Report

First indigenous and local knowledge dialogue workshop for the IPBES thematic assessment of invasive alien species and their control

15-16 November 2019

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1. Introduction

1.1. This report

This is the report from the first indigenous and local knowledge (ILK) dialogue workshop for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) thematic assessment of invasive alien species and their control (the IAS assessment), which was organized by IPBES with the support of the International Indigenous Forum on Biodiversity (IIFB) at the premises of the Secretariat of the Convention on Biological Diversity (CBD). It took place from 15-16 November in Montreal, Canada. The report aims to provide a written record of the dialogue workshop, which can be used by assessment authors to inform their work on the IAS assessment, and also by all dialogue participants who may wish to monitor, review and contribute to the work of the assessment moving forward.

The report is not intended to be comprehensive or give a final resolution to the many interesting discussions and debates that took place during the workshop. Instead, it is intended as a written record of where the conversation is at present, and this conversation will evolve over the coming months and years. For this reason, clear points of agreement are discussed, but also, where there was disagreement or diverging views, these are also presented, for further attention and discussion.

The text in sections 3 and 4 represents an attempt to reflect solely the views and contributions of the participants in the dialogue. As such, it does not represent the views of IPBES, the CBD or UNESCO or reflect upon their official positions.

The agenda and participants list for the dialogue are provided in annexes I and II.

1.2. Context and objectives of the ILK dialogue workshop

IPBES recently launched the IAS assessment, which will run between 2019 and 2023. Participation of indigenous peoples and local communities (IPLCs) is crucial to this assessment, as many IPLCs have first-hand knowledge of the impacts of invasive alien species (IAS) on ecosystems and people. Many IPLC groups also employ their knowledge of the environment to develop responses or management strategies for IAS. Many IPLCs are concerned that their knowledge, needs and views should be properly considered in both research and management of IAS.

During the first months of the assessment, an ILK dialogue workshop was organized as part of a series of approaches to working with IPLCs and ILK throughout the assessment process, as is explained below in section 2.4.

The objective of the ILK dialogue workshop was to provide a space for dialogue between assessment authors and IPLCs, with the following aims:

- Develop recommendations from IPLCs for specific topics and areas of foci for the assessment;
- Develop and refine a series of key ILK questions, which will help shape a narrative for the assessment and direct the collection, analysis and synthesis of information (see section 2.3);
- Explore how IPLCs experience and understand IAS;
- Explore IPLCs' response, adaptation and management strategies for IAS;
- Discuss how the IAS assessment could be useful to IPLCs;
- Identify potential ILK case studies of relevance to the assessment;
- Identify key experts who could be contributing authors, reviewers or participants in future dialogue workshops and review processes; and
- Identify resources and sources of information that could be included in the assessment.

2. Background

2.1. IPBES and ILK

IPBES is an independent intergovernmental body established to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

Since its inception in 2012, IPBES has recognized that IPLCs possess detailed knowledge on biodiversity and ecosystem trends. This was first outlined in deliverable 1(c): *Procedures, approaches and participatory processes for working with indigenous and local knowledge systems* of the first IPBES work programme (2014 - 2018). This was renewed for the IPBES rolling work programme up to 2030 in objective 3 (b) "Enhanced recognition of and work with indigenous and local knowledge systems".

Recognizing the importance of ILK to the conservation and sustainable use of ecosystems as a cross-cutting issue relevant to all of its activities, IPBES established a task force on indigenous and local knowledge systems and agreed on terms of reference guiding its operations towards implementing this deliverable. Much of IPBES's work with IPLCs and on ILK has also been coordinated by a technical support unit (TSU) on ILK, hosted by UNESCO.

Key activities and deliverables so far include:

- Progress in the development of approaches and methodologies for working with ILK was made during previous IPBES assessments (of Pollination, Pollinators and Food Production, Land Degradation and Restoration and four Regional Assessments and a Global Assessment of Biodiversity and Ecosystem Services);

- The development and implementation of the "approach to recognizing and working with ILK in IPBES", which was formally approved by the Plenary at its fifth session in 2017, and which sets out basic principles for IPBES's work with ILK;
- Development and implementation of methodological guidance for recognizing and working with ILK in IPBES, which aims to provide further detail and guidelines on how to work with ILK and guidance for an IPBES "participatory mechanism" for working with IPLCs, particularly in IPBES assessments;
- Development and implementation of a series of activities and pathways to facilitate the participation of IPLCs in IPBES assessments and other activities as part of the "participatory mechanism";
- Organization of ILK dialogue workshops for the assessments, most recently for the assessments on sustainable use of wild species, values of nature, and IAS.

2.2. The IPBES assessment of invasive alien species and their control

The IAS assessment was initiated after the seventh session of the Plenary (IPBES 7, Paris, France, 2019) following a decision from the IPBES Plenary at its sixth session (IPBES 6, Medellin, Colombia, 2018). The IAS assessment is the last assessment of the first work programme of IPBES (2014-2018).

The assessment is led by three co-chairs: Aníbal Pauchard,[1,2] Helen Roy,[3] and Peter Stoett.[4] About 70 experts from more than 40 countries were carefully selected to encompass all regions and required expertise. They will be assessing the current status and trends of IAS and their impacts, taking into account diverse knowledge and value systems and providing policy-relevant options to promote effective IAS management and adaptation strategies. The assessment is supported by the technical support unit on invasive alien species (IAS TSU).

The objectives of the IAS assessment, as set out in the scoping document,[5] are to assess:

- The array of such species that affect biodiversity and ecosystem services;
- The extent of the threat posed by such species to various categories of biodiversity and ecosystem services, including impacts on agrobiodiversity and food, human health and livelihood security;
- The major pathways for and drivers of the introduction and spread of such species between and within countries;
- The global status of and trends in the impacts of such species and associated management interventions by region and subregion, taking into account various knowledge and value systems;
- The level of awareness on the extent of IAS establishment and their impacts; and

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[2] Institute of de Ecology and Biodiversity (IEB), Santiago, Chile.
[3] Centre for Ecology & Hydrology, Wallingford, UK.
[4] Ontario Tech University, Oshawa, Canada.
[5] IPBES/6/INF/10.

- The effectiveness of current international, national and subnational IAS management measures and associated policy options that could be employed to prevent, eradicate and control IAS.

The IAS assessment has three cross-cutting themes, which are:

- Indigenous and local knowledge
- Good quality of life
- Scenarios and models

Each of the cross-cutting themes is supported by a liaison group comprised of representatives from each chapter. The liaison groups' role is to ensure that their cross-cutting theme is well represented, in a consistent manner, throughout the assessment. The ILK liaison group is supported by the IPBES TSU on ILK.

