the effects of large-scale releases of alien translocated or captive raised populations of, for example, fish, trees and game species,

⁴ CBD/IAS/AHTEG/2019/INF/1.

⁵ CBD/IAS/AHTEG/2019/1/3.

on the genetic diversity of local native populations and their long-term ability to adapt to a changing environment, and to take adequate actions to address any detrimental effects on native populations;

8. *Invites* the Secretariat of the United Nations Economic and Social Council, the World Customs Organization and the International Plant Protection Convention, the World Organisation for Animal Health, Codex Alimentarius, the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the Invasive Species Specialist Group of the International Union for Conservation of Nature, within the scope of their respective mandates, to support the implementation of the post-2020 global biodiversity framework with regard to targets and actions related to invasive alien species, including their monitoring and reporting;

9. *Notes* that the Economic and Social Council's Sub-Committee of Experts on the Transport of Dangerous Goods will consider including environmentally hazardous living organisms in chapter 2.9, class 9, of the United Nations *Recommendations on the Transport of Dangerous Goods - Model Regulations*,⁶ at its upcoming session, taking into account the risk of unintentional introduction of invasive alien species, including pathogens, in collaboration with the Inter-agency Liaison Group on Invasive Alien Species and other experts;

10. *Welcomes* the ongoing work of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention)⁷ on the subject of emerging infectious diseases caused by alien pathogens and parasites, as well as invasive alien species that may act as vectors or hosts of pathogens and parasites,⁸ in view of the growing threat that this presents to biodiversity, and *invites* Parties, other Governments and organizations to submit information to the Executive Secretary on experiences and relevant initiatives of horizon scanning, monitoring and managing emerging infectious diseases affecting biodiversity and, especially, the health of wild animals and plants, caused by alien pathogens or parasites and invasive alien species acting as vectors or hosts for pathogens or parasites;

11. *Invites* the Invasive Species Specialist Group of the International Union for Conservation of Nature to undertake assessments on the magnitude of the negative impacts from alien pathogens or parasites and invasive alien species that may transmit pathogens or parasites that may affect biodiversity and make the information available through the Global Invasive Species Database of the International Union for Conservation of Nature;

12. *Requests* the Executive Secretary, subject to the availability of resources:

(a) To prepare a proposal to the Economic and Social Council's Sub-Committee of Experts on the Transport of Dangerous Goods on a globally harmonized labelling system for consignments of environmentally hazardous living organisms, consistent and in harmony with international agreements and in consultation with the Inter-agency Liaison Group on Invasive Alien Species and the Secretariat of the Sub-Committee, for consideration by the Subsidiary Body on Scientific, Technical and Technological Advice prior to the sixteenth meeting of the Conference of the Parties;

(b) To continue collaboration with the International Plant Protection Convention, as well as other members of the Inter-agency Liaison Group on Invasive Species towards developing a globally harmonized and operational guidance on the use and transport of sea containers;

(c) To continue and enhance collaboration with members of the Inter-agency Liaison Group on Invasive Alien Species, including with a view to determining how approaches for the

⁶ United Nations publication, Sales No. E.19.VIII.1.

⁷ United Nations, *Treaty Series*, vol. 1284, No. 21159.

⁸ See, for example, T-PVS/Inf(2019)18.

prevention, control and management of invasive alien species may be usefully applied to biological invasions of pathogenic agents, in particular zoonotic pathogens;

(d) To develop, on the basis of the national reports and in cooperation with the Inter-agency Liaison Group on Invasive Alien Species and other relevant organizations, advice on the evaluation of existing capacity and needs for monitoring, preventing and controlling the introduction and spread of invasive alien species and their harmful effects to biodiversity, and thereafter as relevant, update the online toolkit on invasive alien species of the Convention on Biological Diversity and develop additional training materials for such topics as management of priority species and pathways of introduction, identification and management of priority areas, as well as the application of international data standards in national and regional databases containing information on invasive alien species;

(e) To collaborate with members of the Inter-agency Liaison Group on Invasive Alien Species and other relevant organizations, with a view to identifying gaps in knowledge, monitoring, and management of emerging infectious diseases affecting biodiversity and human health that relate to or are facilitated by invasive alien species, and to propose measures for mitigating and minimizing the negative effects on biodiversity and human health and preventing the further introduction and spread of relevant invasive alien species;

(f) To report the progress on the above to the Subsidiary Body on Scientific, Technical, and Technological Advice prior to the sixteenth meeting of the Conference of the Parties.

Annex I

DRAFT METHODS FOR COST-BENEFIT AND COST-EFFECTIVENESS ANALYSIS WHICH BEST APPLY TO THE MANAGEMENT OF INVASIVE ALIEN SPECIES

(PROVISIONAL ADVICE PURSUANT TO DECISION 14/11, ANNEX II, PARAGRAPH 1 (A))

1. Aichi Biodiversity Target 9 states the need for invasive alien species and pathways to be identified and prioritized and for priority species to be controlled or eradicated. The extended technical rationale for this target (CBD/COP/10/INF/12/Rev.1) includes the statement that “Given the multiple pathways for invasive species introductions and that multiple alien species are already present in many countries, it will be necessary to prioritize control and eradication efforts to those species and pathways which will have the greatest impact on biodiversity and/or which are the most resource effective to address.” Accordingly, a clear need exists to develop methods to prioritize invasive alien species and the active management thereof.
2. Established cost-benefit and cost-effectiveness methods are widely available and already in use in some regions to assist invasive alien species management decision-making, including prioritization. However, these existing analyses typically require detailed information, for example on costs, and may need technical expertise to apply. Including consideration of biodiversity, animal welfare and public acceptability in cost-benefit analyses can also be problematic as, although possible, these are often difficult to represent in simple financial terms.
3. The final decision to eradicate or manage an invasive alien species carries significant costs and risks. While these rapid methods may produce “short lists” of priority species to consider for management, more detailed pilot studies and economic assessments are recommended before commitments to management are made.
4. To support risk management, methods may be required when large numbers of species need to be rapidly assessed, where detailed information is often lacking and where non-monetary based inputs on social and cultural values are required.

