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Subsidiary Body on Scientific, Technical and Technological Advice

Twenty-fifth meeting

Nairobi, 15–19 October 2023

Agenda items 4 and 5

Findings from the assessments by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and the Intergovernmental Panel on Climate Change and their implications for the work undertaken under the Convention

Invasive alien species

Recommendation adopted by the Subsidiary Body on Scientific, Technical and Technological Advice on 19 October 2023

25/6. Invasive alien species

The Subsidiary Body on Scientific, Technical and Technological Advice

Recommends that, at its sixteenth meeting, the Conference of the Parties adopt a decision along the following lines:

The Conference of the Parties,

Recalling its decisions [15/4](#), [15/19](#) and [15/27](#) of 19 December 2022, and recognizing the urgent need to implement the Kunming-Montreal Global Biodiversity Framework,¹ in particular its Target 6,

1. *Welcomes* *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers*² and its key messages of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services[, as well as the chapters of the assessment];

[2. *Endorses* the key messages contained in *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers*];

3. *Notes* the relevance of the findings of the assessment for the implementation of the Kunming-Montreal Global Biodiversity Framework and the work undertaken under the Convention on Biological Diversity;³

¹ Decision 15/4, annex.

² Helen E. Roy and others, *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers* (Bonn, Germany, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services Secretariat, 2023).

³ United Nations, *Treaty Series*, vol. 1760, No. 30619.

4. *Encourages* Parties, other Governments, relevant organizations, indigenous peoples and local communities and relevant stakeholders to make use, as appropriate, of the information contained in the assessment in the implementation of the Convention and the Framework, including when updating or revising and implementing national biodiversity strategies and action plans and during the preparation of the seventh and subsequent national reports, and urges developed country Parties, other Parties in a position to do so and relevant organizations to provide support to developing countries in this regard, including through capacity-building, financing and technology transfer;

5. *Recognizes* that increasing the availability and accessibility of information and means of implementation and addressing major knowledge gaps on biological invasions, in particular in developing countries, would result in more robust and effective policy instruments and management actions and that additional efforts and cooperation are particularly needed to improve data collection in Africa, Asia and Latin America and the Caribbean;

6. *Highlights* the fact that access to adequate and sustained financial and other resources, including international funding to support developing countries, [in accordance with Articles 20 and 21 of the Convention,] underpins and improves the effectiveness of actions for the long-term management of biological invasions, including the eradication, control and ongoing monitoring of invasive alien species and their pathways of introduction;

7. *Notes with appreciation* the efforts of the Global Biodiversity Information Facility to improve access to data and information on invasive alien species;

8. *Endorses* the following elements of voluntary guidance developed on the basis of the work of the Ad Hoc Technical Expert Group on Invasive Alien Species and further complemented through a peer review process to support the implementation of the Framework:

(a) Cost-benefit, cost-effectiveness and multi-criteria analysis methodologies that best apply to the management of invasive alien species, as contained in annex I;

(b) Identification and minimization of additional risks associated with cross-border e-commerce in live organisms and the impacts thereof, as contained in annex II;

(c) Management of invasive alien species as it relates to the prevention of potential risks arising from climate change and other drivers of biodiversity loss, as contained in annex III;

(d) Risk analysis of the potential consequences of the introduction of invasive alien species on socioeconomic and cultural values, as contained in annex IV;

(e) Relevance of databases to support the management of invasive alien species, as contained in annex V;

(f) Additional advice and technical guidance on invasive alien species management, as contained in annex VI;

9. *Urges* Parties, within their capabilities, to make use of the elements of voluntary guidance endorsed in paragraph 8 for the updating and implementation of national biodiversity strategies and action plans and to inform national and subnational actions for the management of invasive alien species;

10. *Also urges* Parties, within their capabilities, and invites other Governments and relevant organizations, as appropriate, in line with national circumstances and priorities and in a manner consistent with relevant international obligations, in the light of the findings of the assessment on invasive alien species and their control:

(a) To make use of the information available in the assessment, including the status of and trends in invasive alien species, the role of direct and indirect drivers in the introduction and establishment of invasive alien species, and effective management options, such as cross-sectoral collaboration, for the implementation of Target 6 of the Framework;

(b) To support and/or develop policy instruments that seek synergies among relevant sectors to manage invasive alien species, and to consider the use of existing multisectoral approaches for achieving the necessary coordination, as appropriate;

(c) To develop or strengthen existing national regulatory instruments to reduce the movement and introduction of invasive alien species, which may be complemented, when appropriate, by the use of relevant voluntary guidance and codes of conduct, including for the regulation of online trade and areas that are not already covered by existing standards, in a manner consistent with relevant international obligations, and taking into account national circumstances and legislations;

(d) To develop or strengthen capacity for the early detection and rapid response to newly introduced alien species to prevent their establishment;

(e) To address knowledge and data gaps identified in the assessment by, among other things, promoting further scientific and socioeconomic research on areas relevant to the management of invasive alien species and supporting capacity-building, technology transfer and technical and scientific cooperation;

(f) To support, including through the provision of financial resources, the development, updating and long-term operation of open and interoperable information platforms systems, infrastructures and data-sharing to support the management of invasive alien species;

(g) To engage a wide range of stakeholders, including women, youth and indigenous peoples and local communities, and scientific and technical groups in the management of invasive alien species;

(h) To promote public awareness of invasive alien species and their management;

(i) To seek opportunities to enhance coordination and collaboration among countries and international and regional mechanisms, and across sectors, [to support the implementation of the One Health approach, among other holistic approaches,] and to ensure that sustained strategic actions are taken to manage invasive alien species;

(j) To conduct knowledge-sharing and capacity-building activities to support Parties, in particular developing country Parties, with implementing Target 6, ensuring the full and effective participation of indigenous peoples and local communities, women and youth in those activities;

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

(a) To further strengthen collaboration among relevant organizations through the Inter-agency Liaison Group on Invasive Alien Species, in line with their respective mandates, with a view to supporting the implementation of Target 6 by:

(i) Continuing the assessment of the existing capacity and scientific, technical and technological needs of Parties, especially developing countries, for their implementation of Target 6;

(ii) Sharing experiences and lessons learned by the Group members that could be useful for work undertaken under the Convention in relation to invasive alien species;

(iii) Developing capacity-building activities and guidance, as needed, to address gaps identified in the aforementioned needs assessment;

(iv) Facilitating international collaboration towards the management of invasive alien species with the participation of indigenous peoples and local communities;

(v) Strengthening collaboration with the relevant sectors, such as tourism and trade, and with the Global Biodiversity Information Facility to improve access to data and information on invasive alien species;

- (b) To hold an open-ended online forum to facilitate the exchange of information and experiences on:
 - (i) Work carried out by Parties and stakeholders towards the implementation of Target 6, in particular to facilitate international and regional cooperation;
 - (ii) Approaches that can be taken to facilitate a collaborative response to biological invasions and the threats and impacts of invasive alien species[, and how those individual approaches could be integrated into the One Health approach];
- (c) To report on progress on the aforementioned activities to the Subsidiary Body on Scientific, Technical and Technological Advice at its future meetings.

Annex I

Cost-benefit, cost-effectiveness and multi-criteria analysis methodologies that best apply to the management of invasive alien species

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.

2. Target 6, among other things, stresses the need to identify and manage invasive alien species⁴ and pathways and to prevent the introduction and establishment of priority invasive alien species. Given the multiple pathways for alien species introductions and the fact that multiple alien species and invasive alien species are already present in many countries, it will be necessary to prioritize efforts for managing those species, the most important pathways⁵ and sites that may be relevant to biodiversity or vulnerable to the impacts of invasion, taking into account feasibility, resource effectiveness and the diverse values of biodiversity for people.

3. To support the prioritization of efforts and eventual decisions for managing invasive alien species, a range of methods are available to analyse the costs, benefits and effectiveness of specific management actions, such as:⁶

(a) Cost-benefit analysis, as appropriate, by which monetary values are used to assess both the costs and benefits of managing specific species or applying management actions;

(b) Cost-effectiveness analysis, by which the costs of implementing a programme are assessed against the benefits, as measured in non-economic terms, for example, the number of threatened species that are protected or the social, cultural and environmental impacts on indigenous peoples, local communities, women and youth;

(c) Multi-criteria methods, by which a wide range of criteria, often measured in various ways, are assessed to prioritize a variety of intervention options;

(d) Risk assessment based on science, which is typically based on a combination of available evidence and expert opinion;

(e) Risk management, by which the risk reduction measures and actions to take are identified.

