



ipbes

Assessment Report on Invasive Alien Species and their Control

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The Intergovernmental Science-Policy Platform on Biodiversity & Ecosystem Services

#InvasiveAlienSpecies Assessment



Food and Agriculture Organization of the United Nations





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■ The invasive alien species assessment



Invasive alien species are one of the 5 major drivers of biodiversity loss

Alien species are animals, plants, and other organisms that have been introduced by human activities to new regions

Invasive alien species are a subset of alien species, known to have established and spread with negative impacts on nature. Many invasive alien species also have impacts on people

“Biological invasions” is a term used to describe the process involving the intentional or unintentional transport or movement of a species outside its natural range by human activities and its introduction to new regions, where it may become established and spread.

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Main key findings

People and nature are threatened by invasive alien species in all regions of Earth

Current policies have been insufficient in managing biological invasions and preventing and controlling invasive alien species

The threats from invasive alien species are **increasing significantly** in every region

People at the heart of the problem, as **many human activities facilitate** the transport, introduction, establishment and spread of invasive alien species

Biological invasions and their adverse impacts can be prevented and mitigated through **effective management**

Ambitious progress in biological invasion management can be achieved with **integrated governance**

A few numbers on status and impacts

>37,000

established
alien species have
been introduced by
human activities
across all regions
and biomes of Earth

60%

of **global species**
extinctions have
been caused,
solely or alongside
other drivers, by
invasive alien
species

>\$423
billion

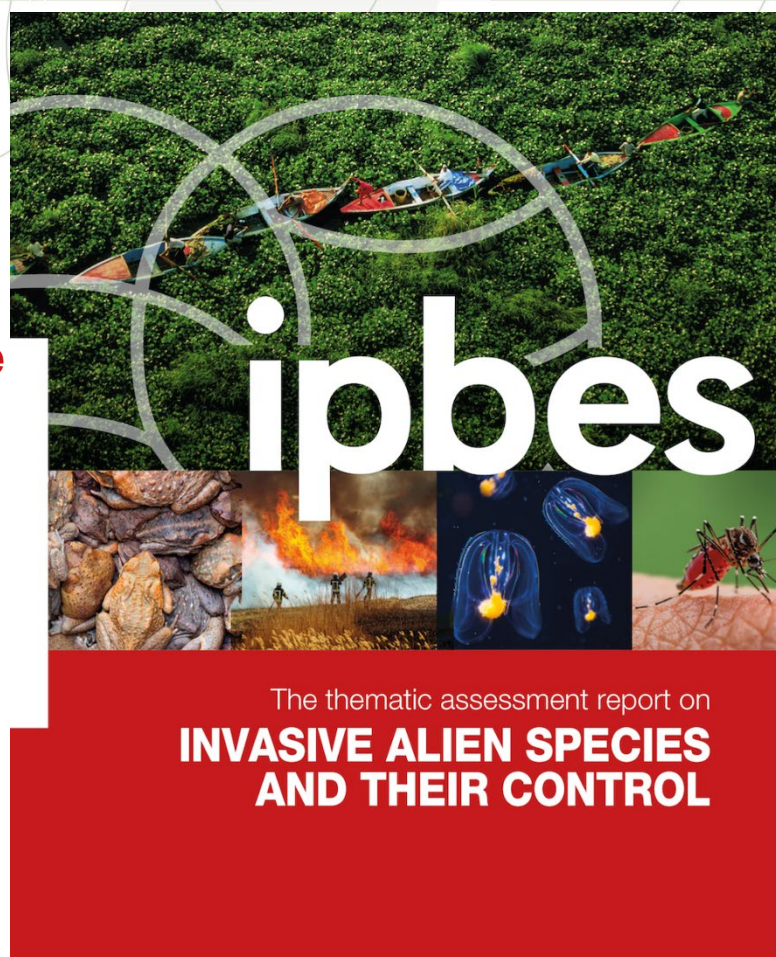
is the estimated
global annual costs
of biological
invasions in 2019

>80%

of impacts on
nature, **nature's**
contributions to
people and
good quality of
life are
negative

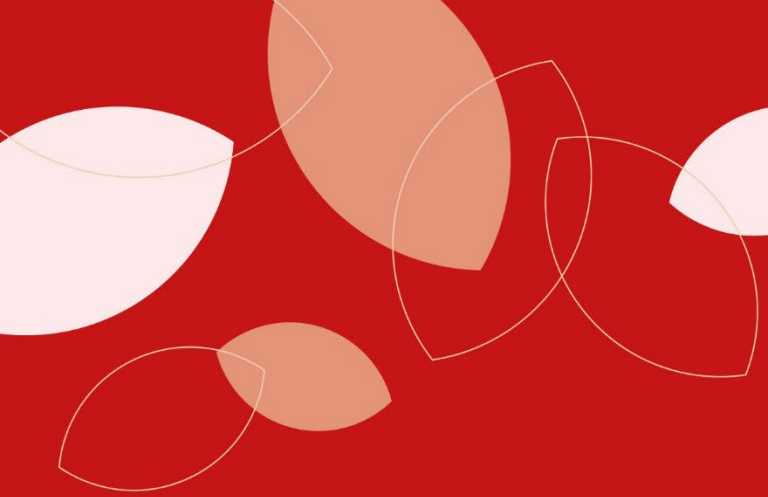
There is compelling evidence for immediate and sustained action

With sufficient resources and long-term commitment, preventing and controlling invasive alien species are attainable goals that will yield significant long-term benefits for people and nature.