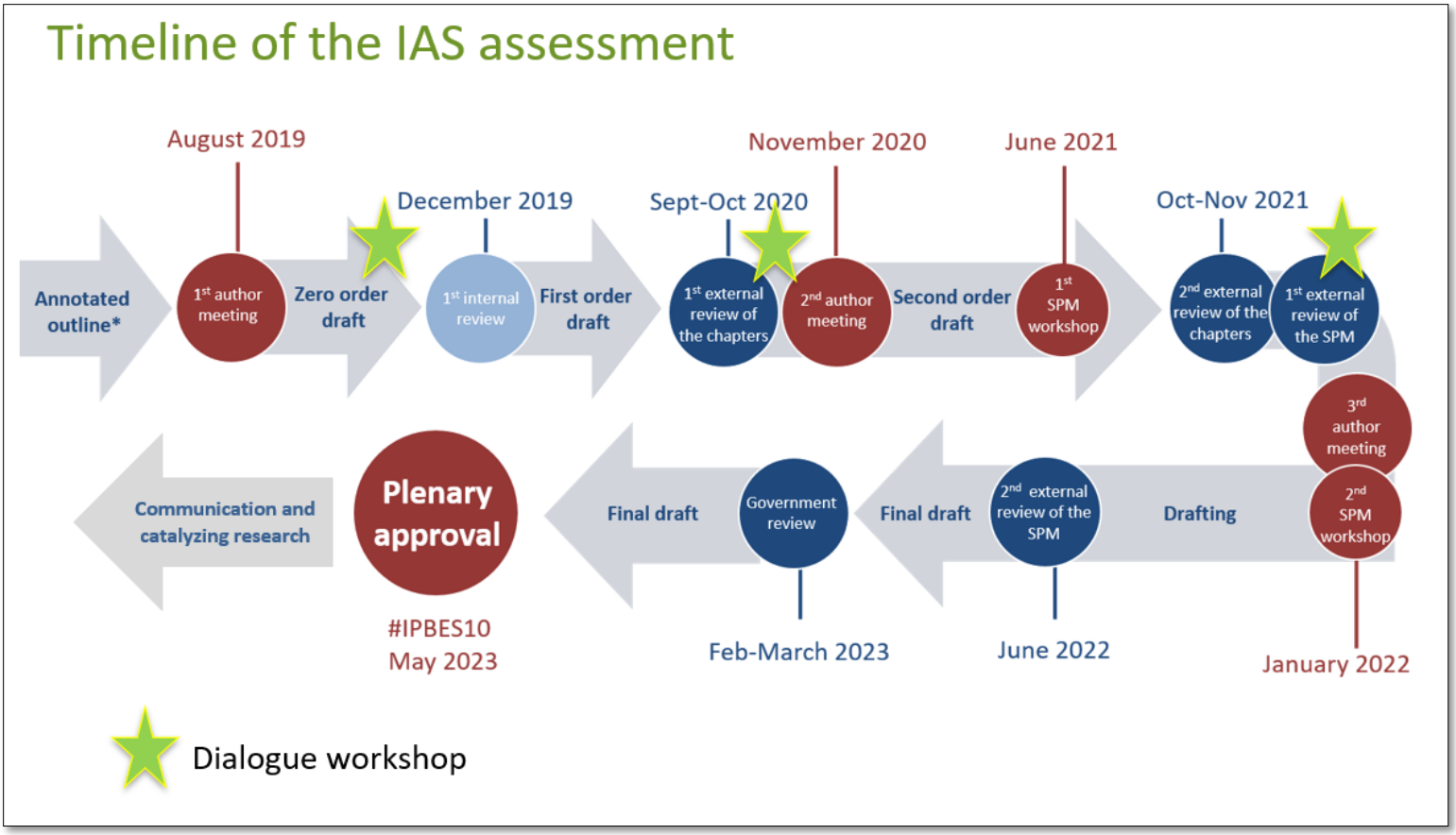

Figure 1: Timeline of the IAS assessment

2.3. Key indigenous and local knowledge questions to be addressed by the assessment of invasive alien species

A series of questions was drafted by the ILK liaison group in order to frame the work with ILK in the assessment. The aims of the questions are to ensure that each chapter addresses ILK and IPLC issues, and that the assessment has an overall narrative between chapters. The questions were sent out to participants in advance of the dialogue workshop for their consideration. Further comments were also invited from participants. The draft questions were as follows:

Chapter 1: Conceptualization

a) From the perspective of IPLCs, is there a conception of an "invasive alien species"? Do IPLCs distinguish it from "native species"? How is this expressed?
b) Do IPLCs see some species as having any negative impact on their communities, lands or waters?
c) How do IPLCs obtain information about IAS? Examples of sources could include elders, on-country trips, hunting, fishing and gathering, continued cultural knowledge transfer, participation in citizen science initiatives, schools and education, reports from the younger generation, reports only from outsiders, or others.

Chapter 2: Trends

a) Are IAS increasing/decreasing in IPLC lands and waters?
b) Are IAS changing IPLC lands and waters, or their activities, laws and regulations, perceptions and beliefs, and/or cultural systems? If so, what changes have occurred or are occurring now?

Chapter 3: Drivers

a) What are main causes and drivers of IAS in IPLC lands and waters?
b) With IAS dynamics affected by many drivers (e.g., land use change, natural resource exploitation, climate change) do IPLCs recognise the main individual drivers of IAS, or are many drivers intertwined, and in what ways?

Chapter 4: Impacts

a) What are the impacts of IAS on IPLC communities, lands, waters?
b) Are there some IAS which IPLCs consider to have greater social and ecological impacts than others? How do they measure this impact? For example, the size of the area impacted, more people talking about it, the degree of common knowledge about IAS, their impact on certain activities including livelihood (hunting, fishing, agriculture), their impact on cultural traditions (specific totems/dreaming/law), involvement with studies, two-way knowledge.
c) When and under what conditions does the arrival of new IAS into the lives of IPLCs change their livelihoods and culture for the better or worse?

d) How and under what conditions do IPLCs incorporate and culturally adopt versus reject new IAS into their communities, in the context of their values or livelihoods?
e) Given all the other pressures on IPLCs (e.g., external population pressure, natural resource exploitation, climate change) and local ecology (e.g., land use changes, weather events, urbanization) are IPLCs able to identify the specific impacts of IAS on their community, or is it hard to discern between these and other impacts?
f) Are IAS making some of these other pressures more challenging?

Chapter 5: Prevention, management and adaptation

a) What are the situations in which IPLCs recognise the need to intervene in the context of managing or adapting to IAS?
b) How do IPLCs determine and implement approaches for responding to the impacts of IAS species on their communities, lands and waters?
c) How do IPLCs use their ILK in developing IAS management interventions?
d) What type of management programs do IPLCs think are most effective in their lands and waters, and in their own localities? Do they see any areas where one level of governance can help support the other, and how?
e) Do IPLCs want to collaborate with different knowledge systems to manage the issue of IAS and their impacts (for example two-way approach using ILK and science or other options), or do they want to manage the issue only within their communities?
f) What types of local cultural values do IPLCs use to manage IAS?

Chapter 6: Future options and policy

a) What future directions do IPLCs envision their communities taking with regard to IAS? For example, will IPLCs strive to mitigate the impacts of these species, to adapt to them, or to use them in harmony with other species?
b) How can these opportunities or channels to express the viewpoints of IPLCs be improved? How can IPLC participation be better integrated with national policies?
c) Are international efforts relevant to IPLC needs and ambitions?

These questions served as a basis to formulate a set of one or two questions for each chapter to frame the discussions during the dialogue workshop. The dialogue workshop questions are given below in section 3.

2.4. Modalities of participation for IPLCs in the assessment process

2.4.1. Introduction

At the dialogue workshop, participants agreed that IPLCs participation is crucial for the development of the IAS assessment, and the ways that IPLCs can participate in the IAS assessment was a key discussion thread throughout the dialogue workshop.

In line with its approach to recognizing and working with ILK, IPBES has worked to develop a series of activities and methodologies by which IPLCs can participate in IPBES assessments. These are outlined below, with specificities for the IAS assessment.

2.4.2. IPLC representation in the assessment expert group

IPBES assessments include ILK experts, i.e., persons from IPLCs who have knowledge about ILK and associated issues, and experts on ILK, i.e., persons who have knowledge about ILK and associated issues, who not necessarily members of IPLCs.

2.4.3. Contributing authors

IPLCs can also be invited to participate as contributing authors in support of an author of the assessment. This can include providing case studies that illustrate key issues or themes of an assessment, or working on portions of text, graphs or illustrations with assessment authors.

Contributing authors provide targeted support to an author, upon his or her request, focusing on a specific part of a chapter, or a specific table or figure. They will be listed as a contributing author only if their input is included in the final report.

2.4.4. Dialogue workshops

Dialogue workshops with IPLCs and assessment authors are a key methodology for IPLCs participation. There will be at least three dialogue workshops during the assessment cycle, at key points in the process, as follows:

- The first dialogue, the subject of this report, had the aims discussed above in section 1.2, and was held on 15-16 November 2019 in Montreal, Canada;
- A second dialogue will take place during the first external review period, and will engage IPLCs in critically reviewing the content of the draft assessment chapters, to assess strengths, gaps, and provide recommendations for additional sources of information. This dialogue workshop will most likely take place in the last quarter of 2020, depending on when the review period for the first order drafts is set;
- A third dialogue will occur during the second external review period, and will engage IPLCs in critically reviewing the content of the draft chapters and summary for policymakers, to assess strengths, gaps, and provide recommendations for additional sources of information. This dialogue workshop will most likely take place in the first quarter of 2022, depending on when the review period for the second order drafts is set; and
- Other dialogues may be arranged during the course of the assessment, including at national and regional levels, depending on funding.

2.4.5. Online reviews of drafts of the assessment

IPLCs can also engage in the two external reviews of drafts of assessments. Drafts are made available on the IPBES website, usually for a six to eight week-period. The IPBES secretariat sends out a notification announcing the availability of the draft for review. Each comment submitted is

specifically addressed by the IAS assessment author teams, and review comments and responses are posted online after the Plenary session that accepts the draft assessment report.

IPBES encourages collaboration among IPLCs or their organizations to create group consensus comments. As mentioned above, IPBES will hold dialogue workshops during both review periods to further facilitate IPLC participation in this process.

The first order drafts of the IAS assessment are currently expected to be available for review in September-October 2020 (tbc).

2.4.6. Call for contributions

An on-line call for contributions will be opened for the IAS assessment in early 2020. The aim is to provide a further avenue for IPLCs to provide information or case studies, and also to recommend networks, organizations or individuals who could become involved in the IAS assessment process. Contributions could include community reports, academic papers, case studies, videos, songs and artwork. The call will be available in English, Spanish and French, and other languages if possible.

2.4.7. Regular communications

The ILK and IAS TSUs will maintain good communications with dialogue participants about the development of the assessment and opportunities for participation and further development of case studies and reporting from the meeting.

Participants requested that special attention be paid to IPLCs when working on outreach and information sharing, especially once the assessment is finished.

2.5. Benefits to IPLCs of participating in the assessment

During the workshop, participants noted that if IPLCs are to participate in the assessment process there should be clear benefits for them. Key benefits discussed included:

- The opportunity for IPLCs to share experiences with other IPLCs around the world about IAS impacts and management strategies;
- The opportunity for IPLCs to share and exchange experience and knowledge around IAS with scientists;
- Use of the final assessment as a tool when IPLCs are working with decision-makers, policy-makers and scientists, noting that part of the planning for the final assessment includes the development of an accessible summary for IPLCs; and
- The opportunity to bring ILK on IAS to the attention of policy-makers and decision-makers, and to consequently increase action on IAS in ways that IPLCs see as appropriate.

2.6. FPIC

Free, prior and informed consent principles are central to IPBES work with IPLCs, and a series of ethical principles and approached. These points were agreed upon by the participants of the dialogue, which will be followed by both IPLCs and the assessment authors. The full agreed-upon text and the names of those agreeing to these principles is provided in annex II to this report.

