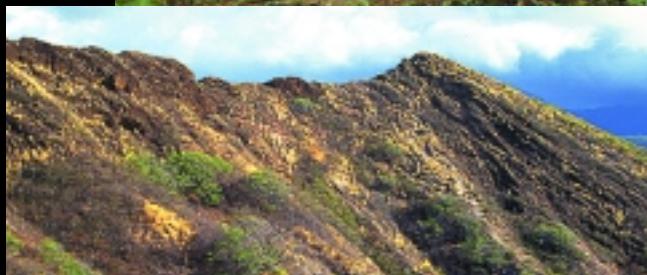
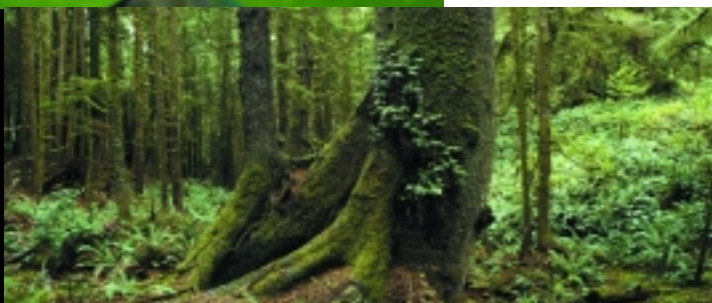
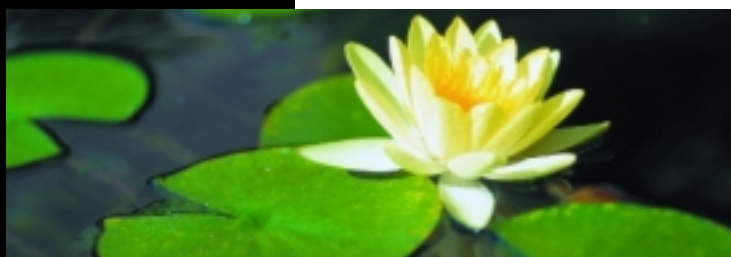
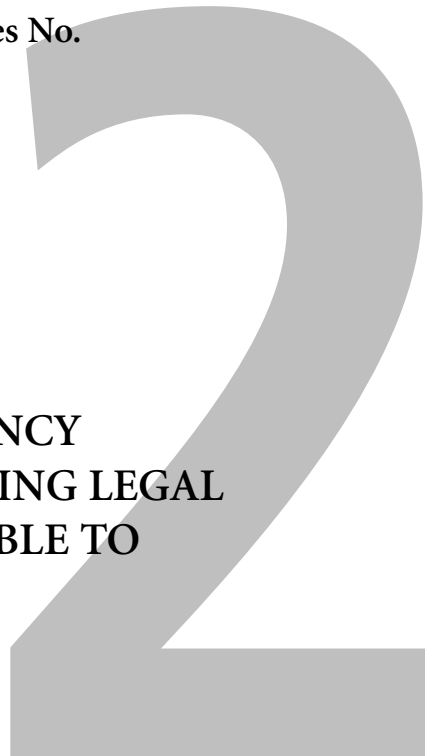




**REVIEW OF THE EFFICIENCY
AND EFFICACY OF EXISTING LEGAL
INSTRUMENTS APPLICABLE TO
INVASIVE ALIEN SPECIES**



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THE EFFICIENCY AND EFFICACY
OF
EXISTING LEGAL INSTRUMENTS
APPLICABLE TO INVASIVE ALIEN SPECIES**

Montreal 2001

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FOREWORD

The Convention on Biological Diversity (CBD), negotiated under the auspices of the United Nations Environment Programme (UNEP), was adopted in 1992 and entered into force in 1993. Its aims are the conservation of biological diversity, the sustainable use of biological resources, and the fair and equitable sharing of benefits arising from the use of genetic resources. One of the major challenges facing the Convention on Biological Diversity is the communication of research results in a way that provides the policy makers, their advisors, the scientific community and other stakeholders with helpful insights.

Major factors leading to biodiversity loss are habitat loss and degradation, invasive alien species, overuse of resources and pollution. Due to the complexity of these factors, various approaches and strategies are being used to reduce biodiversity loss. All, however, require the best available scientific information that allows the development and implementation of sound management strategies.

The goal of the CBD Technical Publications Series is to contribute to the dissemination of up-to-date and accurate information on selected topics that are important for the conservation of biological diversity, the sustainable use of its components and the equitable sharing of its benefits. A large and growing body of evidence has clearly established the need to disseminate synthesis publications relevant to CBD objectives and selected reports presented at CBD meetings.

