

# The role of international organisations in controlling invasive species and preserving biodiversity

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## Summary

Invasive alien species spread through the environment and threaten native biodiversity, assisted by the absence of natural enemies. Alien species may also carry pathogens, which can be transmitted to native species. About half of the known endangered species are under threat from invasive alien species. The Conference of the Parties to the Convention on Biological Diversity in 2008 invited relevant international organisations to work together to fill the gap in the international regulatory framework on invasive alien species. The Convention also reaffirmed the need for capacity and expertise to deal with invasive alien species in many countries, especially in developing countries. In this paper, the authors review the findings of this project.

## Keywords

Biodiversity – Ecosystems – Extinction – Habitat – *In situ* conservation – International organisations – Invasive alien species – Species extinction.

## Introduction

The Convention on Biological Diversity (CBD) has three objectives:

- conservation
- sustainable use of the components of biodiversity
- equitable sharing of benefits arising from the use of genetic resources.

The CBD has almost global governmental membership, with 193 Parties (192 countries and the European Union), and recognises invasive alien species as a threat to biodiversity, giving Parties a mandate for conservation. Article 8(h) of the Convention states, on *in situ* conservation: 'Each Contracting Party shall, as far as possible and as appropriate, prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species' (9).

Numerous international instruments, binding and non-binding, have been developed to deal with biological invasions (Table I). In the history of the CBD, one milestone was reached with the adoption of the 'Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species' under the Convention (12). These principles assist the competent authorities of the Parties to make decisions on the introduction of a given alien species into a new area, from outside its natural range (12).

## The issue of invasive alien species

The globalisation of the economy and the huge volume of rapid transportation of goods and people, over land and water and through the air, have opened up many

**Table I**  
**International organisations that provide regulatory frameworks to control the pathways of invasive alien species**

Acronym	Name of the organisation	Mandate
CBD	Convention on Biological Diversity	Conservation, sustainable use of biodiversity, and fair and equitable access to and sharing of benefits arising from these genetic resources
IPPC	International Plant Protection Convention	Secures action to prevent the spread and introduction of pests of plants and plant products
OIE	World Organisation for Animal Health	Provides disease control standards on animal health (including zoonoses) and animal welfare
FAO-COFI	Committee on Fisheries – Food and Agriculture Organization of the United Nations	Addresses major international fisheries, fish trade and aquaculture problems and other issues related to fisheries and aquaculture. Drew up the Code of Conduct for Responsible Fisheries
WTO-SPS	World Trade Organization Committee on Sanitary and Phytosanitary Measures	Deals with food, animal and plant health and safety, and with product standards in general
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	Ensures that international trade in specimens of wild animals and plants does not threaten their survival
IMO	International Maritime Organization	Develops and maintains a comprehensive regulatory framework for shipping, including: safety, environmental concerns, legal matters, technical co-operation, maritime security and the efficiency of shipping
ICAO	International Civil Aviation Organization	Ensures the safe, efficient and orderly evolution of international civil aviation

opportunities for the more frequent introduction of alien species. These human-made opportunities for species to be introduced into new areas outside their natural range can occur intentionally or accidentally.

Intentional introductions have been made for:

- agriculture and aquaculture
- bio-control (such as the introduction of natural enemies to control pests)
- the *ex situ* preservation of species (14).

Unintentional introductions of species can happen via:

- the transportation of living organisms during trade, tourism and scientific research
- discharged ballast waters from ships
- hull-fouling
- various other pathways (14).

The organisms that are introduced into new regions, outside their natural range of ecosystems and habitats, are called alien species. Alien species include any part, gametes, seeds, eggs or propagules of any such species that might survive and subsequently reproduce. ‘Invasive alien species’ means an alien species whose introduction and/or spread threaten biological diversity (12). Since many species are potentially invasive, and the pathways of introduction are wide-ranging, their management requires collaboration between regulatory agencies at both national and international levels.

In addition, the pressures on the environment from landscape change, climate change and other

anthropological activities have complex effects on ecosystems. These impacts accelerate the spread and establishment of invasive alien species. Collaboration between relevant organisations is a very important consideration (15).

## Impacts of invasive alien species on wild fauna, flora and human well-being

Invasive alien species can thrive and spread in their new environment, particularly in the absence of natural enemies. Invasive alien species can also prey upon or out-compete native species for food and habitat. Moreover, alien species sometimes carry pathogens which threaten native species. The International Union for Conservation of Nature (IUCN) has reported that 625 (51%) of all known endangered species are threatened because of invasive alien species (18). For example, the pathogenic chytrid fungus, *Batrachochytrium dendrobatidis*, threatens wild amphibians with extinction in Central and South America (5, 17).