3. Key recommendations and learning from the dialogue[6]

3.1. Overarching comments

Over the course of the workshop, and during the IPLC caucus, IPLC participants made a series of overarching comments and recommendations for the assessment, which include:

- IAS are a highly sensitive and important issue for IPLCs, and many communities are already experiencing a range of negative impacts on their lands and waters and in their communities.
- For IPLCs, impacts of IAS are social, cultural, and spiritual, as well as environmental. IAS should therefore be recognised as an issue that needs to be addressed in a holistic way.
- There is very little documentation of the social, cultural, spiritual or environmental impacts of IAS on IPLCs. A process could be developed to allow IPLCs to document their own case studies to improve the knowledge-base for communities and the assessment, including by providing guidelines and scientific support.
- Many IPLCs do not have access to scientific knowledge about IAS or their potential means of management, while some communities have been able to engage with scientists around best practices.
- The assessment should recognise the specificities and diversity of IPLCs and their contributions around IAS, and assessment authors should be wary of generalising.
- Bottom-up, community-based good practices and approaches to monitoring, management and decision-making around IAS should be central to the IAS assessment, particularly in chapter 5 on management and in chapter 6 on policy.
- Adaptation to IAS, including as new food sources, could also be considered, noting that this is often done out of necessity rather than choice and noting also that many IPLCs will choose not to include IAS in their diets and livelihoods.
- Indigenous peoples' rights should provide a foundation from which to address indigenous peoples' issues in the assessment. Assessment authors should consider key existing documents and activities relating to IPLCs, including Local Biodiversity Outlooks, Community Based Monitoring Systems (CBMIS), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the Universal Declaration on Human Rights (UDHR).
- A fluid dialogue between IPLCs and assessment authors should continue over the course of the assessment.
- IPLC participation should be innovative and dynamic to promote dialogue between IPLCs to help them to develop their own knowledge-base and management strategies.
- Once the assessment is finalised, post-assessment processes will be very important, which could follow post-assessment dialogue examples from the IPBES pollination

[6] The text in section 3 represents an attempt to reflect solely the views and contributions of the participants in the dialogue. As such, it does not represent the views of IPBES, the CBD or UNESCO or reflect upon their official positions.

assessment (organised by SwedBio and other organisations, more information available here), and could include development of a compilation of assessment messages of particular relevance to IPLCs, so that the IAS assessment is of more direct relevance and utility for IPLCs.

3.2. Conceptualization

Chapter 1 of the assessment will include a discussion on conceptualisation of IAS. Participants at the dialogue workshop were asked the following questions to frame a discussion on conceptualizing IAS:

- Do people in your community have a word (or words) for those species that belong to the place where they live, and species that don't belong or come from somewhere else?
- Are new species accepted or welcomed, or considered to be bad and out of place? Or does this depend on their effects on your communities and your lands and waters?

3.2.1. IPLC concepts of IAS

From the discussions it emerged that, in general, for many IPLCs, **there is not an overarching concept for IAS** that is equivalent to scientific definitions.[7] Participants agreed that the following characteristics describe an IAS:

- IAS multiply faster than native species;
- IAS often do not have local names and there may be no or little historical/traditional knowledge about them;
- IAS are associated with cultural, socio-economic and ecosystem problems;
- IPLCs often do not value IAS as food sources, and in general do not use them in ceremonies.

In many communities, **IAS are described as new species, or species that do not "belong".** In some parts of the Philippines, the term "*Banyaga*" (foreigner) is used if a new species is destructive but, if it's not, it's not seen as invasive. One participant noted that IAS disrupt the relationships between species and when that happens there are problems. In some parts of Argentina, it is considered that all species that have been in an area for a long time are gifts from Pachamama, but new species are not considered to come from Pachamama. Participants also noted that whether a species "belongs" or not may depend on the length of time it has been in an area, and whether a community has incorporated it into their culture.

Although new species are often perceived as negative, one participant shared that **some communities will monitor new arrivals to see what their impacts are before classifying and naming them**. Participants noted that the classification or naming of species varies from

[7] In the scoping document for the IAS assessment, "invasive alien species" are defined as "animals, plants or other organisms introduced directly or indirectly by people into places out of their natural range of distribution, where they have become established and dispersed, generating an impact on local ecosystems and species". There is also contention and discussion within IAS science about issues such as "native" and "alien".

community to community, as different communities experience different impacts. In some communities, there are terms for species with negative impacts (e.g., words translating as "harmful", "bad species" or "pests"). For example, some communities in Guatemala say "*amompeli cardic*" (something that brings death and disease) to refer to animals that cause damage.

Participants noted that, while they may not have an overall term for new species, it is often well-known which species are new. One participant reported that **their community will not use these new species since they do not have a name for them, do not know them, and they are not part of their cultures or diets.** Most participants agreed that new species are especially avoided in spiritual activities or ceremonies, even if native species that would have been used traditionally have disappeared.

As mentioned above, there are, however, cases where **some IAS have been present for a long time and have become part of a community's culture**. Examples of cats and rabbits were given from Australia, and the example of the "*sauco"* tree was given from Guatemala (see case studies below in section 4).

Participants also highlighted that genetically modified organisms (GMOs) are a grave concern for many IPLCs, as they are often considered to be dangerous and damaging, especially where people are encouraged to replace traditionally used species with GMOs.

3.2.2. Conceptualization of indigenous and local knowledge

Participants also discussed ILK in relation to IAS. In Australia, some farmers claim that they have 'local' knowledge, but this is not traditional knowledge of the area, and should not be confused with ILK. Another remarked that, in Panama, ILK can evolve – the Guna (or Cuna) people don't maintain the same knowledge as their ancestors, and their knowledge has evolved, like in any society, but they maintain the concept of ILK. Participants recommended that **the assessment needs to provide a conceptualization and a discussion of ILK in relation to IAS, based on examples from different parts of the world.**

3.3. Trends, drivers and impacts

Trends, drivers and impacts will be discussed in chapters 2, 3 and 4 of the assessment respectively. They were however discussed together during the dialogue workshop to allow participants to give a full narrative about IAS. Participants were asked the following questions to frame the discussion:

- Which 'new' species have had the most impact (positive or negative) on your communities, lands or waters? What was the impact?
- Where did these 'new' important species come from? How did they arrive in your lands or waters? When?
- Were they immediately 'good' or 'bad' for your community, lands and waters, or did their effects grow over time? Why?

- Has there been an increase, decrease, or no change in the numbers of this species over time?

3.3.1. Trends

In general, IPLC participants reported **increases in IAS** in their lands and waters, particularly of fish, insects and plants. Individual examples are discussed in the case studies in section 4 below.

3.3.2. Drivers

Participants noted a range of drivers that led to the introduction and then the spread of IAS in their lands and waters.

More detail is given in the case studies below, but as an overview, drivers discussed at the workshop that lead to the **introduction of IAS** into IPLC lands and waters include the following:

- **Intentional introduction of species** by government or industry, in order to:
  - provide food or improve food production (for local consumption or for sale);
  - compensate for food species lost due to infrastructure projects (e.g., dams);
  - meet afforestation targets; or
  - attempt biological control of existing pests or IAS;
- **Lack of knowledge and insufficient risk analysis by governments (national and local) and scientists** about the likely impacts of introducing IAS, including GMOs predicted to improve food yields;
- **Import of ornamental species for gardens** by the public and horticultural industry;
- **Unintentional introduction of species due to the movement of goods** which harbour species across ecological boundaries and international borders, for example, timber harbouring insects or soils containing seeds or larvae; and
- **Species migration due to climate change**.

Drivers that were discussed that allow or **facilitate the spread** of species include the following:

- **Climate change,** making native species less competitive by changing local environments and weather, e.g., desertification;
- **Agriculture, pollution and large industrial projects** such as dams or logging, which can change habitats and ecosystems to favour IAS over native species and which can disturb land, which makes it easier for IAS to colonise new areas;
- **IAS** having significant impacts on local habitat/environments, making them more suitable for other IAS;
- **IAS evolving and adapting to new environments**, allowing them to spread into new ecosystems;
- **Local movement of soil, wood and other materials that can harbour IAS**, for construction projects or trade;
- **Cross-border trade** and lack of regulations to prevent IAS from spreading;
- **Lack of coherent policies and strategies** to reduce the movement and spread of IAS;

- **Lack of communication, contradictory communications, or communication in favour of IAS coming from Government or industry**, so that local people are unsure what to do;
- **Lack of communication between IPLCs, scientists and governments** around the current trends and impacts of IAS, which can lead to scientists and governments being unaware of realities on the ground; and
- **Government departments working at cross-purposes**, so official responses to IAS are inconsistent.

Participants also discussed cultural practices of IPLCs that lead to the movement of species, including pastoralism (as cattle may carry parasites or seeds with them), exchange of seeds during ceremonies, and ceremonies where plants are moved from one place to another. They also noted that, with a loss of knowledge of traditional medicine and a loss of traditionally used medicinal plants, communities are more likely to use non-native plants from other areas. A participant from Kenya mentioned the case of Shea seeds, an alien species used as a medicinal plant that became very popular, and could have become invasive. However, it was noted that, historically, there has always been some movement of species along with people, and there were no clear examples presented of species being recently moved by IPLCs that then became invasive.

3.3.3. Impacts

A wide range of impacts from IAS were discussed, both environmental and social, cultural and spiritual. More detail is given for specific cases below in section 4.

As an overview of the discussions, **environmental impacts** from IAS include:

- Native species being directly outcompeted or preyed upon by IAS;
- Ecosystem change caused by IAS, including drying out of wetlands due to invasive reeds or invasive tree roots breaking up soils, allowing them to dry out; and
- Native species losing habitats and food sources due to ecosystem changes due to IAS.