A. Multi-criteria methods

5. Multi-criteria methods can be used in circumstances where more detailed, but data-hungry approaches, such as cost-benefit analysis, may be impractical. Multi-criteria methods provide a route to the rapid assessment of options and are already widely used to support invasive alien species decision-making – for example through the risk assessment process. There is scope to use multi-criteria methods more widely to support decision-making to answer questions such as how to prioritize species for management, when to choose between prevention, eradication or long-term management objectives, how to produce rapid assessments of large numbers of species, or how to compare the feasibility of different management options?

6. Multi-criteria decision-making is concerned with structuring and solving decision and planning problems involving multiple criteria. By breaking problems down into their different components they can be used to assess decisions in a transparent and rational manner, they can be rapidly applied to large numbers of cases, and by using expert opinion, or the knowledge of indigenous peoples and local communities with their free, prior and informed consent, they can still be applied where published information is lacking. These modelling and methodological tools are designed to find optimal solutions to complex problems where assessment criteria or data are measured in different currencies.

7. Because multi-criteria approaches often operate in the absence of published data, this may raise concerns over the use of opinion or unsubstantiated information. The way in which multiple criteria are combined to support an overall conclusion can also be problematic and is often based on pragmatism rather than a validated approach. Nevertheless, multi-criteria methods and cost-benefit analysis benefit complement each other, for example an initial prioritization based on a large number of options may be undertaken using a multi-criteria approach, but the proposed priorities may then be more fully assessed using a more rigorous approach such as cost-benefit before resources are committed.

B. Advice for actions

8. A coordinated national, subnational and local response strategies should be developed to minimize incursions and impacts of invasive alien species, such as national, subnational and local invasive species strategies and action plans as a part of national, subnational and local biodiversity strategies and action plans. This could include strengthening and coordinating existing programmes, identifying and filling gaps with new initiatives, and building on the strengths and capacities of partner organizations, including academia and scientific institutions, indigenous peoples and local communities and women and youth at the national, regional and local levels.

9. The best available prioritization methods should be applied to prioritize management of dispersal pathways of invasive alien species within as well as between countries, and for assessing feasibility and cost-effectiveness. These methods should be in a form compatible and complementary to existing approaches to risk assessment. Methods used for risk-prioritization of invasive alien species include cost-benefit, cost-effectiveness and risk analysis. However, the detailed information required to undertake cost-benefit and cost-effectiveness analyses are often in short supply or uncertain, and these analyses require sufficient technical expertise. A number of science-based prioritization methodologies for invasive alien species, horizon-scanning, and impact and management for single or multiple types of invasive alien species have been developed by Parties or independent international science teams and are worth consideration by other countries.

10. Knowledge exchange should be promoted, as well as training and capacity-building to apply the best available prioritization methods consistently across environments.

11. The best available methods for prioritizing the invasive alien species to be managed and for assessing feasibility and cost-effectiveness, in a form compatible and complementary to existing approaches to risk assessment. Multi-criteria decision-making approaches should be used to support risk-based prioritization for management when information required to undertake cost-benefit and cost-effectiveness analysis is lacking or uncertain.

12. States, sectoral authorities and organizations and subnational governments are encouraged to share information on their best practices regarding tools and technologies for the management⁹ of invasive alien species that can be implemented across sectors at all levels.

13. *Multi-criteria decision-making* approaches can be used, wherever possible, when applying risk analysis, cost-benefit and cost-effectiveness analyses to support risk-based prioritization. Invasive alien species prioritized by actual or potential impacts using such rapid methods can then be considered in more detail to ensure that management, based on clear objectives, is indeed cost-effective and feasible. Multi-criteria decision-making can consider such aspects as effectiveness, practicality, feasibility, likelihood of success, cost, public acceptability, including to indigenous peoples and local communities, women and youth of proposed actions as well as any unintended negative impacts of management alongside the risks and impacts posed by the targeted invasive alien species, in line with relevant multilateral agreements. These methods involve a structured process and can help resolve issues associated with decision-making and planning that involve multiple criteria and are designed to find optimal solutions to complex problems where assessment criteria or data are measured in different ways. They can also be used with expert elicitation when only incomplete or imprecise information is available.

14. Multi-criteria methods to support invasive species prioritization, risk management and decision making need to be developed further. Opportunities for development include:

(a) There is considerable variation in the methods and approaches to prioritization and decision making used in different countries – reviewing the strengths and weaknesses of other approaches to this issue would be valuable;

(b) Risk management as part of a larger risk analysis process is widely used in other fields, such as plant health – increased dialogue with experts from these fields would help to develop best-practice;

(c) Other considerations will be needed when applying the approach to different management questions;

(d) Cases in which multi-criteria methods have been applied to invasive alien species management decision making are still limited – more trials and applications would help refine the approach;

(e) Where possible, published quantitative data should be used to underpin decision-making, in order to better identify and access key information.

15. It is suggested that guidelines be developed in order to more explicitly include social and cultural values when assessing the costs, benefits and prioritization of management. This could build on existing processes (for example, Socio-economic Impact Classification of Alien Taxa (SEICAT)) and international best practices on stakeholder engagement in decision-making. Decisions and risk analyses should be based on science and should follow international standards agreed under relevant international organizations, such as the agreement on the application of sanitary and phytosanitary measures, as appropriate.

16. It is recommended that efforts be made to increase the accessibility of data and vocabulary on management activities across species and ecosystems to support evidence-based management prioritization and decision-making. This will be assisted by the creation of common approaches to sharing and reporting experience and information, common data formats that include information on the taxon, management objective, cost and/or effort, area covered and the outcome of management. To promote the production of prioritized lists for action, there is a need for knowledge exchange, training and capacity-building.