4. The following two sections present information on three of those methods (cost-benefit and cost-effectiveness analyses, and multi-criteria methods) that can contribute to the broader risk analysis process⁷ by facilitating the analysis of information that may be different in nature from that used by other methods that rely on purely scientific data (e.g. risk assessment).⁸

⁴ An invasive alien species is a species whose introduction or spread threatens biological diversity. In its decision [VI/23](#), the Conference of the Parties determined that the term “invasive alien species” was deemed the same as “alien invasive species”.

⁵ Pathways that are identified as posing the greatest risk to the environment and biodiversity or those with the greatest opportunities for preventing such risk (see Melodie A. Mc Geoch and others, “Prioritizing species, pathways, and sites to achieve conservation targets for biological invasion”, *Biol Invasions*, vol. 18, pp. 299–314 (November 2015)).

⁶ See [CBD/IAS/AHTEG/2019/1/INF/1](#), para. 10.

⁷ In accordance with the annex to decision [VI/23](#), “risk analysis” refers to: (a) the assessment of the consequences of the introduction and of the likelihood of establishment of an alien species using science-based information (i.e. risk assessment); and (b) the identification of measures that can be implemented to reduce or manage those risks (i.e. risk management), taking into account socioeconomic and cultural considerations. For further information, see, for example, Sabrina Kumschick, John R. U. Wilson and Llewellyn C. Foxcroft, “A framework to support alien species regulation: the Risk Analysis for Alien Taxa (RAAT)”, *NeoBiota*, vol. 62 (October 2020).

⁸ See Helen E. Roy and others, “Developing a framework of minimum standards for the risk assessment of alien species”, *Journal of Applied Ecology*, vol. 55, No. 2 (October 2017).

I. Cost-benefit and cost-effectiveness analyses

5. Methods for cost-benefit and cost-effectiveness analyses are available to assist with the management of invasive alien species, including prioritization. Those methods can also be useful to provide information on the need for and importance of prevention actions, which are key for the achievement of Target 6. For example, cost-benefit considerations can be applied for prioritizing species or dispersal pathways (between and within countries), to determine best management options, and for assessing feasibility and cost-effectiveness.

6. Cost-benefit and cost-effectiveness analyses should be as comprehensive as possible and should ideally encompass multiple areas, such as biodiversity, potential impacts on other non-target species, animal welfare, public acceptability, potential impacts on indigenous peoples and local communities, women and youth, and human health issues, although some of those areas are often difficult to represent in simple financial terms. Similarly, for this type of analysis, case-by-case consideration should be given to when to proceed with an intervention, even in the absence of all the desirable information, and to weighing the time needed for planning a management strategy against the importance of taking prompt and early action.

7. The final decision to take actions to eradicate, contain or manage and control an invasive alien species carries significant costs and risks, including the cost of inaction; as a result, whenever possible, pilot studies and economic assessments are recommended before decisions are made. This, however, is not always feasible, and there exist rapid methods, such as quick assessments in non-monetary terms, that may assist in producing “shortlists” of priority species or sites that can be used to inform management actions.

8. In the case of island ecosystems, the call in Target 6 for the prioritization of actions on priority sites should be considered, and island-specific prioritization tools adapted to the level of risk and magnitude of potential benefits to biodiversity should be used.

9. Lastly, cost-benefit and cost-effectiveness analyses should also take into account the importance of awareness-raising, including education and guidance, as well as data-sharing among Parties, organizations and stakeholders, as important tools to maximize the use of resources and reduce the cost of interventions.

II. Multi-criteria analysis

10. Multi-criteria methods for decision-making provide a structured process that can help to resolve issues involving several factors and identify the best solutions to complex problems that require different assessment criteria or data. Such methods enable the rapid assessment of options and are already widely used to support decision-making relating to invasive alien species, for example, through a risk assessment. They can be used with expert knowledge and opinion when information is limited or in circumstances where more detailed but data-intensive approaches, such as cost-benefit analysis, may be impractical. By breaking problems down into their individual components, multi-criteria methods can be used to assess options for decision-making in a transparent and rational manner.

11. Analytic methods and data requirements for the prioritization of species, sites and pathways are often quite different from one another. Multi-criteria methods can therefore help with making decisions on the management of invasive alien species, such as when to choose between prevention, eradication or long-term management objectives, how to produce the rapid assessments of large numbers of species or how to compare the feasibility of various management options. Multi-criteria decision-making approaches can also be used when applying risk, 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 is effective, cost-effective and feasible.

12. Because multi-criteria approaches often operate in the absence of published data, concerns may be raised over the use of experts' opinions or unsubstantiated information. The source, relevance and limits of the information and data used and their respective uncertainties should therefore be integrated into the analysis and explicitly presented in the interpretation of the results. Multi-criteria analyses could benefit from existing risk analyses for some species and standardized methods for impact assessment, such as the environmental impact classification for alien taxa⁹ and the socioeconomic impact classification for alien taxa.¹⁰ The way in which multiple criteria are combined to support an overall conclusion can also result in divergent views, as the conclusion is often based on pragmatism rather than a validated approach. Case-by-case assessments to consider the usefulness of those methods under specific circumstances are therefore advisable.

13. The application of multi-criteria methods can be improved through, inter alia, the review and harmonization of methods to develop best practices and common protocols; increased dialogue with experts from other fields, such as plant health, to develop best practices; the application of updated risk analysis tools, such as the aquatic species invasiveness screening kit¹¹ and long-term analysis,¹² when data are available; increasing published peer-reviewed and open-access quantitative data and research efforts to generate quantitative data; and the use of traditional indigenous knowledge, pending the free, prior and informed consent¹³ of the indigenous peoples concerned, which may often be unpublished, to complement information from other published sources.

III. Additional actions for the management of invasive alien species

14. The following measures are suggested for Parties, local and subnational governments, organizations and stakeholders, as applicable:

(a) Developing coordinated strategies at various levels of government to minimize the incursions and impacts of invasive alien species. The strategies can be developed as part of national biodiversity strategies and action plans and/or national invasive species strategies and action plans, if possible using similar timescales and taking into consideration broader international cooperation. It 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, civil society organizations, indigenous peoples and local communities, women and youth

(b) Sharing information¹⁴ on best practices for the prevention, management, control and eradication¹⁵ of invasive alien species to support risk analysis and management prioritization. This can be done through inter-agency and cross-sectoral knowledge and information exchange at all levels of government¹⁶ and can include the production of tools (e.g. prioritized lists for action¹⁷ and common data formats); the application of the best available identification and prioritization methods,

⁹ www.iucn.org/resources/conservation-tool/environmental-impact-classification-alien-taxa.

¹⁰ Sven Bacher and others, "Socioeconomic impact classification of alien taxa (SEICAT)", *Methods in Ecology and Evolution*, vol. 9, No. 1 (April 2017).

¹¹ See Centre for Environment, Fisheries, and Aquaculture Science, "Decision support tools for the identification and management of invasive non-native aquatic species", available at www.cefas.co.uk/expertise/research-advice-and-consultancy/non-native-species/decision-support-tools-for-the-identification-and-management-of-invasive-non-native-aquatic-species/.

¹² For example, a number of science-based international standards for pest risk analysis have been adopted by the Commission on Phytosanitary Measures of the International Plant Protection Convention (see www.ippc.int/en/core-activities/standards-setting/ispm/).

¹³ "Free, prior and informed consent" refers to the tripartite terminology of "prior and informed consent", "free, prior and informed consent" and "approval and involvement" (decision 15/4, annex).

¹⁴ See paragraph 5 of decision 15/27, in which the Conference of the Parties encouraged Parties to facilitate data-sharing.

¹⁵ This refers to the application of measures to prevent the introduction of, control or eradicate invasive alien species (CBD/IAS/AHTEG/2019/1/2, para. 13 (e)).

¹⁶ See, for example, regulation (EU) 2016/2031 of the European Parliament and of the Council of 26 October 2016 on protective measures against pests of plants.