Participants also noted that the impacts of IAS combine with other environmental impacts from climate change, industrial development, pollution and land use change.

As an overview of the discussions, **social, cultural and spiritual consequences** from IAS include:

- **Decreased food security** and **disruption to local economies** due to damage to crops or wild resources, and the loss of culturally important food species. One participant reported that such losses cannot be mitigated by using IAS, as their community is unwilling to include IAS in their diets as a replacement for culturally important native species. Others reported that some communities have included IAS in their diets, but often through necessity rather than choice;
- **A decrease in culturally important activities**, e.g., crafts or ceremonies, due to the loss of plants or animals that were used for these activities. IPLCs may be particularly unwilling

to use IAS in their ceremonies or other spiritual activities, as they do not have a spiritual connection to new species; if native species are lost, the activities may cease to occur;

- **Health concerns or impacts** caused by IAS which may be poisonous or carry diseases, which can also deter IPLCs from going out on the land to hunt, fish or gather, or to teach their children;
- **A loss of knowledge and language** as the environment or ecosystem changes and culturally important species disappear or move, and as children are deprived of chances to hunt, fish or gather culturally important species and learn their names, or participate in crafts, ceremonies or other activities relating to these species;
- **A break or disruption of the spiritual connection** that IPLCs feel towards their lands and waters and the species that inhabit them, as IAS and other impacts change the relationships between humans and nature. This can include concerns that IAS and related environmental changes are caused by humans offending spirits or gods. GMOs may also be particularly in conflict with IPLC worldviews;
- **Culture shock and distress** for communities who lose culturally important sources of food or ceremonial species or spiritual connections to their lands and waters, or who have to adapt to new species;
- **Conflicts** between those who perceive positive impacts and those who perceive negative impacts from IAS, and those who want eradication and those who wish to adapt to or embrace new species. Conflicts may also occur about methods of eradication, as some community members may not want poisons or pesticides to be used; and
- **An increase in the amount of labour that must be devoted to managing IAS**, and the need to mobilise people across communities to attempt to reduce IAS populations.

3.4. Prevention, management and adaptation

Chapter 5 of the assessment will discuss prevention, management and adaptation. Participants were asked the following questions to frame the discussion:

- What are the situations in which IPLCs see a need to intervene to manage or adapt to new species?
- How do you determine and implement approaches to respond to the impacts of new species on your communities, lands and waters?
- What (if anything) did your community do to manage or adapt to new IAS?

3.4.1. IPLCs and IAS monitoring

Participants noted that it is crucial that **IPLCs are involved in monitoring IAS**. Examples were given of IPLCs using their knowledge systems to monitor biodiversity, including the impacts of new species in their lands. They also noted that it is usually IPLCs who are aware of the **realities on the ground**, as they are more closely connected to their lands and waters over larger areas compared to scientists or policymakers.

Some participants also noted that **new technologies** (dedicated applications (apps.) or major communications apps.) were used by some communities to monitor and exchange information on the status of specific IAS. More detail is given in the case studies below.

3.4.2. IPLCs and prevention and control of IAS

Participants noted also that it is critical that IPLCs are engaged in efforts to prevent, control or mitigate the impacts of IAS, for the following reasons:

- **IPLCs have in-depth knowledge of their environments**, including how these environments and their people respond to change, so efforts to control or mitigate IAS are more likely to be successful if these include ILK, and participation of IPLCs;
- Efforts to control or mitigate IAS are **more likely to be successful if they work within existing practices and traditions of IPLCs**, as IPLCs are more likely to engage in these management practices. As IPLCs are the often the main resource users on the ground, this increases the likelihood of positive outcomes; and
- For IPLCs, IAS **are an important social, cultural and spiritual issue** rather than only an environmental issue. It is therefore essential that IPLCs are involved in efforts to control or mitigate IAS, as such efforts risk further disrupting their cultures.

More detail is given for specific examples in the case studies below.

Participants also highlighted that **access to land is crucial** if IPLCs are to be involved in efforts to control and manage IAS. If they cannot access lands, which can be the case, for example, in some protected areas, they will not be able to provide knowledge on IAS in these areas.

Participants also discussed **negative impacts from efforts to control or manage IAS**. Where IPLCs have adapted to new species and have incorporated them into their diets or economies, government efforts to eradicate these species without consultation can have negative impacts on food security, local economies, culture and health. Efforts to control IAS with new introduced species also cause concern, as these new alien species can themselves become invasive.

3.4.3. IPLCs, mitigation and adaptation

Many participants also agreed that it **is often too late for prevention or even for control** of IAS that have spread, so the only option is to try to mitigate their impacts or adapt. However, some participants also noted that adaptation carries many risks and burdens for communities, so efforts to control IAS, and research on how to do this, remain crucially important. In terms of **adaptation**, participants discussed strategies that their communities have put in place, including experimenting with other species to replace culturally important species. They noted, however, that these efforts cause a great deal of stress for community members, and are often not very successful, in particular in the case of species used for crafts, medicines or ceremonies as this is often highly specialized knowledge linked to a single species.

3.5. Policy options and future pathways

Chapter 6 of the assessment will discuss policy options and future pathways in relation to IAS. Participants were asked the following questions to frame the discussion:

- What future directions do you envision your community taking with regard to 'new' species? For example, will you strive to mitigate them, to adapt to them, to use them in harmony with other species?
- How should policy-makers address issues related to IAS, and the perspectives, knowledge and experience of IPLCs?
- Are international efforts relevant to IPLCs needs and ambitions?

Participants discussed the following points in relation to policymaking, IPLCs and IAS:

3.5.1. IAS in policymaking

- IAS should **become a priority for policy-makers** – often more economically important sectors such as tourism or agriculture take precedence and if IAS are not affecting these then action can be limited. Often governments do not have sufficient funds to prevent and manage IAS.
- It was highlighted that, in terms of policy approaches, IAS should be viewed as **cross-cutting and holistic**, including drivers and impacts that are both environmental and social. This should be the case at all levels of decision-making, with different conventions and international organizations at the international level, different government departments at the national level (e.g., agriculture, wildlife, tourism, fisheries), and a wide range of sectors and stakeholders, including IPLCs, engaged throughout. Biodiversity, and IAS, should be mainstreamed throughout policy-making.
- **Communication** at all levels (local, national, regional, and international) between IPLCs, scientists, governments and other actors needs to be improved and facilitated, with attention to language barriers.
- Governments could develop a **national strategy** for IAS so that this strategy must be followed even when the government changes, as currently policies and efforts often change with new governments, hindering progress.
- **Policies on reforestation or afforestation** could specify that only native species should be used, as currently many organizations promote alien species as part of efforts to quickly reforest areas to meet international targets. Policies on water bodies should also ensure that only native species are used.
- **Better border controls and management** of the movement of goods that are known to harbour IAS are needed.
- **Efforts to control IAS by releasing other new species (biocontrol)** should be viewed with caution, as there is a risk that these new species will also become invasive.
- **Links between international conventions and national level processes** need to be strengthened, as often international decisions are not implemented at national level. The international system could work more closely with national governments to help them to

develop and implement legal frameworks and strategies for IAS. One participant suggested that frameworks on traditional medicine could provide a model.

3.5.2. IPLCs and ILK in policymaking pertaining to invasive alien species

- **IPLCs should be engaged in monitoring, control and decision-making** related to IAS at all levels, in order for such efforts to benefit from ILK and the activities of IPLCs, and also to help ensure that actions taken do not negatively impact IPLCs. If communities are involved in planning and decision-making, management of IAS could even become a benefit to IPLCs, by providing recognition of ILK and incentives to continue traditional monitoring and management.
- **Governments should recognize and support community-based monitoring and information systems (CBMIS).** Often IPLCs have effective monitoring already in place, but it is not recognized by scientists or governments. There is also a need to recognize and support self-management, and areas of successful co-management, where communities are working with scientists or governments.
- **Women and women's organizations should be actively engaged** in discussions and decision-making about IAS at all levels. Often, they are overlooked in research, management and decision-making processes, but they can have key knowledge about the species that they harvest and use.
- **IPLC rights, including land rights, should be at the heart of all discussions** on IAS and IPLCs. Access to and ownership of land are crucial elements in facilitating IPLC management of IAS.
- **Many communities already have biocultural rights/protocols** (e.g., in the Amazon, and also the law of the Guna in Panama protects the collective intellectual property of the Guna). These types of protocols and laws could be a foundation for discussions with communities on IAS.
- **IPLC concerns about GMOs** should be particularly carefully considered when making decisions about introducing these species.

3.5.3. Capacity-building

- **Capacity-building for IPLCs may be needed**, so that they can organize themselves (both within and between communities) to recognize and develop management plans for IAS, using their ILK.
- **Financial support** may also be needed to help communities to organize and develop their institutions. Community 'pest committees' could be developed, as well as citizen science initiatives for monitoring and control.
- Capacity building is often also needed so **IPLCs can learn how to interact, negotiate and work with researchers and governments**, so that IPLCs can frame research and policymaking in ways that recognize and build on their knowledge of realities on the ground.
- **Encouraging and engaging IPLC youth** in traditional practices is also important, as many young IPLCs are increasingly affected by outside influences and are turning away from the

knowledge and practices that could be used to manage IAS and other environmental problems.

- **Capacity building will also be needed for scientists and policymakers** so they can better engage with IPLCs and ILK around IAS.
- **Centres of excellence on IAS could be created**, as forums for bringing together IPLCs, scientists and policymakers, to help centralize and communicate and develop programmes on IAS.