Invasive alien species also disturb human life when they disrupt the balance of an ecosystem. One such example is the operation of the hydrological cycle, including:

- flood control and water supply
- waste assimilation
- recycling of nutrients
- the conservation and regeneration of soils

- the pollination of crops
- seed dispersal.

Changes to these ecosystem services affect both their current value and their future potential value (2). Therefore, invasive alien species have many negative impacts on human well-being.

Researchers have estimated that the annual environmental costs of introduced pests are very high, for example:

- US\$6.8 billion in Australia
- US\$6.7 billion in Brazil
- US\$25 billion in India
- US\$3 billion in South Africa
- US\$6.6 billion in the United Kingdom
- US\$58 billion in the United States (7).

The potential loss of value of these areas for fisheries, tourism and human habitat were not included in this study.

The cost of all these changes to ecosystem services has not yet been fully estimated, although one study put the total cost at US\$157 billion in annual impacts on the US, and worldwide impacts may be up to US\$1.4 trillion per year, which corresponds to almost 5% of the global gross domestic product (GDP) (8).

In addition, infectious disease agents are also often invasive alien species. Unfamiliar types of infectious agents, either acquired by humans from domesticated or other animals, or inadvertently imported by travellers, can have devastating impacts on human populations. Pests and diseases can also undermine local food and livestock production, causing hunger and famine (16).

## Gaps and inconsistencies identified in the international regulatory framework on invasive alien species

In 2008, the Conference of the Parties (COP) to the CBD reviewed the continuing work on invasive alien species and discussed the gaps and inconsistencies in the international regulatory framework. The COP invited relevant organisations to extend their mandate to cover the species that threaten biodiversity.

Table I summarises the current mandates of the different organisations. The CBD mandate is to protect species,

genetic resources and ecosystems. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to protect wildlife and vegetation from the results of international trade. The World Organisation for Animal Health (OIE) has an important role in protecting animals from listed animal diseases, including zoonoses. The objective of the International Plant Protection Convention (IPPC) is to protect plants and plant products from organisms categorised as plant pests. In addition, there is the World Trade Organization (WTO) Sanitary and Phyto-sanitary Agreement (WTO-SPS), whose purpose is to ensure that governments can apply the relevant measures for food safety and animal and plant health, without putting up false barriers to international trade. The OIE and IPPC both participate in the WTO-SPS committee.

The Committee on Fisheries of the Food and Agriculture Organization of the United Nations sets a voluntary code, the 'Code of Conduct for Responsible Fisheries', which provides a guide to aquaculture development in light of the ecosystem approach and the conservation and management of fisheries. The International Maritime Organization and the International Civil Aviation Organization deal with, *inter alia*, the issue of the spread of invasive organisms via ships' ballast waters and hull-fouling, and civil aviation transportation, respectively.

The COP to the CBD invited the International Committee of the OIE to note the lack of international standards covering invasive alien species, in particular animals, that are not pests of plants under the International Plant Protection Convention, and to consider whether and how it could contribute to addressing this gap. For example, the following actions are mentioned in the decision of the COP in 2008:

- expanding the OIE list of pathogens to include a wider range of animal diseases, including diseases that solely affect wildlife
- considering whether the OIE could play a role in addressing invasive animals that are not considered causative agents of disease and whether, for this purpose, it would need to broaden its mandate.

The identified occurrence of alien species is recorded by various database projects globally and regionally, including the:

- Delivering Alien Invasive Species Inventories for Europe (DAISIE) European Invasive Alien Species Gateway ([www.europe-aliens.org/](http://www.europe-aliens.org/))
- Global Invasive Species Information Network (GISIN) ([www.gisinet.org/](http://www.gisinet.org/))
- Global Invasive Species Database ([www.issg.org/database/welcome/](http://www.issg.org/database/welcome/))

– Inter American Biodiversity Information Network (<http://i3n.iabin.net/>).

More than 11,000 alien species have been recorded in Europe. Over 10% of these became invasive and now threaten native species, according to DAISIE. Other information on invasive alien species, to assist local communities to prevent their spread or eradicate them, is accessible on various websites, such as the National Invasive Alien Species Council ([www.invasivespecies.gov/](http://www.invasivespecies.gov/)) and others (1, 3).

The OIE provides a list of controlled species and the Member States of the IPPC also have a list of species for quarantine control. One possibility is to expand these lists of controlled species to include invasive alien species. However, even though various databases on the occurrence of invasive alien species are available on the internet, there is no unified information resource. For this reason, it is not a simple task for any authority to scrutinise all the available information at the species level. In addition, the levels of threat of certain species differ from one country to another since, for example, climatic conditions vary greatly and the policies and capacity of countries are diverse. Further monitoring, data-sharing and analysis at the species level are all necessary if introductions of alien species are to be effectively controlled under the existing national and international regulatory framework.