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IAS assessment process



Developed over 4 years

- 3 Authors meetings (Tsukuba, online & Aarhus)
- 2 External reviews
- 1 Additional review by governments

The supporting evidence

Over 13,000 documents reviewed in depth
Various values and knowledge systems considered, drawing on scientific and grey literature, and information from Indigenous and local knowledge

Engagement with Indigenous and local knowledge

3 dialogue workshops (Montreal and online),
a call for contributions, and
collaboration with ILK experts and holders within the expert team
and as contributing authors



Photo by IISD/ENB

Produced by a multidisciplinary team of 86 experts and many contributing authors

86 nominated experts from 47 countries, encompassing all regions and many disciplines

About 200 contributing authors, including from Indigenous Peoples and local communities

Supported by a management committee
Technical support unit based in Japan (Institute for Global Environmental Strategies, IGES)



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Knowledge and data gaps: process and examples



Overall aims

1. Take advantage of the full breadth of expertise available in the author team
2. Transparent way of determining gaps
3. Evaluation of gaps



Identification classification and analysis of gaps

1. Gaps were identified across all chapters except Chapter 1 “Introduction” using a two-step survey:
 - Each chapter CLAs were asked to report max 10 of most important gaps from their chapter perspective (i.e., impacts, drivers, etc.)
 - All authors were asked to evaluate relevance of gaps (scale 1-5) for improving understanding, taking actions, costs and challenges
2. Gaps were categorized and classified into:
 - Implementation challenge (financial and scientific)
 - Potential gains (for taking actions and improving knowledge)
3. Synthetized in Chapter 6 and in Table SPM.A1



Categories of knowledge and data gaps

1. Gaps in biomes, units of analysis and species groups
2. Regional gaps in data and knowledge
3. Interoperable data gaps for monitoring invasive alien species and effects of drivers of biodiversity change
4. Gaps in how invasive alien species affect nature's contributions to people
5. Gaps in management and policy approaches
6. Gaps to fill to support the implementation of policy and management
7. Gaps of particular relevance to Indigenous Peoples and local communities

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Table SPM A 1 Table of knowledge and data gaps

Synthesis of the most important knowledge and data gaps identified and collated through the assessment. Confidence levels in the summary for policymakers were allocated with full consideration of the gaps listed in the table; closing those gaps would strengthen the understanding of biological invasions. Experts have assessed the estimated cost and scientific challenge of closing these gaps, as well as the potential gain in increasing understanding of and successfully tackling biological invasions globally (from very low to very high). The listed gaps may not be relevant at local or regional scales.

CATEGORY	GAP	IMPLEMENTATION CHALLENGE		POTENTIAL GAIN	
		Estimated research cost	Estimated scientific challenge	For taking management action	For better understanding biological invasions

Gaps in biomes, units of analysis and species groups

Incomplete or lack of inventories of invasive alien species in marine, tropical and Arctic ecosystems {2.5.2.1, 2.5.2.4, 2.5.2.5, 2.5.4}

Very low

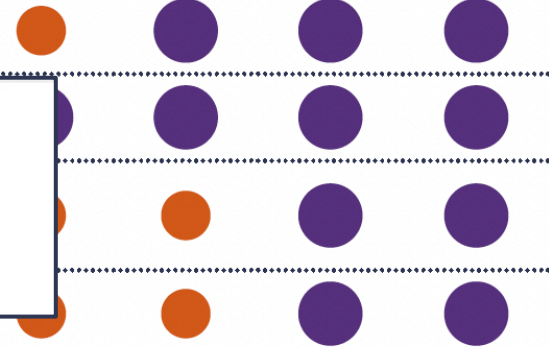
Low

Intermediate

High

Very high

alien microbes {4.7.2}



GAP

Gaps in biomes, units of analysis and species groups

IMPLEMENTATION CHALLENGE

POTENTIAL GAIN

Estimated research cost

Estimated scientific challenge

For taking management action

For better understanding biological invasions

Incomplete or lack **inventories** invasive alien species in marine, **marine, tropical and Arctic** environments



Incomplete or lack of inventories of invasive alien microorganisms **microorganisms and invertebrates**



Lack of understanding of the **drivers** that facilitate biological invasion for some animal groups (notably invertebrates), **fungi and microbes**



Lack of understanding and synthesis of the impacts of invasive alien **microbes**