4. Case studies[8]

4.1. Case studies shared during the workshop

During the workshop, participants provided many examples of how IPLCs are experiencing and managing IAS. These examples are given below in alphabetical order by country. This information could provide the basis for further development of case studies for the assessment.

Name	Country	Species	Description
Christina Martin and Ruth Spencer	Antigua & Barbuda	Giant African snail	**Trends**: Since it was discovered in 2008, giant African snails (*Achatina fulica*) have spread in Antigua. Each snail can lay about 1400 eggs. It now occupies 70% of the island and is completely out of control. Plant protection agencies keep count of snails collected annually – 400,000 in 2018 and 500,000 in 2019, but this doesn't include snails collected by households. **Drivers:** There is no consensus on how giant African snails were introduced into Antigua (possibly as a delicacy for restaurants). The snails have spread in part because of soil removal from one section of the island to another area for construction, as snail eggs are in the soil. **Impacts:** The giant African snail is a threat to human health, as it carries a parasite (Rat lungworm) which causes meningitis. It also impacts the economy, environment and food security because it eats crops, and affects palm and coconut trees. Though there are no studies on the extent of damage for farmers (there is no funding for such studies), farmers sometimes have to abandon their farms after the snails have eaten all their

[8] The text in section 4 represents an attempt to reflect solely the views and contributions of the participants in the dialogue. As such, it does not represent the views of IPBES, the CBD or UNESCO or reflect upon their official positions.

			crops. There are also other indirect impacts on the environment due to eradication techniques (using salt to kill the snails, or ducks and chicken to eat them). **Management:** Several attempts were made to collect the snails, but they didn't work. So far, US$600 000 have been invested in communication and awareness. The government organizes training workshops to educate the general public/students on monitoring, collection and destruction of snails. They hand out kits (gloves, bags, salt) to kill the snails. Just before dying, snails can lay their eggs, so people are asked to burn them. They are also encouraged to tell the authorities if there are increases in snail numbers. Local people use WhatsApp® to exchange information and monitor this species. The agency in charge is against snail consumption (for health reasons), although this is done in other places. Their latest suggestion is to spray chemicals to kill the eggs, but people are afraid of the environmental consequences. Another idea would be to fund scientific studies to make the snails infertile. **Policy:** Now, because the invasion has reached crisis proportions, the government wants to involve local communities all over the island and they have been hearing the voices of local people. One local group wanted to deal with protected areas that had problems with IAS. They were able to make themselves heard on the radio and television. The government gave them permission. There is now more awareness of the value of local people in these processes. The consultation showed that chickens can be used to eat the snails, but most people don't raise chickens. Collecting the snails by hand is very labour intensive, and therefore very expensive. Some say that sniffer dogs can be used – Antigua has sniffer dogs for drugs at the airport, so someone may do research on this. Antigua and Barbuda have a comprehensive environmental protection and management bill at the national level. It has 67 mentions of local communities – it covers biodiversity, access to information and protocols, but invasive species comes under two different ministries. There is a need for better synergies to address the issue of IAS, as snails are

			often seen as an agricultural issue, not as a biodiversity issue. They also affect people's livelihoods, and food production. --- From the ILK dialogue workshop's discussions, there could be a plant in Egypt used to control and manage snails. The plant is powdered and sprayed. This plant has no effect on the environment (**Wanzala Wycliffe**). In Kenya, they also use chili peppers to make some local pesticides to protect vegetables. Participants also recognized that importing alien species to control other species is quite controversial as they can become IAS.
Ruth Spencer	Antigua & Barbuda	Coralita vine and other invasive plants	**Conceptualisation:** In Antigua, people may see IAS plants not solely as threats but also as an opportunity, and people look for productive and alternate means and ways of using such plants. **Impacts:** Older women have seen bees foraging on the yellow flowers of Coralita vine (*Antigonon leptopus*) and the women have observed pigs and goats gnawing at the roots, a bulb like structure, and those animals look healthier than others. The vine may therefore be a source of food for animals, but this may need to be confirmed through further research, which is unfortunately hard to do in Antigua due to a lack of funding and facilities. Also, invasive trees broke up areas of wetlands and dried them out. When these areas were cleared of invasive species, it was discovered that a lot of the local species had died out. **Management:** Only one local organisation is trying to keep local seeds and produce a seedbank. There is however little funding.
Ruth Spencer	Antigua & Barbuda	Mites	**Drivers and Impacts:** The bee industry was almost wiped out because of mites that came into the country on imported goods.

Chrissy Grant	Australia	Crown of thorns starfish	**Impacts:** Crown of thorns starfish (*Acanthaster planci*) eat the coral reefs. It takes years for coral to grow back. This impacts tourism as well as the environment. **Management:** The management authority for the Great Barrier Reef and the Queensland government has a continuous monitoring program to control the outbreaks. *[Note: Crown of Thorns is native to some areas of Australia.]*
Chrissy Grant	Australia	Yellow crazy ants and red fire ants	**Trends:** Yellow crazy ants (*Anoplolepis gracilipes*) and red fire ants (*Solenopsis invicta*) in Australia's Northern Territory. There were eradication programmes, but now they have spread to Queensland. Red fire ants spread further south. **Impacts:** If you get bitten by them it hurts a lot, and people need to be hospitalised at times. This has impacts peoples' lifestyles. **Management:** Spreading poisons to kill the nests. Sometimes they are near schools, so care is needed.
Chrissy Grant	Australia	Feral cats	**Trends:** There are 20 million feral domestic cats in Australia. **Impacts:** Feral cats are killing native species. **Management/adaptation:** Feral cats (*Felis catus*) have been present so long now that some communities have cats as totems, and cats have been incorporated into spiritual dreamings. In other communities, women hunt the cats for economic purposes and for development, as payment for eradication brings income into the community. In other communities, people eat cats – they are a food source because the native species which are their normal food sources have been depleted by the feral cats and supermarkets are far away. These three adaptations can be seen in Central and Western Australia. Also, the government has a programme to eradicate feral cats.

Chrissy Grant	Australia	Rabbits	**Adaptation, management and policy:** In Tasmania and on the Australian mainland, the government tried to eradicate rabbits, but a lot of people relied on rabbits for food, not only indigenous people but also other farming and remote communities. They developed cultural practices around hunting and eating rabbits. The government introduced a disease (Myxomatosis) to rabbits, and as a result people couldn't hunt rabbits for many years. Some were still hunted for fur to make Akruba hats which was safe, but communities could not use rabbits for meat without a health impact. There was no consultation, as the government just saw rabbits as a pest. Communities were very unhappy about the eradication programme. A rabbit proof fence was built in 1901 and completed in 1907, cutting off Western Australia. Meanwhile in Queensland there are large fines if you have a rabbit.
Chrissy Grant	Australia	Cane toad	**Trends and drivers:** The cane toad was introduced from Central America to prey on cane beetles. It spread in Queensland, and then went from tropical coastlands into western areas of Queensland, and eventually crossed to Western Australia – this is a drier desert area, so the toads are adapting to the new climate. **Impacts:** The toads have a poison gland, so they are killing lots of native species. There is, however, a water rat, a native species that can kill and eat the toad, without dying. There are also some birds that are not affected.
Chrissy Grant	Australia	Pond apple (*Annona glabra*)	**Trends:** This plant is spreading along the entire coast of Queensland and is now spreading over to the Northern Territory. Because of this the Pond Apple is registered as a Weed of National Significance (WONS). **Impacts:** It is not poisonous, but it outcompetes the mangroves. **Management/Policy:** In the lower Cape York region, Aboriginal rangers have been trained to manage and eradicate pond apple. There is a local government policy/programme in the Kuku Yalanji's traditional country to eradicate it, and other

			communities may be doing the same. IPLCs know that it is there, and they were able to identify it before the training.
Chrissy Grant	Australia	Feral camel (*Camelus* spp.)	**Trends:** There are more than 2 million feral camels in Australia. The camels have spread extensively across four states and the territory of Central Australia. **Impacts:** They have significant impacts on the environment, infrastructure, economy and social values. **Management:** There was a programme to eradicate the camels, but it has not had a lot of success. Researchers are now tagging a small number of camels to monitor their movements.
Lynn Jacobs	Canada	Emerald ash borer (*Agrilus planipennis*)	The emerald ash borer is an invasive alien insect that attacks and kills healthy ash trees, including the black ash tree used for basket making by the Kahnawa:ke people and many other IPLCs in the region. **Conceptualisation**: This particular species is described and named after its impacts: something that eats and destroy the trees. Different communities see different impacts and therefore name it differently, but they all describe it as a pest. **Trends:** The emerald ash borer has been a problem for the last 5 to 10 years. The primary users (basket makers) and the Environment Protection Office were the first to notice the impacts. **Drivers:** The insect spreads from movement of wood containing their larvae, and also from adults flying tree to tree to lay their eggs. **Impacts**: There are many ash dominant forests in the community of Kahnawa:ke, and more than 100,000 ash trees will die in the community within a decade. It causes more environmental problems because trees die, habitat is lost, and this provides

			opportunities for other invasive species, including *phragmites*, Japanese knotweed, and others. In addition to the ecological and economic impacts, this species has cultural impacts. The black ash is of particular significance for the community because it can be split along its annual growth rings and is used for basket-making. White ash is also often used for basket handles and rims, and sometimes other cultural items such as lacrosse sticks or snowshoes. With the loss of trees, there is a loss of basket-making materials and knowledge (how to harvest, pound and prepare the wood for basket-making, weave, etc.). The knowledge of where the trees are found, their ecosystems, and the language around all those ecological and cultural functions is also being lost. Falling trees are also a danger. **Management and adaptation:** The communities are trying to mitigate the impacts, because there is no way to prevent infestation. Within a decade, the trees will be gone – so to reduce environmental impacts they are working on cutting, replanting and establishing a seed vault – gathering seeds and working with National Tree Seed Centre of Canada to store seeds, so that they can replant these trees when a solution is found to the emerald ash borer. There are education programs in the community for knowledge transfer in order to record the words used by the communities around the trees and basket-making. There is also a management plan to mitigate the impacts, which was developed in collaboration with academics, invasive species organizations and other indigenous environmental organizations. The goal is for environment and cultural centres to work together with basket-makers so they can document the processes from tree identification to harvesting to preparation and weaving. This aims to mitigate cultural impacts by safeguarding their knowledge. Adaptation is another issue. Some basket-makers are experimenting with other materials, such as other trees. But weaving is more challenging – nothing has been found that is as good a material as the black ash. They have participated in meetings bringing together academics, basket-makers and indigenous environmental organizations to link indigenous and scientific perspectives on the problem, and met over the past several years to share approaches.