The risks associated with companion animals, aquarium and terrarium species, and organisms used as live bait and live food have been highlighted (14) but not yet fully addressed by the international organisations listed in Table I. Further consideration of these introduction pathways and the gathering of information on the best practices to manage these risks have been requested and will be discussed at the next COP to the CBD in 2010 (15).

## The importance of capacity-building

The implementation of the CBD depends largely on the Parties themselves. This is recognised by the COP, and was reiterated in 2008, when it specifically identified the need for capacity-building and expertise to deal with invasive alien species in many countries, especially developing countries (15).

The organisations listed in Table I have established a liaison group to address this issue and to take steps to assist the implementation of various CBD decisions at the national, regional and global levels. Representatives from the IUCN Species Survival Committee, Invasive Species Specialist Group and the Global Invasive Species Programme have also joined the liaison group.

Invasive species can come from any group of animals, plants or micro-organisms, including associated pathogens. The lack of taxonomic capacity to identify invasive alien species was highlighted as a constraint when tackling this issue (6). The wide range of taxa of invasive alien species and lack of taxonomic capacity seem to be overwhelming problems for the environment in developing countries, although these countries are eligible for grants to develop projects to control invasive alien species. Some projects conducted in Ethiopia, Ghana, Uganda and Zambia were funded by the Global Environment Facility, with technical assistance provided by non-governmental organisations (NGOs), such as the Global Invasive Species Programme (4) in Africa.

In the Americas, 34 countries participate in the Inter American Biodiversity Information Network (IABIN), which is funded by the Global Environment Facility. This network was developed in close co-operation with the relevant governments, NGOs, universities, museums and the private sector, to collaborate in biodiversity-related sciences and activities. The information on invasive alien species is organised under the IABIN Invasives Network (I3N) (<http://i3n.iabin.net/>), which also shares the information with GISIN, as mentioned earlier ([www.gisinet.org/](http://www.gisinet.org/)).

These projects show that regional co-operation is crucial in initiating projects to deal with invasive alien species. The COP to the CBD established the Global Taxonomy Initiative, as a cross-cutting project (10, 11) to develop taxonomic capacity and aid in implementing the CBD. The Secretariat of the CBD has been requested to convene project development seminars at the national level (13). The open-ended mechanism of the CBD allows NGOs, including the scientific community, to participate. Strengthening regional collaboration and gathering practical support from the scientific community, particularly the veterinary medical community, are essential in improving the capacity to tackle invasive alien species, and the authors urge this most strongly. ■

## Le rôle des organisations internationales dans le contrôle des espèces envahissantes et la préservation de la biodiversité

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### Résumé

Favorisées par l'absence de compétiteurs naturels, les espèces allochtones envahissantes se propagent dans l'environnement et menacent la biodiversité locale. Elles sont parfois porteuses d'agents pathogènes potentiellement transmissibles aux espèces locales. Près de la moitié des espèces menacées d'extinction sont également la cible d'espèces allochtones envahissantes. En 2008, la Conférence des Parties à la Convention sur la diversité biologique a invité les organisations internationales compétentes à travailler en collaboration afin de remédier aux insuffisances du cadre réglementaire international en matière d'espèces allochtones envahissantes. La Convention a également réaffirmé la nécessité de renforcer les capacités et l'expertise nécessaires pour faire face aux espèces allochtones envahissantes dans de nombreux pays, en particulier ceux en développement. Les auteurs font le point sur les résultats de cette initiative.

### Mots-clés

Biodiversité – Conservation *in situ* – Écosystème – Espèce allochtone envahissante – Extinction – Extinction d'espèce – Habitat – Organisation internationale.



## Función de las organizaciones internacionales en el control de las especies invasoras y la preservación de la diversidad biológica

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### Resumen

Las especies foráneas invasoras se diseminan por el medio y ponen en peligro la biodiversidad autóctona, ayudadas por el hecho de no tener enemigos naturales. Las especies foráneas también pueden traer consigo agentes patógenos y transmitirlos a las especies autóctonas. Cerca de la mitad de las especies amenazadas conocidas están en peligro a causa de especies invasoras. En 2008, la Conferencia de las Partes en el Convenio sobre la Diversidad Biológica invitó a las organizaciones internacionales a trabajar concertadamente para subsanar las carencias del ordenamiento reglamentario internacional en cuanto a las especies foráneas invasoras. Las Partes en el Convenio también reafirmaron la necesidad de medios de acción y personal especializado para manejar la cuestión de las especies foráneas invasoras en gran número de países, sobre todo países en desarrollo. Los autores hacen balance y extraen conclusiones de este proyecto.

### Palabras clave

Diversidad biológica – Ecosistemas – Especies foráneas invasoras – Extinción – Extinción de especies – Hábitat – Organizaciones internacionales – Protección *in situ*.



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