17. It is recommended that, in communicating risks associated with invasive alien species it be highlighted that these risks can affect biodiversity and the economy of indigenous regions/peoples and local communities as well as public health.

⁹ This refers to the “application of measures to prevent the introduction of, control or eradicate invasive alien species” (see [CBD/IAS/AHTEG/2019/1/2](#), para. 13(e)).

Annex II

**DRAFT METHODS, TOOLS AND MEASURES FOR IDENTIFICATION AND MINIMIZATION
OF ADDITIONAL RISKS ASSOCIATED WITH CROSS-BORDER E-COMMERCE IN LIVE
ORGANISMS AND THE IMPACTS THEREOF**

(PROVISIONAL ADVICE PURSUANT TO DECISION 14/11, ANNEX II, PARAGRAPH 1 (B))

A. Suggested actions for national and/or subnational authorities/border agencies

1. Legislation and policy set by States

1. Investigate and evaluate the risks posed by all forms of e-commerce to the introduction and spread of invasive alien species and their parts and, if necessary, develop and implement appropriate risk management activities. See also decision XII/17, paragraph 9 (d);
2. Implement when addressing trade with invasive alien species through e-commerce, decision XIII/13, paragraphs 7 and 8 and use the voluntary guidance on devising and implementing measures to address the risks associated with the introduction of alien species as pets, aquariums and terrarium species and as live bait and live food (decision XII/16) and the supplementary guidance for avoiding unintentional introductions of invasive alien species associated with trade in live organisms (decision 14/11), as relevant.
3. Review existing national and/or subnational legislation, regulations and policies to verify that e-commerce is adequately addressed or make changes as needed to ensure that enforcement actions can be taken, in accordance with decision XIII/13, paragraph 2.
4. Establish mechanisms to identify commodities of concern that may be obtained via e-commerce with a focus on high and potential high-risk consignments, such as soils, growing media, and living organisms.
5. Consider the use of lists that specify which species may be imported and restrict the remainder, rather than lists that only identify those species whose import is prohibited or restricted, in the interests of preventing the unintended introduction of invasive alien species, and especially in the case of countries that are vulnerable to invasive alien species, such as small island developing States, island countries, and countries with islands. These considerations should be consistent with the guidance contained in decisions XII/16, paragraph 23,¹⁰ and decision 14/11(a),¹¹ as well as other applicable international obligations and standards, including those recognized by the World Trade Organization Agreement on the General Agreement on Trade in Services (GATS) that are relevant for cross-border e-commerce, as well as in accordance with decisions XII/16, paragraphs 22 and 14/11, paragraph 11(a).

2. Indigenous peoples, local communities and relevant stakeholders engagement

6. In accordance with decision XIII/13, paragraph 7, develop mechanisms, in collaboration with e-commerce stakeholders, for identification of e-commerce traders, their locations and other stakeholders with a view to facilitating inter-agency and multi-stakeholder participation and cooperation.
7. Engage with indigenous peoples and local communities, women and youth, as well as the wider community and general public for detection of early incursion, establishment or spread of invasive alien species, including from e-commerce, across traditional lands and waters, as well as the wider community and general public.
8. Ensure, in accordance with decision 14/11, paragraph 10, compliance with the sanitary, phytosanitary and veterinary import requirements of importing countries among e-commerce customers

¹⁰ Encourages Parties and other Governments (a) to develop and share a list of regulated invasive alien species, based on the results of risk analysis, where appropriate. Decision 14/11, para. 11 (a).

¹¹ States should maintain lists of species with the assessed potential to become invasive and associated with unacceptable risks for biodiversity and make it available through the clearing-house mechanism or other appropriate means. Decision 12/16, para. 23.

and traders by providing quality information on the risks to the customer's country (legal, environmental and health related).

9. Strengthen coordination with postal and express courier services to ensure that relevant information on the risks and preventive measures are conveyed to e-commerce users in accordance with decision XII/16, paragraph 24, and taking into consideration decision 14/11, annex I, paragraphs 7, 9-11, 13 and 29.

10. Ensure, in collaboration with national and regional trade authorities, that import/export requirements are up-to-date, clear and accessible to e-commerce traders, indigenous peoples, local communities and relevant stakeholders.

11. Aim to inform both sellers and buyers about potentially invasive alien species, focusing on their legal responsibility. Both social media and specialized media, such as pet magazines/journals/books, especially journals from pet or plant association/society and multi-agency targeted publicity campaigns should be used to disseminate correct information, aiming to shift consumer values (e.g. toward native and non-invasive species) and to change behaviours (e.g. to prevent impulse purchase of invasive alien species) in accordance with decision XIII/13, paragraph 7(a).

12. Encourage, taking into consideration decision XIII/13, paragraph 7, e-commerce platforms and e-payment service providers, postal and express courier services to adhere to national regulations, international standards and guidance on invasive alien species in their operations, in consistency with other international obligations.

13. Consider implementing the Single Window¹² approach, which allows the sharing of standardized information and documents with a single-entry point to fulfil all import, export and transit-related regulatory requirements. Its implementation at the national and/or subnational level may facilitate reporting on regulated articles (including live alien organisms with phytosanitary and sanitary risks, and risks to biodiversity), taking into account decision XII/16, paragraph 6, decision XIII/13, paragraph 7(c) and decision 14/11, annex I, paragraph 33.

14. Establish legal and policy frameworks that allow for the advanced international electronic sharing and exchange of data between all actors involved in the international supply chain, as appropriate, and use these data to triage packages and determine the level of inspection needed (risk-based inspection).