¹⁷ Such lists might be specific to an area or species.

including cost-benefit and multi-criteria methods; and training, capacity-building and technology-transfer efforts;

(c) Considering economic, social and cultural values, as well as possible positive and negative impacts on native biodiversity when assessing the costs, benefits and prioritization of intervention strategies for the prevention, management, control and eradication of invasive alien species. This could build on existing processes, such as the socioeconomic impact classification for alien taxa, and international best practices¹⁸ relating to the engagement of indigenous peoples and local communities, women, youth and stakeholders in decision-making. It is suggested that guidelines be developed to include social and cultural values more explicitly when assessing the costs, benefits and prioritization of management;

(d) Considering, where possible, that the decisions and risk analyses should be based on science, following international standards agreed under relevant international organizations or instruments, such as the International Plant Protection Convention and the World Organization for Animal Health, while at the same time considering, as far as possible, indigenous knowledge systems, including their social, cultural and ecological dimensions, which can contribute to a comprehensive assessment;

(e) Communicating risks associated with invasive alien species, including related uncertainties, in a holistic manner, and the potential consequences associated with their introduction, and considering impacts on biodiversity, the economy, the cultural and social values of indigenous peoples and local communities, public health, animal health and welfare, the quality of life and climate resilience;

(f) Applying early detection and rapid response measures to prevent new invasions from alien species, including through rapid risk assessments, potential scenario-driven distribution models, monitoring, citizen science programmes and alert systems and rapid response protocols, such as incident command systems;

(g) Using context-specific tools and interventions in terms of risk levels and biodiversity characteristics. This could be useful for the management of priority sites for prevention, eradication or control, such as islands where invasive alien species are a major driver of biodiversity loss, including through the use of island-specific prioritization tools, or in marine and connected water systems, where prevention is particularly critical;

(h) Using decision support tools, which enable management actions to proceed in line with the precautionary approach, despite knowledge and data gaps;

(i) Undertaking rapid assessments to support decision-making on measures to eradicate, contain or manage invasive alien species. Rapid methods in non-monetary terms may assist to produce “shortlists” of priority species to be considered for management. Detailed pilot studies and economic assessments are however needed to support decision-making on management actions. To support risk management, additional or supplementary methodologies may be required if large numbers of species need to be rapidly assessed, detailed information is lacking or non-monetary-based inputs on social and cultural values are required.

¹⁸ For example, the European Alien Species Information Network.

Annex II

Identification and minimization of additional risks associated with cross-border e-commerce in live organisms and the impacts thereof

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.

I. Suggested actions for national and subnational authorities and border agencies

A. Legislation, policy and technical actions

2. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Investigating and evaluating risks, including those from cross-border trade, posed by all forms of e-commerce¹⁹ in invasive and potentially invasive alien species, and developing and implementing appropriate risk management strategies;²⁰

(b) Reviewing existing national, subnational and regional legislation regulations²¹ and policies, as appropriate, verifying whether e-commerce is adequately addressed and making any changes necessary to ensure that enforcement actions may be taken, where needed, to reduce the risk of biological invasions associated with e-commerce in wildlife²² (in line with decision XIII/13 of 17 December 2016);

(c) Reducing the risk associated with trade in invasive alien species sold online (in line with decision XIII/13, para. 7) by using the guidance on devising and implementing measures to address the risks associated with the introduction of alien species as pets, aquarium and terrarium species and as live bait and live food (in line with decision XII/16 of 10 October 2014) and the supplementary voluntary guidance for avoiding the unintentional introductions of invasive alien species associated with trade in live organisms (in line with decision 14/11 of 29 November 2018);

(d) Enhancing international and regional cooperation initiatives and networks, with a view to exchanging good practices to enhance national and subnational policies and legislations, recognizing specific circumstances and priorities;

(e) In cooperation with relevant organizations, establishing and supporting mechanisms to identify the occurrence and spread of invasive alien species associated with e-commerce, with a focus on high-risk and potentially high-risk consignments, such as soils, growing media and living organisms (including their bedding, where applicable);

(f) Using, as appropriate, available tools, such as the Global Register of Introduced and Invasive Species,²³ that provide country-level checklists of alien and invasive alien species and can support actions for the identification of invasive alien species associated with e-commerce;

(g) Assessing invasion risks posed by alien species before permitting their entry. Such assessments might be used for establishing or updating lists of invasive and potentially invasive alien species in the interest of preventing their unintended introduction, especially in territories particularly vulnerable to invasive alien species, such as islands. Such considerations should be aligned with the

¹⁹ See decision XII/17, para. 9 (d).

²⁰ See, for example, Convention on the Conservation of European Wildlife and Natural Habitats Standing Committee document T-PVS/Inf(2021)39.

²¹ See, for example, regulation (EU) 2016/2031 of the European Parliament and of the Council of 26 October 2016 on protective measures against pests of plants.

²² Wildlife is defined as wild fauna and flora.

²³ See www.griis.org.

guidance contained in decisions XII/16 and 14/11 and other applicable international obligations and standards, including those linked to the General Agreement on Trade in Services,²⁴ that are relevant to cross-border e-commerce;

(h) Revising and updating international agreements and import requirements, including for e-commerce, on invasive and potentially invasive alien species that do not fall under phytosanitary requirements or that have a potential to be hitchhikers or contaminants of other species.

B. Stakeholders' engagement

3. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Developing mechanisms, in collaboration with e-commerce stakeholders, for identifying e-commerce traders, their locations and other stakeholders with a view to facilitating inter-agency and multi-stakeholder participation and cooperation (in line with decision XIII/13, para. 7);

(b) Engaging and collaborating with indigenous peoples and local communities, women and youth, as well as the wider community and general public, towards the prevention and detection of the early incursion, establishment or spread of invasive alien species from e-commerce;

(c) Helping to ensure compliance with sanitary, phytosanitary and veterinary import, animal welfare and wildlife trade requirements of importing countries between customers and e-commerce traders by providing updated and quality information on the risks to the customer's country (in terms of legal, environmental, health and sociocultural aspects) (in line with decision 14/11, para. 10);

(d) Strengthening coordination and communication with sellers and exporters of live organisms and e-commerce users and, when applicable, postal and courier services, to help to communicate relevant information on the risks and preventive measures, noting the limitations of postal and courier services when it comes to regulating the import of goods (in line with decision XII/16, para. 24, and taking into consideration decision 14/11, annex I, paras. 7, 9–11, 13 and 29);

(e) Ensuring, in collaboration with national and regional trade authorities, that import and export requirements are up to date, clear and accessible to e-commerce traders, indigenous peoples, local communities and relevant stakeholders;

(f) Informing sellers and buyers about invasive and potentially invasive alien species, focusing on their legal responsibility. The involvement of social media and specialized media, such as pet magazines, journals and books, especially journals from pet or plant associations or societies, and magazines and journals on biocontrol agents can be sought and multi-agency targeted publicity campaigns can be launched to disseminate correct information, with the aim of shifting consumer values (e.g. towards native and non-invasive species) and changing behaviours (e.g. to prevent the impulse purchase of invasive alien species) (in line with decision XIII/13, para. 4);

(g) Encouraging partnerships and collaboration with e-commerce platforms, e-payment service providers and postal and express courier services to ensure adherence to national regulations, international standards and guidance on invasive alien species in their operations, consistent with other international obligations (in line with decision XIII/13, para. 7 (b));

(h) Implementing the single-window 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.²⁵ Its implementation at the national and subnational levels may facilitate reporting on regulated articles, including live alien organisms with phytosanitary and sanitary risks

²⁴ See www.wto.org/english/tratop_e/serv_e/gatsintr_e.htm.

²⁵ See 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.

and risks to biodiversity (in line with decision XIII/13, para. 7 (c), and decision 14/11, annex I, para. 32). The single-window approach can interoperate with relevant existing information systems (e.g. the European Alien Species Information Network)²⁶ for sharing relevant information (two-way data flow).

C. Monitoring and compliance

4. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Gathering data in accordance with national legislation and circumstances (in line with decision 14/11, annex I, paras. 34–36), using all available means and tools, including citizen science, to monitor compliance and evaluate the efficacy of activities implemented to mitigate risks associated with e-commerce. The data collected can be used, together with other relevant information, including compliance history and information from indigenous peoples and local communities obtained with their free, prior and informed consent,²⁷ to inform risk-based inspections and determine whether investigation or enforcement action is needed. Data analytics can be applied to discern any abnormal trends and patterns, including potentially invasive alien species incursions and impact risks;

(b) Disseminating good practices on risk-based interventions using best-practices in data analytics to facilitate legitimate e-commerce and, at the same time, identify and stop illegal trade. Wherever possible, prioritizing the use of non-intrusive inspection technologies and promoting 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 the detection of prohibited and restricted articles moving through the express courier and postal systems;

(c) Developing and implementing training and illustrated tools to facilitate an appropriate level of monitoring and inspection of e-commerce markets, in particular considering the challenges related to labelling, which may make understanding what might need to be inspected more difficult. This may include developing guidance for monitoring e-commerce platforms and issuing warnings, notices and other enforcement actions when non-conformity is detected in e-commerce transactions and for the proper handling of restricted items seized in compliance with national and subnational laws and regulations.