			Policy: There is a lack of knowledge-sharing due to language barriers in Quebec – English and Mohawk are spoken in Kahnawa:ke, whereas the government and general population in Quebec is French speaking, which creates a communication barrier. The nearby city of Montreal contacted the community when the emerald ash borer was reaching the region because they were concerned about the community's forests acting as a nursery ground for emerald ash borer. Most forests outside the community have been cut for urban and agricultural development. The community has forests close to the city, so the city was concerned about their management plan, but there was not a great deal of communication or support offered. Kahnawa:ke developed its own management strategies, because the emerald ash borer has environmental, economic and cultural impacts. A non-native wasp that will prey on the ash borer beetles was released; but the community is concerned about biocontrol in the future, and that this too could become an invasive species. There is also an exciting new Canada-USA Ash Protection Initiative focussing on the propagation of trees that are resistant to emerald ash borer, which the community was informed about and expressed interest in collaborating on.
Lynn Jacobs	Canada	*Phragmites australis*, Japanese Knotweed (*Fallopia japonica*), Buckthorn (*Rhamnus cathartica*) and wild parsnip (*Pastinaca sativa*)	**Drivers:** Habitat destruction gives space for phragmites, Japanese knotweed and other invasive plants. The horticulture industry also promotes Japanese knotweed. It is very vigorous (e.g., it grows under parking lots and comes up on the other side), so control is very difficult. The movement of soil and vehicles are spreading invasive plants, especially phragmites. **Impacts:** Phragmites dries out wetlands which gives a cascading effect. Wild parsnip causes skin to become sensitive to sunlight and burns skin, which is a problem especially for hunters. These and other invasive plants are displacing native species, including medicines, destroying wetlands and aquatic and terrestrial environments. **Management:** The primary users (fishermen and hunters) and the Environment Protection Office were the first to notice the impacts of these plants. Kahnawa:ke tries to reach out to community members to find solutions. The community is currently

			working on education to identify and monitor invasive plants. Being close to an urban environment there are many invasive species that impact Kahnawa:ke, but the community can't keep up with them. The community is seeking funding to work on a management plan for invasive plants but there could be conflicts around community values because some control could involve the use of pesticides if no other viable control is available.
Lynn Jacobs	Canada	Ticks bearing Lyme disease	**Trends:** Lyme-bearing ticks are increasing in the area around Kahnawa:ke. **Impacts:** There are impacts on health as well as on cultural activities and knowledge transmission. As people are now concerned about Lyme disease, this hinders efforts to encourage children to spend time on the land, which is where most learning of ILK can take place.
Ramiro Batzin	Guatemala	Eucalyptus	**Drivers:** There are policies that private enterprises develop, but they are interested in private gain, not considering state policies or communities. Eucalyptus is not well accepted but one company fosters it because it wants to show that it has reforested areas, and is promoting community cultivation. They say it can be used as fuelwood. Some communities are using eucalyptus to produce fuelwood, but it isn't working as expected because the wood doesn't produce sufficient heat. There are no studies on the impact on IPLCs. **Impacts:** Eucalyptus dries up the earth.
Ramiro Batzin	Guatemala	Sauco tree (*Sauco cimarron*)	**Monitoring and adaptation:** A tree (sauco) entered the community's territory, and they noted its arrival and monitored its impacts to see if it was good or bad. Now it is part of the indigenous diet and it is also part of their medicine, and they even have stories regarding how this plant is now protecting the territory. So it is considered an alien species, but not invasive or negative. This also demonstrates that IPLCs have systems to monitor biodiversity.

			Policy: Monitoring programmes should engage with IPLCs and their own monitoring systems.
Ramiro Batzin	Guatemala	Orchids and technology	**Adaptation:** Some indigenous peoples have made progress in the use of technology, but based on their ILK. For example, in Guatemala, they have a lab for in vitro orchid production, so the community use modern technology for germination and use of genetic elements, but they do so following the Mayan calendar associated with moon cycles.
Ramiro Batzin	Guatemala	African killer bees	**Impacts:** African killer bees affect food security (honey management) while decreasing pollination.
Ramiro Batzin	Guatemala	Mediterranean fly (*Ceratitis capita*)	**Policy**: The USDA together with Mexico and Guatemala developed a programme called Moscamed to eradicate the Mediterranean fruit fly with chemicals. This policy was not elaborated in consultation with IPLCs. As a result, there were major impacts on native plant and food security for IPLCs, and major conflicts with IPLCs.
Lucy Mulenkei	Baringo-Bogoria Basin, Kenya	*Prosopis juliflora*	**Drivers:** *Prosopis,* a spiny tree, was introduced by an international organisation and has now spread. It is also dispersed by livestock. **Impacts:** *Prosopis* in Kenya is a threat to animals and humans. **Management:** Communities have made some economic use of the plant, e.g., charcoal. Also, in some communities it is not considered a problem, as in some places it does not have thorns and people use it for shade, so it is hard to tell communities to destroy it.
Lucy Mulenkei	South Africa	*Eucalyptus* spp.	**Management and policy:** The environment minister banned eucalyptus and ordered the trees to be cut down. Then, other authorities said that new species of eucalyptus are good, so it is confusing for communities.
Lucy Mulenkei	Kenya	Medicinal plants	**Adaptation:** It is very difficult to use alien species in ceremonies. Pastoralists, such as the Maasai, have to look for the native grasses, and for medicines. They can't use alien plants even if these look similar, because they don't know them. A special plant is used as a

			perfume, and it is disappearing, but people can't use an alternative, and prefer to sweat. In some pastoralist communities, building materials have to be from native species.
Wycliffe Wanzala	Kenya	*Lantana camara; Eucalyptus credulis;* Water hyacinth (*Eichhornia crassipes*); *Tagetes minuta* (Nanjaka); *Salvinia molesta* (water fern)	**Trends and Drivers:** *Lantana* was introduced into Kenya at the end of 2nd World War, as an ornamental species. It diversified into use as a medicinal plant, and spread to neighbouring areas as an ornamental, and then became a weed. **Impacts and adaptation:** *Eucalyptus credulis* dries out soils, uses a lot of water and nutrients, and grows very large. Soils don't recover fertility after it is harvested. Ways have been improvised to use the wood to make briquettes for cooking, and this has been patented. **Management:** The government and communities are trying to determine ways to use water hyacinth as it is impossible to remove. It can be used to clean sewage water and there are community projects and programmes that are becoming quite successful.
Wycliffe Wanzala	Kenya	New domestic breeds of livestock and crops	**Trends, drivers, impacts:** Some traditional domesticated animal species are disappearing and are being replaced by new breeds, for example red Masaai sheep are very good for the environment, but they are disappearing as technology advances. A new breed of banana engineered in a laboratory is being disseminated around sub-Saharan Africa at a rapid rate – indigenous peoples are being persuaded to adopt them, and to abandon their own genetic resources. Likewise, the East African Zebu is being replaced by a new breed. Uganda and Kenya's indigenous tribes are being taught that new species are the best and that they should abandon what have been using for a long time. But the long-term viability and impacts of this have yet to be seen. Note from participants: This also echoes the experience of Argentinian IPLCs with GMO potatoes.

Onel Masardule	Panama	Tilapia, lionfish (*Pterois* spp.) and the poncho rat (capybara - *Hydrochoerus hydrochaeris)*	**Conceptualisation:** There is no Guna word for tilapia, but the Guna community now depends on this species for food and income. **Drivers**: Tilapia was introduced into Panama by the government to help with hydroelectric dams by eating weeds and to help the communities as a food source to mitigate dam impacts. They used to raise them in farms, but they escaped into the rivers. **Impacts**: Tilapia is very invasive in Lake Bayano and has replaced all the native fish. There are so many of them you can stand and shoot them easily. It impacts biodiversity, destroys all other species, and also impacts the Guna's way of life, health, food and knowledge. It impacts knowledge because, now children do not know which species were there before, or their names. **Management/adaptation**: Tilapia is now impossible to control. In the same lake, poncho (a rat) was introduced, so some IPLCs tried to adapt by consuming poncho, which was a shock to their culture, while other communities rejected poncho. The Guna faced a similar situation with lionfish: a simple solution is to eat them, but the communities didn't want to because they do not find the fish beautiful, and they do not know it and it has no name in their language. It is important to take into account the cultural context (e.g., octopus isn't eaten in some communities and is considered as an insult and only fit for animals, while in others it is considered delicious). The Guna's organization is trying to decide how to deal with the lionfish and other invasive species, wondering if the solution is to change the mentality of the Guna, but this has many risks for ILK, traditional culture and community wellbeing.
Onel Masardule	Panama	Paja canalera (*Saccharum spontaneum);* Sargento	**Trends:** A plant introduced in the canal to control weeds, *paja canalera*, has become invasive. Sargento fish (peacock bass) is another invasive species. Cacao is not originally from Panama, it is from Asia, but now more is produced in Panama than anywhere else. It has a big impact on biodiversity.