3. *Monitoring and compliance*

15. Gather data, taking into consideration decision 14/11, annex I, paragraphs 34-36, and in compliance with national legislation and circumstances, using all available means and tools (e.g. crowdsourcing) to monitor compliance and to evaluate the efficacy of activities that are implemented to mitigate risks associated with e-commerce. The data collected should be used, together with other relevant information including compliance history, and relevant information from indigenous peoples and local communities with their free, prior and informed consent, to inform risk-based inspections and determine if investigation or enforcement action is needed. Data analytics should be applied to discern any abnormal trends and patterns, including potential invasive alien species incursion and impact risks.

16. Disseminate good practices and risk-based interventions using best practice methods of data analytics to facilitate legitimate e-commerce and, at the same time, identify and stop illicit trade. Wherever possible, prioritize the use of non-intrusive inspection (NII) technologies, and promote the adequacy of existing technologies e.g. scanners, sniffer dogs and other available tools for the detection of invasive alien species, and the further development of automated biosensors to improve efficient detection of prohibited and restricted articles moving through the express courier and postal systems.

¹² A single window is defined as a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements (see <http://www.wcoomd.org/~media/wco/public/global/pdf/topics/facilitation/activities-and-programmes/tf-negotiations/wco-docs/info-sheets-on-tf-measures/single-window-concept.pdf>).

17. Develop and implement training and tools to facilitate appropriate level of monitoring and inspection in e-commerce markets. This could include developing guidance on monitoring of e-commerce platforms and on the issuance of warnings, notices and other enforcement actions when non-compliances are found in e-commerce transactions, and the proper handling of restricted items seized in compliance with national and/or subnational law.

B. Suggested actions for web marketplaces (sale platforms) and e-payment service providers, postal and express courier services

18. Web marketplaces (sale platforms) and e-payment service providers, postal and express courier services are strongly encouraged to:

(a) Consider the information available from relevant international bodies, national and/or subnational authorities and other sources, regarding the risks (both legal and environmental) posed by invasive alien species and take steps accordingly to make their users aware of them, taking into account decision 14/11, annex I, paragraphs 11-13;

(b) Monitor e-commerce taking place within their platforms or jurisdiction and, consistent with relevant national and/or subnational legislation, alert relevant authorities where there is evidence of illegal or otherwise potentially damaging trade in invasive alien species taking place;

(c) Develop and apply improved management measures to minimize the risks of introduction of invasive alien species through e-commerce, consistent with international and national obligations.

C. Suggested actions for international bodies/agreements and cross-jurisdictional collaboration

19. International bodies/agreements, in collaboration with regional organizations and national authorities, as relevant, are strongly encouraged to undertake the following:

(a) Collaborate to share data, information, technology and expertise on e-commerce in potential invasive alien species;

(b) Draw on guidance from other international bodies, including the ongoing work by the World Customs Organization and in the Bern Convention;

(c) Continue to monitor e-commerce with potential invasive alien species at the global and regional levels with a view to identifying trends and risks in trade of invasive alien species;

(d) Prepare guidance to assist national border agencies in responding to non-compliance, considering that both domestic and international actions may be required to respond effectively;

(e) Improve collaboration between national border agencies in order to enhance opportunities to link existing security initiatives with invasive alien species risk management and targeted (risk-based) inspections. This will also provide a mechanism for timely information-sharing among national border agencies and other relevant ministries/departments on issues related to cross-border e-commerce trade;

(f) Conduct joint capacity-building activities with relevant organizations, Parties and other Governments and provide technical assistance and resources for implementing existing international guidelines and standards, and developing national and/or subnational regulatory frameworks or measures to address the risks associated with e-commerce for all relevant stakeholders including indigenous peoples and local communities;

(g) Expand the concept of “authorized economic operators”¹³ (AEO); trusted trader to cross-border e-commerce and include invasive alien species risks in AEO criteria and requirements. Implementing AEO and trusted trader programmes in the e-commerce environment for postal operators, express carriers and e-platforms, which would result in a lower frequency of inspections;

¹³ See also WCO *Compendium of Authorized Economic Operator Programmes* (2019), <http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/tools/safe-package/aeo-compendium.pdf?db=web>

(h) Establish frameworks that allow for the advanced electronic exchange of data between all parties involved in the international supply chain and use these data to triage packages and determine the level of inspection needed (risk-based inspection).

D. Suggested actions for relevant international expert organizations

20. Relevant international expert organizations are strongly encouraged to:

(a) Raise awareness among international, national organizations and e-commerce stakeholders about import/export requirements and what can be done to minimize the risk of introduction and spread of alien and potentially invasive species associated with e-commerce, taking into account decision XIII/13 paragraph 7(a);

(b) Building on such frameworks as EICAT,¹⁴ establish an international invasive alien species risk-based labelling system, to be used for all species sold via e-commerce and provide guidance on the handling and care of organisms. On consignments of live alien species, such labelling should include information to enable identification of hazards for biodiversity and the identification of species or lower taxa (e.g., scientific name, taxonomic serial number or its equivalent), taking into account decisions XII/17 and 14/11 as well as the ongoing work of the Economic and Social Council's Sub-Committee of Experts on the Transport of Dangerous Goods.

Annex III

¹⁴ IUCN *Environmental Impact Classification for Alien Taxa*, <https://ipbes.net/policy-support/tools-instruments/environmental-impact-classification-alien-taxa-eicat>

DRAFT METHODS, TOOLS AND STRATEGIES FOR THE MANAGEMENT OF INVASIVE ALIEN SPECIES AS IT RELATES TO PREVENTION OF POTENTIAL RISKS ARISING FROM CLIMATE CHANGE AND ASSOCIATED NATURAL DISASTERS AND LAND USE CHANGES
(PROVISIONAL ADVICE PURSUANT TO DECISION 14/11, ANNEX II, PARAGRAPH 1 (C))