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

5. Web marketplaces (sale platforms) can be classified into three categories, which can overlap, namely:

(a) Online marketplaces, which are larger online sites that sell a great variety of items and often provide individual retailers with access to international buyers (e.g. eBay and Amazon);

(b) Individual retailers who sell online across borders from their own sites and may have physical shops);

(c) Peer-to-peer trading platforms, such as Facebook groups, or other online platforms dedicated to, for example, certain types of pets, through which trading takes place between primarily non-commercial entities. These tend not to buy or sell across borders.

6. The following actions are suggested for web marketplaces (sale platforms), e-payment service providers and postal and express courier services, as applicable:

(a) Using the information available from relevant international bodies, national and subnational authorities and other sources regarding the risks (both legal and environmental) posed

²⁶ See <https://easin.jrc.ec.europa.eu/easin>.

²⁷ “Free, prior and informed consent” refers to the tripartite terminology of “prior and informed consent”, “free, prior and informed consent” and “approval and involvement” (see decision 15/4, annex).

by invasive alien species to take steps accordingly to make their users aware of them (in line with decision 14/11, annex I, paras. 11–13);

(b) Monitoring e-commerce taking place on their platforms and, consistent with relevant national and subnational legislation, improving the ability to verify the cargo of postal parcels and alert relevant authorities where there is evidence of illegal or otherwise potentially damaging trade in invasive alien species;

(c) Developing and applying improved management measures to minimize the risks of introducing invasive and potentially invasive alien species through e-commerce, consistent with international and national obligations.

III. Suggested actions for relevant international organizations, bodies and agreements, including standard-setting organizations

7. The following actions are suggested for international organizations and bodies, as applicable:

(a) Sharing data, information, technology and expertise on e-commerce in invasive and potentially invasive alien species;

(b) Using guidance from relevant international bodies, including the ongoing work conducted by the World Customs Organization, the Convention on the Conservation of European Wildlife and Natural Habitats, the International Plant Protection Convention²⁸ and the World Organization for Animal Health;

(c) Monitoring e-commerce in invasive and potentially invasive alien species at the global and regional levels, with a view to identifying trends and risks in relation to trade in those species;

(d) Developing guidance and tools to assist national border agencies in responding to non-compliance, considering that both domestic and international actions may be required to respond effectively;²⁹

(e) Improving collaboration among 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 and departments on issues related to cross-border e-commerce;

(f) Conducting joint capacity-building activities with relevant organizations, Parties and other Governments at all levels, providing technical assistance and resources for implementing existing international guidelines and standards and developing national 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) Exploring the possibility to expand the concept of “authorized economic operators”³⁰ to cross-border e-commerce, including for postal operators, express carriers and e-platforms, which would result in a lower frequency of inspections;

²⁸ The management of e-commerce and postal and courier pathways has been identified as one of eight development agenda items in the Strategic Framework 2020–2030 of the International Plant Protection Convention (see International Plant Protection Convention, Outline for the International Plant Protection Convention e-Commerce Guide for plants, plant products and other regulated articles (2017-039)).

²⁹ This framework is provided in the World Customs Organization *SAFE Framework of Standards*.

³⁰ See the World Customs Organization *Compendium of Authorized Economic Operator Programmes*. Available at www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/tools/safe-package/aeo-compendium.pdf?db=web.

(h) Developing frameworks and resources that enable the advanced electronic exchange of data among all parties involved in the international supply chain and using the data to sort packages and determine the level of inspection needed (risk-based inspection);³¹

(i) Raising awareness among international organizations, regional organizations, national organizations and e-commerce stakeholders about import and export requirements and actions that can be taken to prevent or minimize the risk of introduction and spread of invasive and potentially invasive alien species associated with e-commerce³² (in line with decision XIII/13, para. 7 (a));

(j) Building upon such frameworks as the environmental impact classification for alien taxa,³³ considering the development and implementation of an international invasive alien species risk-based labelling system to inform buyers and importers and to be used for all species sold online. With regard to consignments of live alien species, such labelling could include information enabling the identification of hazards for biodiversity and the identification of species or lower taxa (e.g. scientific name and taxonomic serial number or its equivalent) (in line with decision XII/17, para. 6 (g), of 10 October 2014, and decision 14/11, annex I, para. 14), taking into account the ongoing work of the Economic and Social Council Subcommittee of Experts on the Transport of Dangerous Goods, the World Trade Organization, the International Plant Protection Convention, the World Organization for Animal Health and other relevant organizations and instruments.

³¹ See International Plant Protection Convention ePhyto Solution. Available at www.ippc.int/en/ephyto/.

³² Including aquatic species, as many requirements are centred on terrestrial pests and diseases.

³³ See www.iucn.org/resources/conservation-tool/environmental-impact-classification-alien-taxa.

Annex III

Management of invasive alien species as it relates to the prevention of potential risks arising from climate change and other drivers of biodiversity loss

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.

I. Linkages between invasive alien species, climate change and other drivers of biodiversity loss

2. Global drivers of biodiversity loss, such as land use and climate change, are known to lead to changes in terrestrial and aquatic ecosystems that have profound consequences for biodiversity. Climate change and other drivers of biodiversity loss facilitate the spread and establishment of many alien species and create new opportunities for them to become invasive. Those interactions are considered in a report for the Ad Hoc Technical Expert Group on Invasive Alien Species issued in 2019³⁴ and documented in *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers* of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.³⁵

3. Climate change can increase the rates and risks of introduction, establishment and spread of many invasive and potentially invasive alien species. Human adaptations to climate change may alter land use and increase disturbances in the ecosystems, which, in turn, facilitate the establishment of alien species. Climate change can also affect the range and expansion of and shifts in host species of, for example, invasive insects and pathogens, which could lead to the propagation of pests and diseases.

4. Climate change is associated with more frequent extreme weather events, such as drought, cyclones and flooding, as well as slow-onset events. Extreme events can contribute to the movement of invasive and potentially invasive alien species to new areas and cause disturbances in habitats that enable invasive alien species to establish themselves and spread. They can also lead to sudden human population movements, and displaced people can inadvertently transport invasive alien species with them.

5. Not all alien species incursions are successful, nor will all invasive alien species benefit from climate change, as some may become less abundant under changing climate conditions. However, while some invasive alien species will decline in importance, the currently low impact of others may become significant.

6. The prevention and management of invasive and potentially invasive alien species become an even greater challenge with climate change and other drivers of biodiversity loss, in particular for island ecosystems and island States. Adequate information, actions for prioritization and other tools that support the management of invasive alien species in the face of climate change will be required.³⁶

7. Land- and sea-use changes interact with the various stages of biological invasions, including transport, introduction, establishment and spread. This applies to terrestrial, aquatic and marine biomes. Disturbances and land transformations offer new opportunities for new species to colonize

³⁴ [CBD/IAS/AHTEG/IAS/2019/1/2](#).

³⁵ Helen E. Roy and others, *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers* (Bonn, Germany, Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services Secretariat, 2023).

³⁶ See [CBD/IAS/AHTEG/2019/1/3](#).

and spread, and land- and sea-use changes can often bring about the use of introduced species (e.g. new forage species and plantation trees).³⁷

II. Prediction

8. Managing the impacts of invasive alien species on biodiversity and ecosystem services, in particular in the context of climate change and other drivers of biodiversity loss, requires understanding how the actual and potential environmental, socioeconomic and cultural impacts may vary as a result of those changes, so that management priorities may be adapted accordingly. In this sense, modelling and foresight exercises under various climate change scenarios could be useful.