Poor understanding of drivers of change that facilitate biological invasions in **freshwater and marine systems**



Lack of **data on successful restoration attempts** marine systems {5.5.6, 5.6.2.1}



GAP

Regional gaps in data and knowledge

IMPLEMENTATION CHALLENGE

POTENTIAL GAIN

Estimated research cost

Estimated scientific challenge

For taking management action

For better understanding biological invasions

Comparatively incomplete **inventories** of invasive alien species in **Africa and Central Asia**



Comparative lack of understanding of the **drivers** that facilitate biological invasions in **developing economies**



Lack of data and knowledge of the drivers of biological invasions in **Sub-Saharan Africa, tropical Asia and South America**



Incomplete data on the **impacts** of invasive alien species across Africa and Central Asia {4.7.2}



GAP

Interoperable data gaps for monitoring invasive alien species and effects of drivers of change

IMPLEMENTATION CHALLENGE

POTENTIAL GAIN

Estimated research cost

Estimated scientific challenge

For taking management action

For better understanding biological invasions

Lack **standardization of terminology** for invasive alien species monitoring {2.4.4.5, 6.6.2.3, 6.6.2.7}



Lack of information on the role of **indirect drivers** governance and sociocultural drivers, in affecting biological invasions {3.1.5, 3.6.1, Box 3.13}



Lack of understanding of the net effects of multiple **interacting** drivers in shaping and promoting biological invasions {3.5, Box 3.10, 3.6.1, Box 3.13}



Lack of integration of impact data and knowledge sources across **languages**



Incomplete data to undertake risk management, cost-effective species-based surveillance and detection of **fungi, microbes and marine pests**



Incomplete data to prioritize biological invasion management under **climate, sea- and land-use change**



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Gaps in management and policy approaches

Estimated
research cost

Estimated
scientific
challenge

For taking
management
action

For better
understanding
biological
invasions

Lack **control options** marine invasive alien species and invasive alien microbial fungal pathogens of plants and animals {5.6.1.1}



Lack of agreed-upon methods of supporting management decision-making for invasive alien species with both **positive and negative impacts**



Lack of methods of managing pathways for invasive alien species arriving as **contaminants** rough shipping containers, e-commerce (legal/illegal), biofouling or ports, and across land borders and along trade supply chains {Table 5.11, 5.6.2.4}



Lack of methods for adaptive management of invasive alien invertebrates and plants using **alternative approaches** declining number of chemical control options {5.6.2.5}



Lack of **eradication guidelines** tegies for generalist invasive alien invertebrates, diseases and hard-to-detect freshwater and marine invasive alien species {5.6.2.1, Table 5.11}



GAP

IMPLEMENTATION
CHALLENGE

POTENTIAL GAIN

Gaps to fill to support the implementation of policy

Estimated
research
cost

Estimated
scientific
challenge

For taking
management
action

For better
understanding
biological
invasions

Lack of tools and frameworks to **predict** biological invasions {6.2.1, 6.6.1.6, 6.7.2.7}



Lack of tools to reduce **barriers to information-sharing** and across countries {6.6.2}



Lack of research and data on how best to implement **integrated governance** systems to manage biological invasions {6.6.1.3, 6.6.1.4, 6.6.2}



Design principles for an integrated governance system to manage biological invasions {6.7.2.3, 6.7.3}



Lack of mechanisms that allow **effective collaboration** different elements of the socioecological systems {Figure 6.7, 6.7}



GAP

Gaps of particular relevance to Indigenous Peoples and local communities

IMPLEMENTATION CHALLENGE

POTENTIAL GAIN

Estimated research cost

Estimated scientific challenge

For taking management action

For better understanding biological invasions

Lack of information on invasive alien species **status & trends** on land and water managed by Indigenous Peoples and local communities {Box 2.6}



Lack of information on Indigenous and local knowledge, values and culture regarding **drivers & impacts** of invasive alien species on land and water managed by Indigenous Peoples and local communities {1.6.7.1, Box 3.12}



Lack of understanding of and mechanisms for **sharing knowledge** on invasive alien species and their drivers, impacts, management and governance among Indigenous Peoples and local communities and researchers and other outsiders {6.6.1.5}



Lack of consideration of the knowledge and perceptions of Indigenous Peoples and local communities in **scenarios & models** {1.6.7.3, 4.7.1, 6.6.1.6}



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Overview of gaps

Lack of knowledge:

1. Regional (species and impacts) (everywhere but particularly in developing economies)
2. Taxonomic (particularly microbes and invertebrates)
3. Aquatic environments
4. Processes (interaction of drivers, models & scenarios)

Lack of standards and instruments:

5. Governance (design of integrated governance, effective collaboration, IPLC)
6. Management (control and monitoring) (aquatic systems, climate change, guidelines, IPLC)
7. Lack of international standards (terminology, language)





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Thank you!

¡Gracias!

Merci!