1. The interactions of climate change, associated changes in land and marine ecosystems and biological invasions will have profound consequences for biodiversity. These interactions are considered and potential responses enumerated in CBD/AHTEG/IAS/2019/1/2.
2. Climate change is aiding increased rates of (and risk of spread of many alien species). Human adaptations to climate change will alter land-use and increase disturbances in the ecosystem that, in turn, facilitate the establishment of alien species.
3. Not all invasive alien species incursions are successful, nor will all invasive alien species benefit from climate change, as some may become less abundant under particular changing climates. Some invasive alien species will decline in importance while some currently low impact alien species may become significant invasive alien species.
4. Climate change may exacerbate existing problems and impacts of invasive alien species, with both direct and indirect impacts on biodiversity and socioeconomic values. Changing ocean currents will have huge impacts on species movements in marine environments as well as influence climatic conditions on land. Loss of permanent sea ice is opening up new sea transport routes and shipping in the Arctic is creating greater probability of invasive alien species introduction and establishment in the Arctic terrestrial and marine environments.
5. Climate change is associated with more frequent extreme weather events like cyclones and flooding. Extreme weather events cannot only transport invasive alien species to new areas, but also cause disturbances in habitats which enable invasive alien species to establish themselves and spread. Climate-induced extreme weather events can also lead to sudden human population movements and displaced people can inadvertently transport invasive alien species.
6. Prevention and management of invasive alien species under climate change becomes an even greater challenge with climate change. New prioritization actions will be required.
7. For more information on tools that support management of invasive alien species in the face of climate change.¹⁵

A. Prediction

8. Managing the impacts of invasive alien species on biodiversity and ecosystem services requires knowledge of the manner in which the actual and potential impact will vary as a result of climate change so that management priorities can be adapted accordingly.
9. States, organizations and relevant stakeholders, taking into account, among other things, decision 14/5, are strongly encouraged:
 - (a) To undertake horizon scanning to forecast/predict future changes in actual and potential risks and impacts of invasive alien species arising from climate change;
 - (b) To identify changes in invasive alien species pathway risks arising from climate change. Climatically similar regions posing the greatest current mutual risks today are likely to change in the future along with changes in vectors and pathways, including changes in trade and the movement of people between these regions;
 - (c) To prioritize invasive alien species on the basis of potential direct and indirect impacts in the context of climate change;

¹⁵ See the synthesis report of the Online Forum (CBD/IAS/AHTEG/2019/1/INF/1).

- (d) To identify effects of climate change on new potential invasive alien species introductions or pathways of introductions and establishment into pristine and invaded communities;
- (e) To determine and prioritize for action sites at the greatest risk from climate change and invasive alien species;
- (f) To prioritize efforts to maintain ecosystem goods and services, as well as ecosystem structures and functions on sites at the greatest risk from climate change and invasive alien species;
- (g) To apply climate models to understand the impacts of invasive alien species on biodiversity and ecosystem services arising from climate change, and to further develop models for use on a broad scale by developing countries;
- (h) To develop better methods to integrate (i) climate change models, (ii) land-use scenarios and (iii) trends in trade with invasive alien species data analysis to improve prediction capability;
- (i) To define scenarios to understand where invasive alien species may indirectly increase the impacts of climate change on biodiversity and ecosystem services by transforming ecosystems;
- (j) To modify/fine-tune invasive alien species risk analysis, and identify potential alien invasive species¹⁶ (including disease vectors) that remain only casual under current conditions without significant impact; and are likely to become established and/or invasive and have an increased impact due to rapid population growth as a result of climate change;
- (k) To identify and study potential future invasive alien species that can establish and spread and have an increased impact as a result of climate change. This can be done by using such approaches as sentinel sites to monitor changes in abundance, spread and impacts of such species or by carrying out trait- and impact-based risk assessments;
- (l) To identify invasive alien species that are likely to benefit under increased CO₂ levels, rising temperatures, increased frequency of extreme events, fire regimes of increased frequency and intensity, high salt-water incursions, changes in ocean currents and changes in precipitation patterns, and prioritize management to prevent their spread and impacts, including humane methods of eradication and control;
- (m) To improve knowledge of the risks of invasive alien species adapting to new environmental conditions, including rapid evolution and hybridization;
- (n) To identify impacts of invasive alien species arising from climate change on biodiversity and ecosystem services;
- (o) To ensure the meaningful participation of indigenous peoples and local communities, use of their biocultural indicators, early identification and warning systems and traditional knowledge in the development of predictions of invasive alien species under climate change with their “free, prior and informed consent” or “free, prior informed consent” or “approval and involvement”, depending on national circumstances.

B. Planning and prevention

10. States are encouraged, in collaboration with experts, subnational government, indigenous peoples, local communities and relevant stakeholders:

- (a) To develop climate change relevant risk analysis for prioritizing invasive alien species for management (e.g. fire enhancing weeds);
- (b) To develop and implement management strategies to eradicate, contain or control high ranking potential alien species and introduced or established invasive alien species before they can respond

¹⁶ Sleeper alien species: alien species whose population persistence is limited by the current climate and which are expected to exhibit greater rates of establishment as a result of climate change.

to climate change. Those strategies should be object of an appropriate risk analysis, in order to avoid unnecessary biosafety concerns;

(c) To monitor the spread and impact of all established and potential alien species, particularly in sites or regions where biodiversity and ecosystem services are likely to deteriorate rapidly under climate change. Best-practice approaches using, for example, remote sensing or sensor networks are suggested to be undertaken;

(d) To minimize the potential of biological invasions or develop spatial response planning for areas in which communities are threatened with a high risk of extreme weather events (e.g, relocate zoos, botanical gardens, exotic aquaculture facilities from extreme-event-prone areas);

(e) To adapt current pathway management with a view to reducing changes in risks arising from climate, including predicted associated changes in trade and movement of people;

(f) To engage all sectors, including agriculture and public health agencies and industries, in invasive alien species planning activities where climate change risks are cross-sectoral;

(g) To raise public awareness of changing invasive alien species threats arising from climate change and include the participation of the public and all relevant sectors in response planning;

(h) To collect best practices of indigenous peoples and local communities on the monitoring, controlling and mitigation of the impacts of invasive alien species caused by climate change;

(i) To engage with regional and local specialists when considering prevention, planning and mitigation measures.