9. In view of the above, the following technical actions are suggested for Parties and stakeholders, as applicable (taking into account decision 14/5 of the Conference of the Parties to the Convention on Biological Diversity of 29 November 2018, especially its annex):

(a) Undertaking horizon scanning to forecast or predict future changes caused by climate change, in actual and potential risks and impacts of invasive alien species;

(b) Identifying changes caused by climate change in the pathway of introduction of invasive and potentially invasive alien species. Climatically similar regions exposed to the greatest current risks today are likely to change in future, along with changes in vectors and pathways, including changes in trade and the movement of people to and from those regions;

(c) Identifying the effects of climate change and other drivers of biodiversity loss on the introduction of new potentially invasive alien species or on their pathways of introduction and establishment in both pristine and already invaded communities;

(d) Applying modelling (e.g. for climate, species distribution and time-space scales) to evaluate the potential for range expansion of invasive alien species under various climate change scenarios and their impacts on biodiversity and ecosystem services, including by developing models for use on a broad scale by developing countries;

(e) Improving methods to integrate climate change models, land-use scenarios and trends in trade with the help of invasive alien species data analysis to improve projection capability;

(f) Defining scenarios to understand where invasive alien species may indirectly compound the impacts of climate change on biodiversity and ecosystem services by transforming ecosystems;

(g) Refining the risk analysis of invasive alien species, including by identifying potentially invasive alien species (e.g. disease vectors) that, under current conditions, remain without significant impact but are likely to become established or invasive and to have an increased impact owing to rapid population growth as a result of climate change (the so-called “sleeper alien species”). This can be done, inter alia, by using societal participation and digital technologies (e.g. in epizootic surveillance) and approaches, such as through the use of sentinel sites to monitor changes in the abundance, spread and impacts of such species, or by carrying out trait- and impact-based risk assessments;

(h) Improving knowledge of invasive and potentially invasive alien species that are likely to benefit under increased CO₂ levels, eutrophication, the presence of nutrients and fertilizers, pesticides, rising temperatures, the increased frequency of extreme weather events, fire regimes of increased frequency and intensity, high saltwater incursions, changes in ocean currents and changes in precipitation patterns. Improved scientific information will help to prioritize management

³⁷ See Convention on the Conservation of European Wildlife and Natural Habitats Standing Committee document T- PVS/Inf (2008) 5 rev.

decisions to prevent their spread and impacts, including by resorting to measures for eradication, containment and control;³⁸

(i) Improving knowledge of the risks of invasive alien species adapting to new environmental conditions, including their potential for rapid evolution and their role in disease spillover and hybridization, as well as the understanding of the impact of land-use changes on niche availability;

(j) Using indigenous biocultural indicators and traditional knowledge, with the free, prior and informed consent³⁹ of the peoples concerned, of early identification and warning systems, in prediction of invasive and potentially invasive alien species caused by climate change and other drivers of biodiversity loss.

III. Planning and prevention

10. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Prioritizing invasive alien species on the basis of potential direct and indirect impacts, such as their role in disease transmission, in the context of climate change;

(b) Prioritizing protected areas, key biodiversity areas and other effective area-based conservation measures, taking into account nature contributions to people and ecosystem goods and services, as well as ecosystem functions on those priority sites;

(c) Monitoring the spread and impact of all potential and established alien species, in particular in sites or regions where biodiversity and ecosystem services are likely to deteriorate rapidly as a result of climate change and other drivers of biodiversity loss. Evidence-based and best-practice approaches using, for example, remote sensing or sensor networks are recommended, as well as digital tools for participatory surveillance by local civil society groups;

(d) Minimizing the potential impacts of biological invasions and developing spatial response planning for areas in which communities are threatened with a high risk of extreme weather events (e.g. by relocating zoos, botanical gardens and exotic aquaculture facilities from areas prone to extreme weather events);

(e) Considering the movement of post-disaster debris as a potential pathway of introduction of alien and invasive alien species;

(f) Adapting current pathway management to reduce risks arising from climate and other drivers of biodiversity loss, including by predicting associated changes in trade and the movement of people;

(g) Engaging all sectors, including agriculture and public health agencies and industries, in planning activities relating to invasive alien species where risks from climate change and other drivers of biodiversity loss are cross-sectoral, in line with the whole-of-society and whole-of government approach called for in the Framework;

(h) Raising public awareness of threats from invasive alien species further aggravated by climate change and other drivers of biodiversity loss, and engaging the public and all relevant sectors in response planning;

³⁸ Where applicable, humane measures and guidelines should be considered when applying management measures. See Kevin Smith and others, *A Manual for the Management of Vertebrate Invasive Alien Species of Union Concern, Incorporating Animal Welfare*, 1st ed. (European Union, 2022).

³⁹ “Free, prior and informed consent” refers to the tripartite terminology of “prior and informed consent”, “free, prior and informed consent” and “approval and involvement” (see decision [15/4](#), annex).

- (i) Supporting best practices and traditional knowledge,⁴⁰ innovations and practices of indigenous peoples and local communities with regard to the prevention, monitoring, controlling and mitigation of the impacts of invasive alien species caused by climate change and other drivers of biodiversity loss;
- (j) Engaging regional and local specialists, including animal welfare and zoonotic disease experts, when considering prevention, planning and mitigation measures;
- (k) Promoting early detection and rapid response.

IV. Management

11. The following management actions are suggested for Parties, organizations, indigenous peoples and local communities and relevant stakeholders, where applicable:

- (a) Applying adaptive management approaches to prioritize management actions in the context of climate change and other drivers of biodiversity loss and sharing the information with other Parties and stakeholders to improve outcomes;
- (b) Taking steps to increase the long-term functional resilience of ecosystems and habitats threatened by climate change, extreme weather events, natural disasters and associated invasive alien species incursions, in particular in islands and coastal systems (in line with decision 14/5, paras. 3 (h) and 4 (b) and annex, and decision X/33, para. 8 (n), of 29 October 2010);
- (c) Undertaking focused management actions, including mitigation, monitoring, containment, eradication, when possible, or control of invasive and potentially invasive alien species, in areas that could act as non-native sources for spread into identified vulnerable areas or native communities;
- (d) Collating existing data and information into international online databases (e.g. the Global Invasive Species Database)⁴¹ to enable the interoperable collection and dissemination of data and information on the effectiveness of actions to mitigate the impacts of invasive alien species arising from climate change and other drivers of biodiversity loss;
- (e) Taking into account the precautionary approach when contemplating ex situ conservation measures, such as relocation or assisted migration, to avoid unintended ecological consequences, such as the introduction and spread of invasive alien species (in line with decision X/33, para. 8 (e));
- (f) Collaborating with indigenous peoples and local communities with their free, prior and informed consent to document and support best practices and traditional knowledge, with regard to the monitoring, control and mitigation of the impacts of invasive alien species, diseases and shifting species distributions caused by climate change and other drivers of biodiversity loss;
- (g) Providing tools⁴² and mechanisms for collecting and analysing data, for effective decision-making on addressing linkages between climate change and invasive alien species;
- (h) Making use of the categorization of pathways of introduction of invasive alien species and considerations for their prioritization⁴³ to have a common understanding of and nomenclature for pathway categorization (in line with decision XII/17, para. 6 (d));

⁴⁰ Traditional knowledge is defined as the knowledge, innovations and practices of indigenous and local communities embodying tradition lifestyles relevant to the conservation and sustainable use of biological diversity (decision 14/13).

⁴¹ See www.iucngisd.org/gisd/.

⁴² For example, the Environmental Impact Classification for Alien Taxa can be used to look at the impacts of species in various climatic zones, which might help to predict the future impacts of species in areas that may become climatically similar.

⁴³ See [UNEP/CBD/SBSTTA/18/9/Add.1](http://www.unep.org/cbd/sbstta/18/9/Add.1).

(i) Ensuring that national policies on climate change and other drivers of biodiversity loss recognize their linkage to the potential establishment and spread of invasive alien species, especially through climate change adaptation activities.

V. National, regional and international cooperation

12. The following areas can benefit from national, regional and international cooperation in addressing challenges related to invasive alien species:

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

(b) Policy guidance developed under other relevant conventions (e.g. the United Nations Framework Convention on Climate Change,⁴⁴ the Convention on the Conservation of Migratory Species of Wild Animals,⁴⁵ the International Treaty on Plant Genetic Resources for Food and Agriculture,⁴⁶ the Convention on International Trade in Endangered Species of Wild Fauna and Flora⁴⁷ and the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa);⁴⁸

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

(d) The One Health approach;

(e) Programmes and other activities funded by multilateral agencies or forums, such as the Global Environment Facility, the Clean Development Mechanism, the Green Climate Fund, the Blue Fund, the Loss and Damage Fund and other donors;

(f) Training, capacity-building and knowledge transfer for governmental and non-governmental development assistance agencies and operatives engaged in disaster relief on the risks of introduction and spread of invasive and potentially invasive alien species through their activities.