		(peacock bass); Cacao	
Jovelyn T. Cleofe	Philippines	*Gmelina arborea*	**Drivers and impacts:** It is common to intentionally introduce alien fast growing trees for economic purposes or food. *Gmelina arborea* was intentionally introduced and replaced native trees because they grow fast. People prefer to grow it in a monoculture, rather than slower growing native trees. The government also supports this. There are now ecological impacts. Mahogany (*Swietenia macrophylla*) is a similar case.
Jovelyn T. Cleofe	Philippines	Freshwater species	**Drivers and impacts:** Ornamental Chinese soft-shell turtles, knife fish, water hyacinth, and janitor fish were introduced into the Philippines' freshwater systems and they replaced native species. All these species were introduced for economic purposes, without studying their potential environmental impacts. **Management**: There is no prevention plan, and the communities do not know how to manage them as they are already introduced and are promoted by governments.
Jovelyn T. Cleofe	Philippines	Policy	**Policy:** In the Philippines, public consultation on policies has to take place at the local level. When communities are organised and aware, they can engage – the government has to bring policy issues to the local level three times. This allows organized groups to engage and they can influence laws. It requires capacity-building for bringing communities together and developing grassroots organizations.
Polina Shulbaeva	Russia (Siberia)	Kamchatka crabs or Red King Crab (*Paralithodes camtschaticus*)	**Trends and impacts:** Kamchatka crabs are very popular and very expensive but because of climate change they are moving into the Arctic and eating everything, which is impacting Arctic indigenous peoples and Saami fishing, as it kills native species. It is now an international issue. The Government of Norway is trying to take action against it. Kamchatka crab is one of the largest edible crab species in the world. Crabs can grow as large as 28cm with a leg span of up 1.8m and can reach weights of 10 to 15kg.

Polina Shulbaeva	Russia (Siberia)	Siberian silk moth (*Dendrolimus superans sibiricus*)	**Drivers**: The main driver of silk moth invasion is climate change. Another important driver is the lack of control of transboundary connections such as the timber trade. Siberian trees go to China, and trees also go from China to Russia, and invasive species are carried along with this. There is no border control. **Impacts**: Caterpillars of silk moth destroy coniferous forests from spring to late autumn. As a result hundreds of thousands of hectares of Russian forests are destroyed – it happens very fast. (The Russian Ministry of Nature has issued an annual report "On the State and Environmental Protection of the Russian Federation in 2018". According to the report, for 2018, in only one Tomsk region, the silk moth killed 23.7 thousand hectares of forest). The moths feed on the trees and are impossible to control. In affected areas there are no more birds, and no food left for animals (e.g., reindeer) and the infected trees have to be cut down, which profits harvesting companies (often from abroad). Traditional community lifestyles are impacted, including land use and spiritual aspects, as they can't use these areas anymore. **Management**: When hunters find silk moth webs, they need to alert a government department immediately. They try to control it, but it is impossible at times. The most effective management approach is to poison silkworm caterpillars in the spring, but due to delays the funding for these activities can be allocated in the summer and autumn, when the forest has already died.
Polina Shulbaeva	Russia (Siberia)	Borshitievik (Giant Sosnowsky hogweed or *Heracleum sosnowskyi*)	**Trends:** IPLCs in Siberia have seen Borshitievik as a problem since the 1980s. It has now reached Norway and other Circumpolar Arctic territories. **Drivers**: Birds eat them and spread the seeds. **Impacts**: There is now common knowledge about this species: when it is smaller than 60cm and without seeds, it is not poisonous and very rich in nutrients and vitamins and used as a very healthy food for cattle. When the Borshitievik is taller than 60cm, its stems and leaves can cause serious allergic bullous dermatitis, often referred to as "burns". These can even be fatal. The plant may contain photosensitizing substances

			(furanocoumarins) that cause phytophotodermatitis, cancerous tumours and congenital malformations in humans and animals. There is now common knowledge about this species: when it is smaller than 60cm and without seeds, it is not poisonous and very rich in nutrients and vitamins and used as a very healthy food for cattle. **Management**: Smaller plants without seeds are very easy to remove, but when it is taller than 60cm, all the seeds need to be removed, using a bag or piece of cloth. It is only considered eradicated it hasn't grown back in 5 years. Therefore, every year in spring people have to go back and check if it has grown again. IPLCs have been monitoring and managing this species without chemicals and without support. -- From the ILK dialogue workshop's discussions, the idea of controlled fires to manage this issue was raised.
Ndiaga Sall	Senegal	*Aquatic plants: Typha* spp. (balak) *Pistia stratiotes* (Tombalay) and the great *Salvinia molesta*	**Trends**: In 1889, the Typha plant covered 7% of Lake Guiers, and in 2012 the infestation covered 40% of the lake. **Drivers:** The expansion of the typha occurred following the softening and the low flow of the waters and also a high level of eutrophication (the process by which nutrients accumulate in an aquatic environment), which was seen after the installation of the Diama and Manantali dams, and the embankments and hydro-agricultural developments on both banks. The plant's spread is favoured by the presence of nutrients from waste; calm water; weak currents; stopping the rise of the salt tongue; species biology; and the absence of appropriate proactive management methods to contain the phenomenon within acceptable limits.

			Impacts: *Typha* spp. in Senegal are a very serious problem, affecting the main lakes which provide Senegal with drinking water. Typha prevents fisherman from fishing from pirogues (traditional boats). It also impacts water quality. About 450,000 and up to 550,000 water birds (Anatidae), 250,000 shorebirds, 20,000 flamingos, 3,000 to 12,000 lesser flamingos, and 2,500 European spoonbills owe their winter survival to the quality of the environments of the Senegal River Delta. These species have already been greatly affected by the Diama Dam, which has caused softening of the waters upstream, which is responsible for the proliferation of many plant species, including in particular the *Typha autralis*, *Pistia stratoites* and more recently the great *Salvinia molesta*. Anatidae are grain-eating birds and lily seeds are a good part of their diet. Their numbers have a clear instability over time, which is due to an evolving environment and variable water supplies. Depending on the water level the lily may not appear and thus the grain-eating birds will not have seeds. These are also important nesting places for birds of prey. Other impacts include silting of the hydraulic axes (trapping of particles); formation of blockages with loss of water flow; increased evapotranspiration; threats to adjacent wetlands (parks, reserves) due to loss of wealth in aquatic biodiversity (eutrophication); disruption of the food chain due to plankton decline; decrease in dissolved oxygen; loss of biological diversity; and fast propagation speed linked to the biology of invasive plant species. These impacts lead to a range of additional problems, including eventual blockage of waterways (navigability of boats, reduction of fishing, obstacles to the development of ecotourism...); inaccessibility of water bodies; obstruction of irrigation canals; difficulty in watering livestock; problems for water and hydroelectric installations; development of waterborne diseases (proliferation of vectors); constraints on drinking water supplies; and decreased water quality.

			Management and Policies: Mechanical methods include pulling out and burning typha, and using it as compost, fuel, or insulation. As drinking water quality is a national priority for the people of Senegal, the government invested a lot of money, and communities have successfully used it as biogas and charcoal for heating. Following that, the government put in place a monitoring committee (involving the Ministry of Environment and local communities) and a national observatory (composed of the Ministry of Environment, researchers and IPLCs). There are also local committees (IPLCs and local representatives) in charge of local management. They are looking now at creating an inter-country committee. Controlling the proliferation of aquatic plants in general can be done by combining physical and biological control methods in order to minimize their spread, including hacking, manual removal, physical barriers and biological control. The purpose of these combined operations is to ensure sustainability of the removal efforts. Physical methods include hacking with heavy mechanical equipment, for example the intervention in the delta of the Senegal River in collaboration with Mauritania. Manual removal has also taken place with the participation of beneficiary communities, building on existing associations, mobilization and awareness-raising, organization of committees, training of populations and acquisition of boats and manual tools. Biological control methods include establishment of infrastructure for the reproduction of insects; acquisition of laboratory equipment; breeding and releasing insects; and training of technicians and populations on release and monitoring techniques. Other tools include awareness-raising and incentives for stakeholders around the issue of the fight against aquatic plants; and encouraging the use of harvested plants for economic purposes and community training on this.
Ndiaga Sall	Senegal	*Striga hermonithica* (ndoxum) (a native invasive)	**Drivers:** Seeds can spread with the wind, birds or animal fertilizers. **Impacts:** Striga is a parasitic plant which prevents millet from growing. **Management**: When it was first reported, some IPLCs met to try to find a solution and understand the plant. They were able to halt striga infestation by combining plant-based

			fertilizers and a different period of sowing (first tested on a small patch and then extended to larger millet production areas). Since then, monitoring agencies have been established and try to eradicate it with organic fertilizers.
Ndiaga Sall	Senegal	*Mitragyna* inermis (Xoos), *Mimosa pigra* (Dajat)	These plants are IAS in Senegal.