C. Management

11. It is suggested that States take the following actions:

(a) Apply adaptive management approaches to future prioritized management actions in the context of climate change and share the information with other Parties to improve outcomes;

(b) Take steps to increase the long-term functional resilience of threatened ecosystems and habitats to climate change, extreme weather events and natural disasters and associated invasive alien species incursions, particularly for islands and coastal systems, taking into account guidance in decision 14/5, paragraphs 3(h), 4(b) and its annex as well as decision X/33, paragraph 8(n);

(c) Undertake focused management actions, including containment, eradication when possible or control of invasive alien species in areas that could act as non-native sources for spread into identified vulnerable areas and/or native communities;

(d) Collate existing knowledge into international online databases to allow the interoperable collection and dissemination of data and knowledge on the effectiveness of actions to mitigate impacts of invasive alien species arising from climate change. An example of such a database is the Database of Island Invasive Species Eradications (DIISE);¹⁷

(e) Develop and integrate invasive alien species management strategies into “threatened climate vulnerable species movement-assisted translocation actions” to avoid unintended consequences, taking into account decision X/33, paragraph 8(e);

(f) Collect best practices of indigenous peoples and local communities on the monitoring, control and mitigation of the impacts of invasive alien species, diseases and shifting species distributions caused by climate change.

¹⁷ <http://diise.islandconservation.org>.

D. National and international cooperation

12. States and relevant international organizations are strongly urged to integrate pathway and invasive alien species risk based multi-criteria prioritization approaches into all levels of planning to obtain multiple benefits and shared outcomes, including the following:

(a) National and international climate mitigation and adaptation strategies, environmental impact assessments, and response planning activities in accordance with decision X/33, paragraph 8(p);

(b) Other relevant conventions (e.g. United Nations Framework Convention on Climate Change, Convention on the Conservation of Migratory Species of Wild Animals) and providing relevant United Nations implementing agencies with policy guidance;

(c) National and international commitments and actions under the Sustainable Development Goals;

(d) Market incentive programmes and other actions funded by multilateral agencies or forums, such as the Global Environment Facility, the Clean Development Mechanism and the Green Climate Fund.

13. It is suggested that relevant international organizations organize training for governmental and non-governmental development assistance agencies and operatives engaged in disaster relief, identify risks of introducing and spread of invasive alien species with their activities and undertake rapid response with appropriate measures, such as quarantine of equipment and goods, emergency response, eradication, containment and control.

Annex IV

DRAFT RISK ANALYSIS ON THE POTENTIAL CONSEQUENCES OF THE INTRODUCTION OF INVASIVE ALIEN SPECIES ON SOCIAL, ECONOMIC AND CULTURAL VALUES (PROVISIONAL ADVICE PURSUANT TO DECISION 14/11, ANNEX II, PARAGRAPH 1 (D))

1. It is suggested that guidelines be developed in order to more explicitly include social and cultural values when assessing the costs, benefits and prioritization of management. This could build on existing processes (for example, Socioeconomic Impact Classification of Alien Taxa (SEICAT)) and international best practices on engagement of indigenous peoples, local communities and relevant stakeholders in decision-making. New Zealand incorporates cultural knowledge, values and perspectives (mātauranga) in the management of invasive alien species. Māori are involved in the governance of invasive alien species management, especially when culturally and spiritually significant (taonga) species are at risk. This system is worthy of emulation. States should seek formal participation and ensure bidirectional data streams between data holders and generators through the national data portals (where applicable) to the global-level aggregators. Country membership status, capacity, resources and other aspects should be understood by all Parties. Open access to data and seamless integration of this data between data tools used by indigenous peoples, local communities and relevant stakeholders is an imperative for better management and monitoring of this threat. This will (a) increase data flows necessary for CBD level analysis and international decision-making and (b) open opportunities for national capacity-building and resourcing.

2. It is suggested that efforts be made to increase qualitative and quantitative knowledge and data on socioeconomic and cultural impacts of invasive alien species on communities and society, including indigenous peoples and local communities, and methods to use this knowledge when prioritizing invasive alien species for impact and management feasibility and likelihood of success. It will be important to define socioeconomic, cultural and community well-being criteria in order to collectively evaluate such impacts, for example how the impacts of invasive alien species on treasured, sacred, culturally and spiritually significant native species can be measured and impact thresholds understood and addressed.

3. Enhanced risk communication is essential to facilitate dialogue and understanding between and among indigenous peoples, local communities and relevant stakeholders, who may include the general public and indigenous peoples and local communities. Risk communication seeks to reconcile the views of

all interested parties in order to achieve a common understanding of the risks posed by invasive alien species, develop credible risk management options and consistent regulations, and promote awareness of issues concerning invasive alien species.

4. There is a lack of well-documented semi-quantitative criteria for socioeconomic, cultural and community well-being on which not only to evaluate impacts, but also to evaluate the effectiveness of the applied risk management option.

5. Social impact assessment offers a structured process for identifying, evaluating and addressing social costs and benefits. It has potential value for enabling public participation in planning and as a key component of integrated assessments of management options.

Annex V

DRAFT USE OF EXISTING DATABASES ON INVASIVE ALIEN SPECIES AND THEIR IMPACTS, TO SUPPORT RISK COMMUNICATION

(PROVISIONAL ADVICE PURSUANT TO DECISION 14/11, ANNEX II, PARAGRAPH 1 (E))

1. This advice is aimed at assisting Parties, other Governments and organizations in developing and maintaining efficient, timely and up-to-date data and information for management of invasive alien species.