⁴⁴ United Nations, *Treaty Series*, vol. 1771, No. 30822.

⁴⁵ United Nations, *Treaty Series*, vol. 1651, No. 28395.

⁴⁶ United Nations, *Treaty Series*, vol. 2400, No. 43345.

⁴⁷ United Nations, *Treaty Series*, vol. 993, No. 14537.

⁴⁸ United Nations, *Treaty Series*, vol. 1954, No. 33480.

Annex IV

Risk analysis of the potential consequences of the introduction of invasive alien species on socioeconomic and cultural values

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.
2. Socioeconomic and cultural values are often context-dependent, as they may include such issues as security, material and non-material assets, health and social, spiritual and cultural relationships. The impacts of invasive alien species should therefore be determined on a case-by-case basis. Social impact assessments,⁴⁹ which were developed alongside environmental impact assessments, offer a structured process for identifying, evaluating and addressing social costs and benefits.
3. Risk analyses allow for both scientific and technical information and socioeconomic and cultural information to be considered in the decision-making process. In this regard, inputs from cost-benefit and cost-effectiveness analyses (see annex I) can be useful during a risk analysis and facilitate the consideration of socioeconomic and cultural values.
4. In addition, in the context of a risk analysis, risk communication plays an important role in facilitating a common understanding of the risks posed by invasive alien species, developing credible risk management options and consistent regulations and promoting awareness.

Consideration of socioeconomic and cultural values

5. The following actions are suggested for Parties, organizations and stakeholders, as applicable:
 - (a) Recognizing and respecting the traditional knowledge,⁵⁰ innovations and practices of indigenous peoples and local communities, women and youth that can contribute to the monitoring, early detection and control of invasive alien species, and integrating emerging technologies in a way that complements and respects indigenous knowledge systems;
 - (b) Promoting knowledge and information-sharing through culturally appropriate solutions and capacity-building among indigenous peoples, local communities, women, youth and stakeholders, thereby ensuring their active participation in decisions and practices concerning invasive alien species management, with their free, prior and informed consent,⁵¹ as appropriate;
 - (c) Developing guidelines to include socioeconomic and cultural values more explicitly when assessing the costs, benefits and prioritization of management measures for invasive alien species. This could build upon existing processes (e.g. the socioeconomic impact classification for alien taxa)⁵² and international best practices with regard to the engagement of indigenous peoples, local communities and relevant stakeholders in decision-making, as well as upon existing guidelines of similar scope for other processes, as applicable;
 - (d) Gathering qualitative and quantitative data on the socioeconomic and cultural impacts of invasive alien species (e.g. how the impacts of invasive alien species on treasured, sacred,

⁴⁹ Social impact assessments include the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (Frank Vanclay, "International principles for social impact assessment", *Impact Assessment and Project Appraisal*, vol. 21, No. 1 (March 2003)).

⁵⁰ Traditional knowledge is defined as the knowledge, innovations and practices of indigenous and local communities embodying tradition lifestyles relevant to the conservation and sustainable use of biological diversity (decision 14/13).

⁵¹ "Free, prior and informed consent" refers to the tripartite terminology of "prior and informed consent", "free, prior and informed consent" and "approval and involvement" (see decision 15/4, annex).

⁵² Sven Bacher and others, "Socioeconomic impact classification of alien taxa (SEICAT)", *Methods in Ecology and Evolution*, vol. 9, No. 1 (April 2017).

culturally and spiritually significant native species can be measured)⁵³ and developing methods for the consideration of that information in the prioritization and management of invasive alien species;

(e) Considering public awareness, education campaigns for all ages, especially in schools, and for consumers and risk communication to support stakeholders' engagement in the consideration of the impact of invasive alien species on socioeconomic and cultural values;

(f) Using social impact assessments to assess the impacts on people and communities of an intervention for the management of alien and invasive alien species in a multistage manner. This will facilitate the analysis of information collected before, during and after an intervention.⁵⁴

⁵³ The eradication of invasive alien species can sometimes affect the interests of indigenous communities when the species has become an important resource over time. This should be a consideration in choosing the best management approach, where compatible with conservation outcomes.

⁵⁴ Franck Vanclay and others, *Social Impact Assessment: Guidance for Assessing and Managing the Social Impacts of Projects*, (International Association for Impact Assessment, 2015).

Appendix

Examples of considerations of socioeconomic and cultural values

Nepal

1. Government agencies, in cooperation with various organizations and communities, have developed awareness-raising campaigns, research and on-the-ground management strategies to support the establishment of early warning systems to combat the spread and impact of invasive alien species and promote the restoration of native habitats affected by them. Addressing that challenge has required sustained collaboration among stakeholders, including government bodies, research institutions, local communities and indigenous organizations. Through cooperation, it is possible to mitigate the adverse effects of invasive species and protect the unique biodiversity of Nepal for future generations.

New Zealand

2. The Government of New Zealand is working on the incorporation of cultural knowledge, values and perspectives (*mātauranga*) in the management of invasive alien species. Māori are involved in the management of invasive alien species, especially when culturally and spiritually significant (*taonga*) species are at risk. The national invasive alien species system provides an example of working in partnership with indigenous people, under the unique constitutional context of the Treaty of Waitangi, to contribute to improving biodiversity outcomes.

South Africa

3. The Constitution of South Africa provides that everyone has the right to an environment that is not harmful to his or her health or well-being, thereby providing a basis for socioeconomic considerations. The National Environment Management: Biodiversity Act, 2004, Alien and Invasive Species Regulations provide that a risk assessment should include key economic, social and ecological considerations (without defined modalities) that will guide a decision on whether or not to issue an import permit for exotic species. Some studies suggest that environmental and socioeconomic impacts are significantly correlated, as in the case of the water hyacinth.

Sweden

4. Certain invasive alien species, such as *Lupinus polyphyllus*, *Rosa rugosa*, *Heracleum mantegazzianum* and *Impatiens glandulifera*, have an impact on biologically and culturally important meadows and pastures characterized by a specific flora and fauna resulting from traditional agricultural practices that are increasingly being abandoned. Such meadows and pastures form the traditional Swedish countryside, which is homely and picturesque. Some socioeconomic impacts of biodiversity loss have been recognized, including the loss of quality and value of honey derived from modified pastures. Invasive plant species can form monocultures, replacing the diversity of endemic flora and completely changing the scenery. The cultural impact of a changing scenery on the average member of the population is difficult to measure.

Annex V

Relevance of databases to support the management of invasive alien species

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.

I. Importance of databases

2. Information on such issues as species distribution, characteristics and impacts is essential for applying analytical tools (e.g. risk analysis, cost-benefit and cost-effectiveness analyses, and establishment, spread and population modelling) and designing effective actions to minimize the impact of invasive alien species.

3. There are currently several databases⁵⁵ that provide useful information on the prevention, control or eradication of invasive alien species. Well-maintained databases with agile systems that reduce the time lag between the detection of an alien species in the field and the availability of that information online can inform decision-making and support the achievement of and monitoring of progress towards Target 6.

4. The use of a common, well-defined and accepted terminology is important to enable a more effective use of information from databases, including by ensuring a better flow of data and harmonization among the different platforms.

5. Since databases are key to the prioritization and management of actions regarding invasive alien species, long-term funding is needed to support their proper operation and maintenance to ensure continued data availability in support of decision-making. In addition, access to databases on invasive alien species and their management requires capacity-building, improved technical and scientific cooperation and technology transfer. Similarly, permanent efforts are needed from the international community to maintain and update existing data systems.