4.2. Documenting case studies

Participants highlighted that they would like to further document their own case studies and share information to improve their management of IAS, as there are limited number of publications related to IAS and ILK.

The IPBES secretariat noted that IPBES does not carry out original research as part of the assessment process, or fund research, so if case studies are to be documented outside of the dialogue workshop reporting process this would need to be done by other organizations or communities themselves.

Participants noted that, if funding is not available for such community research this can be an obstacle. They also suggested that the IPBES capacity-building team look into ways of supporting these kinds of activities for communities.

Other suggestions included mobilizing researchers outside of IPBES to work with communities to document case studies.

The IPBES secretariat will look into these suggestions.

Annex I - Agenda

Friday 15 November	
8h30-9h00	Registration
9h00-9h45	Opening Opening words from International Indigenous Forum on Biodiversity and Secretariat of the CBD Introductions
9h45-10h30	Aims, methods and agenda of the dialogue - Presentation on agenda and discussion How can the dialogue be most useful for all participants? Discussion on Free Prior and Informed Consent
10h30-11h00	*Refreshment break*
11h00-12h00	Introduction to IPBES, including work on ILK (15 mins) Introduction to the invasive alien species assessment: aims, methods, structure, timelines, final product, ILK in the assessment, progress so far (30 mins) Discussion (15 mins)
12h00-13h00	Conceptualizing invasive alien species – how do IPLCs understand invasive alien species? Does this differ from scientific conceptions?
13h00-14h00	*Lunch – note that lunch in not provided*
14h00-15h00	Continue: Conceptualizing invasive alien species – how do IPLCs understand invasive alien species? Does this differ from scientific conceptions?
15h00- 15h30	*Refreshment break*
15h30-17h30	Trends, drivers and impacts of invasive alien species

Saturday 16 November	
9h00-9h30	Reflection on yesterday, introduction to the day
9h30-10h30	Prevention, management and adaptation for invasive alien species by indigenous peoples and local communities
10h30-11h00	*Refreshment break*
11h00-12h00	Likely future trends in invasive alien species and policy responses – what policy options could the assessment present to policy makers?
12h00-13h00	IPLC caucus
13h00-14h00	*Lunch – note that lunch in not provided*
14h00-14h30	Report back from caucus
14h30-15h30	IPLCs and the final assessment • How could the final assessment be utilized by IPLCs? • What could be done to make the assessment useful for IPLCs? • What are the key issues to keep in mind?
15h30-16h00	*Refreshment break*
16h00-16h45	Participation in the assessment Timelines for collaboration, communication and dialogue throughout the assessment process, identifying key experts, resources, case studies, meetings and events
16h45-17h00	Next steps Closing (indigenous representative)

Annex II - FPIC document and participants list

Free Prior Informed Consent (FPIC) principles for sharing of knowledge during the indigenous and local knowledge dialogue workshop for the IPBES invasive alien species assessment
Montreal, Canada, 15-16 November 2019

The names attached at the end of this document agreed during the dialogue workshop to follow the principles and steps laid out in the document.

Background

Within the framework of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), principles of Free Prior Informed Consent (FPIC) apply to research or knowledge-related interactions between indigenous peoples and outsiders (including researchers, scientists, journalists, etc.). Given that the dialogue process includes discussion of indigenous knowledge of biodiversity and ecosystems, there may be information which the knowledge holders or their organizations or respective communities consider sensitive, private, or holding value for themselves which they do not want to share in the public domain through publications or other media without formal consent.

Objectives of the workshop

For IPBES, the objective of the workshop is to learn from participants about their perspectives on invasive alien species. The aim is to gather a series of recommendations for the invasive alien species assessment, which will be used to inform the further development of the assessment. Other results may include case studies that illustrate invasive alien species assessment themes. It is hoped that the workshop will provide an opportunity for all participants to learn more about IPBES and assessment, and to reflect and learn from one another about how indigenous and local knowledge can influence environmental decision-making.

Principles

The dialogue will be built on equal sharing and joint learning across knowledge systems and cultures. The aim is to create an environment where people feel comfortable and able to speak on equal terms, which is an important precondition for true dialogue.

To achieve these aims, the following dialogue goals are emphasized:

- Equality of all participants and absence of coercive influence
- Listening with empathy and seeking to understand each other's viewpoints
- Bringing assumptions into the open

If at any point during the dialogue workshop participants feel that the above goals are not being achieved, participants are asked to bring this to the attention of the workshop organizers in a timely fashion.

Sharing knowledge and respecting FPIC

To ensure that knowledge is shared in appropriate ways during the workshop, and that information and materials produced after the workshop are used in ways that respect FPIC, we propose the following:

1. Guardianship – participants who represent organizations and communities
   - Participants who represent organizations or communities will act as the guardians of the use of the knowledge and materials from their respective organizations or communities that is shared during or after the workshop. Any use of their organizations' or communities' knowledge will be discussed and approved by the guardians, as legitimate representatives of their organizations or communities.
   - Guardians are expected to contact their respective organizations and communities when they need advice. Guardians are also expected to seek consent from their organizations or communities when they consider that this is required.

2. FPIC rights during the dialogue workshop
   - The FPIC rights of the indigenous peoples in the workshop will be discussed at the beginning of the workshop, until participants feel comfortable and well informed about their rights and the process, including the eventual planned use and distribution of information. This discussion may be revisited during the workshop, and will be revisited at the end of the workshop once participants have engaged in the dialogue process.
   - Participants do not have to answer any questions that they do not want to answer, and do not need to participate in any part of the workshop in which they do not wish to participate;
   - At any point, any participant can decide that they do not want particular information to be documented or shared outside of the workshop. Participants will inform organizers and other participants of this. Organizers and participants will ensure that the information is not recorded.
   - Permission for photographs must be agreed prior to photos being taken and participants have the right not to be photographed. Organizers will take note of this.

3. After the workshop
   - Permission will be obtained before any photograph of a participant is used or distributed in any form.
   - Participants maintain intellectual property rights over all information collected from them about themselves or their communities, including photographs.
   - Copies of all information collected will be provided to the participants for approval.
   - Any materials developed for the invasive alien species assessment or other IPBES products using information provided by participants will be shared with the participants for prior approval and consent.
   - The information collected during this dialogue workshop will not be used for any purposes other than those stated above, unless permission is sought and given by participants.
   - Participants can decline to consent or withdraw their knowledge or information from the process at any time, and records of that information will be deleted if requested by the participant.

The participants of the workshop agreed to follow the principles and steps laid out in this FPIC document. Their names are as follows:

Indigenous Peoples and Experts on Indigenous and Local Knowledge		
Francisco Ramiro Batzin Chojoj	Guatemala	Co-chair of the International Indigenous Forum on Biodiversity; Director General of Asociacion Sotz'il
Jovelyn T. Cleofe	Philippines	Philippine Country Co-Coordinator, LMMA Network International
Chrissy Grant	Australia	Jabalbina Yalanji Aboriginal Corporation
Lynn Jacobs	Canada	Director of Environmental Protection, Mohawk Council of Kahnawà:ke
Christiana Martin	Antigua	Antigua Barbuda Horticultural Society
Onel Masardule	Panama	Executive Director of the Foundation for the Protection of Traditional Knowledge (FCPI)
Lucy Mulenkei	Kenya	Co-chair of the International Indigenous Forum on Biodiversity; Executive Director of the Indigenous Information Network
Ndiaga Sall	Senegal	Coordinator of Enda Santé
Polina Shulbaeva	Russia	Regional Coordinator, Centre for Support of Indigenous Peoples of the North (CSIPN)
Ruth Spencer	Antigua	Coordinator- Training, outreach and resource mobilization of the Freetown Community Group/Caribbean Marine Managed Areas Network
William Thanenrishon Whyte	Canada	Elder from Kahnawà:ke
Wycliffe Wanzala	Kenya	Associate Professor and Director of the Institute of Ethnobiology and Ethnomedicines (IEE), Maasai Mara University
IPBES		
Peter Stoett	Canada	Dean of Social Science & Humanities at the University of Ontario Institute of Technology; Co-chair of the IPBES assessment
Esra Per	Turkey	Associate Professor at Gazi University; IPBES fellow (chapter 3)
Michael Ansong	Ghana	Lecturer in Department of Silviculture and Forest Management- Faculty of Renewable Natural Resources, Kwame Nkrumah University of Science and Technology; Lead author (chapter 4)
John Bukombe	Tanzania	Senior Research Officer at Tanzania Wildlife Research Institute (TAWIRI); Lead author (chapter 5)
Patricia Howard	UK/US	Faculty of Social Science, Wageningen University & Research Center; Lead author (chapter 6)
Simone Athayde	Brazil	University of Florida, IPBES assessment of values
Tanara Truong	France	Technical support unit for the invasive alien species assessment
Peter Bates	UK	Technical support unit for indigenous and local knowledge
Convention on Biological Diversity		
Teresa Mazza	Canada	Programme Management Assistant, Peoples and Biodiversity Unit
John Scott	Australia	Senior Programme Officer on Traditional Knowledge, Peoples and Biodiversity Unit
Junko Shimura	Japan	Programme Management Officer on Invasive Alien Species and Taxonomy, Biodiversity Science, Policy and Governance Unit
Viviana Figueroa	Argentina	Consultant