2. Enhanced risk communication is essential to facilitate dialogue and understanding between and among indigenous peoples, local communities and relevant stakeholders. Risk communication seeks to reconcile the views of all interested Parties in order to achieve a common understanding of the risks posed by invasive alien species, develop credible risk management options and consistent regulations, and promote awareness of issues concerning invasive alien species.

3. It is essential that regularly updated and curated data is maintained on invasive alien species distribution, impact and management action and relevant knowledge. Relevant publicly available data should be shared with the key global data aggregators to support processes under the Convention on Biological Diversity and other international and regional agreements.

4. It is essential that Parties, other Governments and organizations engage with key global aggregators and data providers (e.g. Global Biodiversity Information Facility (GBIF), Global Registry of Introduced and Invasive Species (GRIIS)) and ensure bidirectional data streams between data holders and generators through the national data portals (where applicable) to the global-level aggregators. Open access to data, seamless integration of this data between data tools and availability of the data to indigenous peoples, local communities and relevant stakeholders are imperative for better management and monitoring of invasive alien species. National or central coordination of data streams is essential for timely, comprehensive and fair availability of the occurrence data on invasive alien species from multiple sources. This will (a) increase data flows necessary for global and regional analysis and decision-making and (b) open opportunities for national capacity-building and resourcing.

5. It is important to facilitate data sharing and, where appropriate, use common international data standards, standard terminology in national, regional, local and thematic databases, even if languages differ between data portals.

6. It is also important to obtain free, prior and informed consent from indigenous peoples and local communities when using their traditional knowledge.

7. Real-time data sharing is recommended, to allow access to up-to-date information to enable early detection and rapid response.

8. There is a great need for States, organizations and the scientific community to identify gaps in knowledge and information on alien species in existing databases and strive to improve knowledge and data, especially for organism groups on which knowledge is especially poor, such as alien marine species, invertebrates, microorganisms and fungi. Increased interaction between data generators, data providers and

experts may provide improvements in the quality of data. Collaboration between experts in collating existing databases using existing standards could also contribute to filling these information gaps. Errors in current databases should be identified and corrected in existing databases.

9. Existing global invasive alien species data providers, such as the IUCN-Invasive Species Specialist Group (IUCN-ISSG), the Global Biodiversity Information Facility (GBIF) and CABI, could be invited to provide a global platform for sharing information, experiences and analysis of the results of management activities for invasive alien species, best practices in policy and regulatory mechanisms and codes of conduct to address activities that lead to the introduction and spread of alien and invasive species, aquariums and local productive activities.

10. IUCN-ISSG and partners could be invited to index, collate and archive the development of policy response indicators within the Biodiversity Indicators Framework (BIP) and Sustainable Development Goal indicator 15.8.1.

11. States, organizations and experts are invited to continue supporting the ongoing development of the Global Registry of Introduced and Invasive Species (GRIIS) and other expert networks focused on collation and curation of new and existing data.

12. GBIF could be invited to include distribution data on invasive alien species in their global biodiversity databases.

13. States, sectoral authorities, international, regional and local organizations and relevant stakeholders could be invited to contribute to and use the CABI Invasive Species Compendium, which is an encyclopedic resource of scientific information on invasive alien species to help inform decision-making.

14. States, sectoral authorities, international, regional and local organizations, experts and relevant stakeholders are invited to use and further develop, as needed, impact assessment frameworks (e.g, EICAT and SEICAT) to develop science-based policies and prioritization of invasive alien species management actions.¹⁸

Annex VI

Draft additional advice and technical guidance on invasive alien species management

A. Advice on the use of sanitary and phytosanitary measures

1. The application of sanitary and phytosanitary (SPS) measures to regulate import/export of alien organisms at the national level requires close collaboration between national authorities and other relevant ministries and departments. Some countries closely coordinate their activities on import requirements for alien organisms among relevant ministries and agencies, including national plant protection organizations and the veterinary authorities (e.g., coordination in Australia between the Department of Agriculture and the Department of Environment and Energy).

2. Environmental authorities, national plant protection organizations and veterinary authorities should be advised to establish strong partnerships with national, regional and local governments in connection with mandates for alien species management. This will help prevent the introduction of invasive alien species and support early detection, rapid response and effective management. Such partnerships could include collaboration in setting national and regional priorities, completing risk assessments, carrying out surveillance, developing response plans, sharing information and exchanging expertise.

3. A large number of the international standards that are recognized by the World Trade Organization (WTO) Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) are relevant for protecting biodiversity. These SPS measures should be applied more widely, not only in the context of agriculture, but also to protect the health of wild fauna and flora.

¹⁸ For more information on using these tools, see CBD/AHTEG/IAS/2019/1/2, pp 31-35.

4. A number of guides, manuals and training materials have been developed under the International Plant Protection Convention (IPPC) to build capacity and support the implementation of international standards. These materials should be used to raise awareness and build capacity among partner organizations to address the issue of invasive alien species.
5. There is a need for capacity-building among developing countries, for implementing existing IPPC and the World Organization for Animal Health (OIE) international guidelines and standards and for developing national regulatory frameworks to address the risks associated with invasive alien species.
6. Regional cooperation and partnerships should be further developed to support the achievement of Aichi Biodiversity Target 9 and beyond, through regular coordination and communication, identification of common priorities and alignment of efforts on a regional basis. This could be supported through IPPC by using the model of regional plant protection organizations to foster cooperation on invasive alien species.
7. A key gap that needs additional attention and guidance is pathogens affecting wildlife and invasive alien species that may be a vector or host of pathogens or parasites and other organisms that do not meet the IPPC definition of quarantine pests, the pathogens causing diseases listed under OIE and other organisms (e.g. invasive ants) that are not covered by IPPC or OIE.
8. As countries adopt different approaches in regulating invasive alien species (e.g., lists of restricted, prohibited and permitted species or hybrids), guidelines could be developed on how such approaches can be implemented in compliance with the SPS Agreement, with a view to facilitating the development of better regulation and ensure transparency.