II. Maintenance of efficient, timely and high-quality up-to-date standardized data and information for the management of invasive alien species

6. The following actions are suggested for Parties, organizations, stakeholders and database managers, as applicable:

(a) Performing an analysis of the focus and contents of all the international platforms that are currently available, to evaluate whether there is sufficient information and capacity to track progress towards Target 6, and identify and fill any gaps;

(b) Increasing collaboration among data providers to address data gaps, especially for regions, ecosystems and organism groups for which knowledge is poor (e.g. alien marine species, invertebrates, microorganisms and fungi) and to keep information on databases up to date;

(c) Maintaining a dynamic data flow of records of invasive alien species occurrences from a wide variety of sources, including field monitoring, citizen science and specimen collections, as brought together by the Global Biodiversity Information Facility,⁵⁶ on the one hand, and expert-

⁵⁵ See *The Thematic Assessment Report on Invasive Alien Species and their Control: Summary for Policymakers*, appendix 3 (see footnote 2).

⁵⁶ See www.gbif.org/.

derived checklists, including up-to-date literature reviews, as compiled in the Global Register of Introduced and Invasive Species,⁵⁷ on the other hand;

(d) Ensuring the interoperability of data streams between data providers (e.g. national authorities and researchers) and aggregators (e.g. the Global Biodiversity Information Facility, the Global Register of Introduced and Invasive Species, the CABI Compendium⁵⁸ and the European Alien Species Information Network)⁵⁹ to increase the data flows necessary for global and regional analyses and decision-making and to create opportunities for national capacity-building and financing;

(e) Considering the potential usefulness of supporting the development of an international database or repository, including by strengthening existing ones and avoiding duplication of work, where all the information needed for the implementation of Target 6 could be accessed in multiple languages and following a standardized format for ease of submission and translation. Such an international database could be used as a one-stop shop for information on invasive and potentially invasive alien species;

(f) Establishing strategies for the long-term funding of and support for the maintenance of databases and information systems, including support for the maintenance and ongoing development of the Global Register of Introduced and Invasive Species, the Global Invasive Species Database⁶⁰ and other expert networks focused on the collation and curation of new and existing data that can support the achievement of Target 6;

(g) Considering the need for knowledge and data-sharing to be free and open source and to overcome language and cultural barriers, while also taking into consideration the specific needs of developing Parties, which struggle with insufficient financial, technical and human resources. Establishing portals where case studies and best practices could be shared (e.g. an invasive alien species clearing house, such as the Global Invasive Alien Species Information Partnership)⁶¹ can be envisaged to facilitate that process;

(h) Including the training of agents in sectors where the control and prevention of invasive alien species can be enforced (e.g. customs agents, border and port police and cabotage managers);

(i) Obtaining the free, prior and informed consent⁶² of indigenous peoples and local communities when using their traditional knowledge;⁶³

(j) Using the CABI Compendium and the Global Invasive Species Database, which are encyclopedic resources of scientific information on invasive alien species, to inform decision-making;

(k) Using and developing, as appropriate, risk and impact assessment frameworks (e.g. the environmental impact classification of alien taxa⁶⁴ and the socioeconomic impact classification of

⁵⁷ See <https://griis.org/>.

⁵⁸ See www.cabidigitallibrary.org/journal/cabicompendium.

⁵⁹ See <https://alien.jrc.ec.europa.eu/easin>.

⁶⁰ See www.iucngisd.org/gisd/.

⁶¹ See www.cbd.int/invasive/giasipartnership/.

⁶² This should recognize that indigenous interest extends beyond the use of traditional knowledge and includes interests in how data relating to culturally significant species and places are used and how and where they are stored (e.g. the concept of indigenous data sovereignty). “Free, prior and informed consent” refers to the tripartite terminology of “prior and informed consent”, “free, prior and informed consent” and “approval and involvement” (see decision 15/4, annex).

⁶³ Traditional knowledge is defined as the knowledge, innovations and practices of indigenous and local communities embodying tradition lifestyles relevant to the conservation and sustainable use of biological diversity (decision 14/13).

⁶⁴ www.iucn.org/resources/conservation-tool/environmental-impact-classification-alien-taxa-eicat.

alien taxa)⁶⁵ for developing science-based policies and prioritizing actions to manage invasive alien species.⁶⁶

Annex VI

Additional advice and technical guidance on invasive alien species management

1. The present annex contains advice and voluntary guidance for Parties and stakeholders to support the implementation of the Kunming-Montreal Global Biodiversity Framework, in particular its Target 6, on invasive alien species, as well as other relevant targets.
2. The present advice does not constitute an attempt to modify the existing rights and obligations of a Party under the Convention or any other international agreement.

I. Use of sanitary and phytosanitary measures

3. The following actions are suggested for Parties, organizations and stakeholders, as applicable:
 - (a) Improving collaboration among relevant ministries and departments (e.g. environmental sanitary, phytosanitary and human health authorities) towards the application of sanitary and phytosanitary measures that can contribute to preventing the introduction and spread of invasive and potentially invasive alien species and disease spillover. The collaboration could include, for example, setting national and regional priorities, completing risk assessments, carrying out surveillance activities, developing response plans, sharing information and exchanging expertise;
 - (b) Broadening the application of sanitary and phytosanitary measures, not only in the context of agriculture, but also to protect the natural environment, biodiversity and human health, and considering the need for cross-sectoral collaboration and technology transfer, in line with the mandate of relevant conventions;
 - (c) Using, as appropriate, materials developed under the International Plant Protection Convention and the World Organisation for Animal Health to strengthen capacities and develop national regulatory frameworks and national biosecurity strategies to address the risks associated with invasive and potentially invasive alien species;
 - (d) Improving regional cooperation to support the achievement of Target 6, through regular coordination and communication, the identification of common priorities and the alignment of efforts. This could be supported through the International Plant Protection Convention by using the model of regional plant protection organizations to foster cooperation on invasive alien species;
 - (e) Addressing existing key gaps, such as the need for additional attention and guidance on the issues of pathogens affecting wildlife and invasive alien species that may be a vector or host of pathogens or parasites and of other organisms that do not meet the International Plant Protection Convention definition of quarantine pests or are not included in its list of pathogens causing diseases or listed by the World Organisation for Animal Health (e.g. invasive ants);

⁶⁵ See Sven Bacher and others, “Socioeconomic impact classification of alien taxa (SEICAT)”, *Methods in Ecology and Evolution*, vol. 9, No. 1 (April 2017).

⁶⁶ For an example on how to use the Environmental Impact Classification of Alien Taxa standard and its applications, see [CBD/AHTEG/IAS/2019/1/2](#), annex V, paras. 12–17.

(f) Considering how various approaches to regulating invasive alien species⁶⁷ (e.g. lists of restricted, prohibited or permitted species or hybrids) can be implemented in compliance with the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures, with a view to facilitating the development of better regulation and ensuring transparency;

(g) Developing guidance regarding invasive or potentially invasive alien species that do not fall under international agreements (e.g. those that are not regulated by sanitary and phytosanitary measures).

II. Management measures for specific pathways

4. The following advice refers to pathways⁶⁸ that present specific gaps and inconsistencies that need to be addressed (in line with decision VIII/27, paras. 16, 29–37, 40–44, 49–51, 58 and 59, of 31 March 2006).

A. Inter-basin water transfer and navigational canals

5. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Supporting the ratification and implementation of relevant international maritime agreements and guidelines (e.g. the International Convention for the Control and Management of Ships' Ballast Water and Sediments⁶⁹ and the Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species)⁷⁰ for all marine traffic, to minimize the spread of invasive and potentially invasive alien species through shipping routes;

(b) Enhancing regional cooperation on planning, monitoring and data exchange on invasive and potentially invasive alien species specifically related to inter-basin water channels, with a view to establishing early warning and rapid response systems, and researching and employing methodologies to reduce new invasions through those channels;⁷¹

(c) Promoting measures to prevent the introduction, establishment and spread of invasive alien species in procedures for the planning, development and management of inland waterways and coastal infrastructure, in consultation with relevant stakeholders, including indigenous peoples and local communities after obtaining their free, prior and informed consent,⁷² and other groups that are dependent on waterways (e.g. boaters and recreational boat users). Such measures could include training for port State authorities and relevant stakeholders to carry out controls and inspections;

(d) Requiring impact assessments, to ensure that invasive and potentially invasive alien species are considered in water transfer schemes and navigation canal projects, and developing technical advice on methods and mechanisms to prevent or minimize the introduction or spread of those species through canals and pipes.⁷³

B. Sea containers and cargos

6. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

⁶⁷ For example, the regional approach to surveillance and regulation of the European Centre for Disease Prevention and Control and of the European Food Safety Authority with regard to animal health (available at www.efsa.europa.eu/en/topics/topic/animal-health#efsas-role) and invasive alien species (available at www.efsa.europa.eu/en/topics/topic/invasive-alien-species).

⁶⁸ See UNEP/CBD/SBSTTA/18/9/Add.1.

⁶⁹ International Maritime Organization, document BWM/CONF/36, annex.

⁷⁰ International Maritime Organization Marine Environment Protection Committee resolution MEPC.207(62).

⁷¹ See, for example, regulation (EU) No. 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, art. 22, para. 1 (d), as supplemented by Commission delegated regulation (EU) 2018/968 of 30 April 2018, and the European Alien Species Information Network Notification System (available at <https://easin.jrc.ec.europa.eu/notsys>).

⁷² “Free, prior and informed consent” refers to the tripartite terminology of “prior and informed consent”, “free, prior and informed consent” and “approval and involvement” (see decision 15/4, annex).

⁷³ See decision VII/4, annex.

(a) Raising awareness of the issue of sea containers and their role in carrying alien species or invasive alien species, regardless of the type of cargo that they contain;

(b) Increasing further collaboration among relevant organizations, including the International Plant Protection Convention, the World Organisation for Animal Health, the International Maritime Organization and the World Customs Organization, the business sector and relevant stakeholders to develop harmonized operational standards and guidance, as applicable, to address existing and potential pathways of biological invasion (contaminants, stowaways or hitchhikers) by means of sea containers, taking into account the appropriate treatment of sea containers before loading cargos;⁷⁴

(c) Avoiding the introduction and spread of invasive and potentially invasive alien species through the transport of sea containers (in line with decision XIII/13, para. 11, decision 14/11, annex I, paras. 10 and 34–36, and other relevant international guidance)⁷⁵ and ensuring that trade partners involved in sea container supply chains exercise due diligence when assuming their custodial responsibility to verify that containers are free of visible pest contamination before they are transferred into the custody of the next responsible party in the chain.

C. Marine biofouling

7. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Developing and promoting new regulations to prevent and address biofouling of marine infrastructures, such as offshore wind farms, oil platforms, ports and shore defences;

(b) Informing and training shipping and boating stakeholders on preventing the introduction and spread of invasive alien species (e.g. by raising awareness of the recommendations contained in the publication *Biofouling Management for Recreational Boating*);⁷⁶

(c) Developing mitigation measures and programmes to prevent the introduction or spread of aquatic invasive and potentially invasive alien species. Such measures are particularly important given that it is almost impossible to eradicate those species once established.

D. International development assistance

8. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Supporting, in association with international aid programmes, developing countries in capacity-building, resource mobilization and information-sharing for assessing and managing the risks of introducing invasive alien species. Developed countries can play a key role in facilitating this process;

(b) Helping to ensure that aid agencies take into consideration procedures or codes of practice to minimize or avoid the introduction and spread of invasive and potentially invasive alien species in their initiatives, projects, programmes and agreements.

E. Emergency relief, aid and response

9. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Documenting any case of invasive alien species in aid-recipient countries across broad sectors;

⁷⁴ See, for example, the guidance provided by the European Maritime Safety Agency on best practices for ballast water sampling.

⁷⁵ See, for example, International Plant Protection Convention Secretariat, *Sea Container Supply Chains and Cleanliness: an IPPC Best Practice Guide on Measures to Minimize Pest Contamination* (Rome, Food and Agriculture Organization of the United Nations, 2020).

⁷⁶ See Global Environment Facility-United Nations Development Programme-International Maritime Organization, *Biofouling Management for Recreational Boating: Recommendations to Prevent the Introduction and Spread of Invasive Aquatic Species* (London, International Maritime Organization, 2022).

(b) Including the risk of introduction and spread of invasive and potentially invasive alien species in emergency response strategies, protocols and codes of practice and encouraging relevant actors to follow the recommendations to prevent and minimize such introduction and spread into new areas (in line with decision VIII/27, para. 42). To support those actions, emergency management approaches, such as incident command systems, can be linked to rapid response measures for invasive alien species;

(c) Identifying the responsibilities of aid providers and aid recipients to avoid any invasive alien species introductions through contaminants in aid transport and transfer.⁷⁷

F. Civil air transport

10. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Engaging relevant sectors at all levels to develop standards to prevent hitchhiker or stowaway species arriving by air;⁷⁸

(b) Strengthening collaboration among relevant organizations, including the International Plant Protection Convention, the World Organisation for Animal Health, the International Civil Aviation Organization, the World Customs Organization and the International Air Transport Association, to develop harmonized operating standards related to air cargo, in compliance with International Civil Aviation Organization Assembly resolution A36-21.

G. Tourism

11. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Avoiding the introduction and spread of invasive alien species through the transport of living organisms (in line with the guidance in decision XII/16, annex, para. 9, and decision 14/11, para. 11 (c));

(b) Collaborating with travel and tourism operators and tourism associations at all levels of government to develop: (i) awareness programmes and guidelines⁷⁹ to inform tourists, tourism agencies, indigenous peoples and local communities, policymakers, managers of protected areas and customs authorities, among others, of the risk posed by invasive alien species; and (ii) strategies to minimize those risks,⁸⁰ in particular on priority sites, such as island ecosystems.

III. Capacity-building activities

12. The following actions are suggested for Parties, organizations and stakeholders, as applicable:

(a) Including the prevention and management of invasive alien species in the capacity-building programme of the Secretariat of the Convention of Biological Diversity, in line with Target 6;

(b) Establishing regular training programmes at the global, regional, national or subnational level, with support from a range of actors, especially academics, scientific experts and indigenous peoples and local communities, after obtaining their free, prior and informed consent, to facilitate the timely achievement of Target 6;

⁷⁷ See International Plant Protection Convention Secretariat, *Safe Provision of Food and Other Humanitarian Aid to Prevent the Introduction of Plant Pests During an Emergency Situation* (Rome, Food and Agriculture Organization of the United Nations, 2021).

⁷⁸ See, for example, the International Air Transport Association Environment Committee guidance on prohibited carriage of wildlife and related products by passengers (available at www.iata.org/contentassets/adfc0ea8044648fcbff13d79dceff7ae/encom-pax-wildlife-guidance-final-2003-nov-2015.pdf).

⁷⁹ See, for example, Convention on the Conservation of European Wildlife and Natural Habitats Standing Committee document T-PVS/Inf (2017) 1.

⁸⁰ See decision VII/14.

- (c) Considering using existing resources and developing technical manuals and training packages, as appropriate, on the following topics:
- (i) Taxonomic identification of organisms, including identification keys based on morphology, link to databases with images, DNA barcoding, artificial intelligence-aided identification and citizen science;
 - (ii) Publication and use of data on invasive alien species based on international data standards to enable the cross-linking of subnational, national, regional and global thematic databases;
 - (iii) Use of monitoring data to predict the spreading trends in invasive and potentially invasive alien species;
 - (iv) Best practices for successful eradications and other useful information resources on technical advice;⁸¹
 - (v) Use of shared information on invasive alien species for subnational and national policy-setting and implementation;
 - (vi) Application of classical biological control⁸² agents against invasive alien species;⁸³
 - (vii) Application of an ecosystem-based approach to control invasive alien species;⁸⁴
 - (viii) Multi-criteria decision-support manual for policymakers;
 - (ix) Model regulatory act on invasive alien species with responsibility shared among broad sectors;
 - (x) Cost-effective methods for packaging biological samples collected in the field, to guarantee early detection in remote and restricted-access locations;
 - (xi) How to implement Target 6.

⁸¹ See the International Union for Conservation of Nature guidelines on invasive alien species (available at www.iucn.org/search?key=invasive&f%5B0%5D=topic%3A1174), the Convention on Biological Diversity toolkit (available at www.cbd.int/invasive/cbdtoolkit/) and the Research Institute for Nature And Forest *Guidance for Drafting Best Management Practices for Invasive Alien Species* (available at https://purews.inbo.be/ws/portalfiles/portal/14941741/Adriaens_etal_2018_Gu%20idanceBestPractices.pdf).

⁸² The International Plant Protection Convention defines biological control as pest control strategy making use of living natural enemies, antagonists or competitors and other self-replicating biotic entities.

⁸³ See *CBD Technical Series No. 91*.

⁸⁴ See CABI biological control of invasive plants, available at www.cabi.org/what-we-do/cabi-centres/biological-control-of-invasive-%20plants/.