B. Advice on management-specific pathways

1. Inter-basin water transfer and navigational canals

9. The ratification and application of relevant international maritime agreements (e.g. the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention), mentioned in paragraph 25 of decision VIII/27, and the Guidelines for the control and management of biofouling mentioned in paragraphs 29 and 30 of decision VIII/27) should be promoted in order to diminish the spread of invasive alien species through new shipping routes opening up as a result of climate change.
10. Regional cooperation among States should be enhanced on planning, monitoring and data exchange on invasive alien species specifically related to inter-basin water channels to establish early warning and rapid response systems as well as researching and employing methodologies to reduce new invasions through these channels.
11. Measures to prevent the introduction and spread of invasive alien species in the procedures for planning, development and management of the inland waterway infrastructure should be promoted, as appropriate. Relevant organizations, indigenous peoples and local communities, women and youth and other stakeholders, including local fishers and other groups that are dependent on the waterways (e.g., boaters, recreational boat users, outfitters), should be consulted and engaged when planning and designing such measures.

2. International aid programmes

12. Developing countries need capacity-building, resource mobilization and information sharing for assessing and managing the invasive alien species risks associated with international aid programmes.
13. Aid agencies should ensure that any initiatives/projects/programmes/agreements avoid the introduction of invasive alien species into the area.

Emergency relief, aid and response

14. Environmental authorities should consult the relevant enforcement agencies to comply with the SPS Agreement or the country's quarantine regulation to prevent risk of biological invasions associated with emergency relief, aid and response.

15. Documenting any case of invasive alien species in aid-recipient countries should be initiated across broad sectors.

16. The risk of invasive alien species should be incorporated into emergency response strategies.

17. The responsibilities of aid-providers and aid-recipients should be identified to avoid any invasive alien species introduction through contaminants in aid transports and transfers.

3. Air transport

18. Relevant organizations should engage indigenous peoples, local communities and relevant stakeholders at all levels to develop standards to prevent hitchhiker or stowaway species arriving by air.

19. Relevant organizations, including IPPC, OIE, ICAO, WCO and IATA, should collaborate to develop harmonized operating standards related to air cargo, with input from indigenous peoples, local communities and relevant stakeholders.

20. States should avoid the introduction and spread of invasive alien species through the transport of living organisms, in accordance with the guidance annexed to decisions XII/16 and 14/11.

4. Tourism

21. Parties, in collaboration with travel operators and non-governmental organizations, should develop awareness programmes and campaigns to educate tourists, tourism agencies, local communities and policymakers on the risk and management of invasive alien species, and strategies and techniques to minimize risks.

22. Minimizing the impact of touristic activity to prevent the introduction and spread of invasive alien species should be prioritized, taking into account vulnerable ecosystems, such as in protected areas, and island ecosystems.

23. The Secretariat should collaborate with the World Tourism Organization to consider joint efforts in addressing tourism as a major possibility for introducing invasive alien species and the management thereof.

5. Sea containers and cargos

24. Parties and other Governments should be aware that sea containers may carry invasive alien species with any cargoes, including industrial products, not only cargoes containing living organisms.

25. Relevant organizations should engage indigenous peoples, local communities and relevant stakeholders at all levels to develop guidelines to prevent invasions of hitchhiker or stowaway species through sea containers.

26. Relevant organizations, including IPPC, OIE, IMO and WCO, should further collaborate to develop harmonized operational standards to address the pathways of biological invasion (contaminants and stowaway) via sea containers, in close cooperation with the relevant business sector and input from indigenous peoples, local communities and relevant stakeholders, taking into account the appropriate treatment of sea containers prior to loading cargos.

27. The introduction and spread of invasive alien species through the transport of sea containers should be avoided, in accordance with the guidance annexed to decision XIII/13 and take appropriate actions to prevent the unintentional spread of invasive alien species via sea containers, taking into account paragraphs 10, 34, 35 and 36 of the guidance annexed to decision 14/11 and other relevant international guidance, for example, the IPPC Guidance from the International Plant Protection Convention's Sea Container Task Force.¹⁹

28. Trade partners involved in operation of sea containers should act proactively to prevent unintentional introduction and spread of invasive alien species.

¹⁹ Reducing the spread of invasive pests by sea containers (<http://www.fao.org/3/ca7670en/CA7670EN.pdf>)

C. Advice on capacity-building activities

29. The capacity-building programme under the Convention, should include capacity-building in invasive alien species management.

30. Training programmes at the international, national, subnational or local level should be established by inviting broad sectors, especially academics and scientific expert organizations and other relevant organizations, including indigenous peoples and local communities and women and youth.

31. The evaluation of existing capacity and the development of training packages for relevant topics, such as taxonomy, ecology, invasion biology, risk analysis – in particular horizon scanning – biological control, management of priority species and pathways should be considered within the long-term strategic framework for capacity-building.

32. There is a need to develop technical resources, including technical manuals for broad sectors, as follows:

(a) Taxonomic identification of organisms, including identification keys based on morphology, and the link to databases with images and to lists of specialists, DNA barcoding, artificial-intelligence-aided identification and citizen science;

(b) How to apply sanitary and phytosanitary measures to prevent spread of invasive alien species;

(c) How to publish and use data on invasive alien species using international data standards to ensure cross-linking national, subnational and regional and global thematic databases;

(d) Best practices published on successful eradications, and other useful information resources on technical advice on websites;

(e) How to use shared information on invasive alien species for national and subnational policy-setting and implementation;

(f) How to apply classical biological control agents against invasive alien species and under what circumstances;

(g) How to apply an ecosystem-based approach to control invasive alien species;

(h) Multi-criteria decision support manual for policymakers;

(i) If needed, a model regulatory act on invasive alien species with shared responsibility among broad sectors;

(j) Management manuals for broad sectors to communicate on invasive alien species among different stakeholders, including indigenous peoples and local communities and women and youth.