The Technical Publications Series is intended to:

- Foster scientific and technical cooperation;
- Improve communication between the Convention and the scientific community;
- Increase awareness of current biodiversity-related problems and concerns; and
- Facilitate widespread and effective use of the growing body of scientific and technical information on conserving and using biological diversity.

The CBD Technical Publications Series comes at a time when the international community through the Conference of the Parties to the Convention has committed itself to achieving tangible results in all aspects of the sustainable management of biological diversity for social and economic purposes. We therefore believe that this series will be useful to the broader scientific community and those concerned with biodiversity management.

I am very pleased to make available to the scientific community and those actively involved in biodiversity management the second publication in the CBD Technical Series, addressing existing legal instruments applicable to invasive alien species. It is my hope that this publication will broaden our understanding of the complexity of the issue of invasive alien issue and at the same time facilitate the implementation of remedial measures to reduce or halt biodiversity loss attributed to invasive alien species.

I wish to express my sincere gratitude to all those who have contributed in, one way or another in the preparation and production of this series.

Hamdallah Zedan
Executive Secretary

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The Secretariat of the Convention on Biological Diversity wishes to acknowledge the consultants who prepared the first draft of the document: Clare Shine, IUCN Commission on Environmental Law, in collaboration with Françoise Burhenne-Guilmin, Charles Di Leva and Nattley Williams, IUCN Environmental Law Centre, with contributions of information, ideas and views by Adnan Awad, David Carter, Nick Davidson, Eladio Fernandez-Galiano, John Hedley, Véronique Herrenschmidt, Jeff McNeely, Marshall Meyers, Hal Mooney, Sean Murphy, Laurie Neville, Anne Perrault, Maj de Poorter, Veronique Plocq Fichelet, Guy Preston, Chedly Rais, Jamie Reaser, Peter Schei, Jil Self, Greg Sherley, Jeff Waage, David Waddilove, Paula Warren, Erik Wijkstrom and Brooks Yeager, and substantive contributions from Veit Koester, Steve Raaymakers and Megan Quinlan.

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Hamdallah Zedan
Executive Secretary

REVIEW OF THE EFFICIENCY AND EFFICACY OF EXISTING LEGAL INSTRUMENTS APPLICABLE TO INVASIVE ALIEN SPECIES

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Acronyms and abbreviations

<i>AEWA</i>	Agreement on the Conservation of African-Eurasian Migratory Waterbirds (The Hague, 1995)
<i>ASEAN</i>	Association of South East Asian Nations
<i>CBD</i>	Convention on Biological Diversity
<i>CITES</i>	Convention on International Trade in Endangered Species of Wild Fauna and Flora
<i>CMS</i>	Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979)
<i>COP</i>	Conference of the Parties
<i>EEC</i>	European Community
<i>EIA</i>	Environmental impact assessment
<i>EIFAC</i>	European Inland Fisheries Advisory Commission of the FAO
<i>FAO</i>	United Nations Food and Agriculture Organization
<i>GEF</i>	Global Environment Facility
<i>GISP</i>	Global Invasive Species Programme
<i>GMO</i>	genetically modified organism
<i>IAS</i>	Invasive Alien Species
<i>ICAO</i>	International Civil Aviation Organization
<i>ICES</i>	International Council for the Exploration of the Sea
<i>ICPM</i>	Interim Commission on Phytosanitary Measures (under the IPPC)
<i>IGP</i>	Interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species
<i>IMO</i>	International Maritime Organization
<i>IPPC</i>	International Plant Protection Convention
<i>ISPM</i>	International Standard for Phytosanitary Measures
<i>IUCN</i>	The World Conservation Union
<i>IUCN-ELC</i>	IUCN Environmental Law Centre
<i>LMO</i>	living modified organism
<i>Madrid</i>	Protocol 1991 Madrid Protocol on Environmental Protection (under the Antarctic Treaty)
<i>MEA</i>	Multilateral environmental agreement
<i>MEPC</i>	IMO's Marine Environment Protection Committee
<i>NGO</i>	non-governmental organization
<i>OIE</i>	Office International des Epizooties
<i>Ramsar</i>	Convention on Wetlands of International Importance especially as Waterfowl Habitat
<i>REIO</i>	Regional economic integration organization
<i>RPPO</i>	Regional plant protection organizations
<i>SADC</i>	Southern African Development Community
<i>SBSTTA</i>	Subsidiary Body on Scientific, Technical and Technological Advice
<i>SCOPE</i>	Scientific Committee on Problems of the Environment
<i>SPAW</i>	specially protected areas and wildlife
<i>SPS Agreement</i>	1995 WTO Agreement on the Application of Sanitary and Phytosanitary Measures
<i>UNCLOS</i>	United Nations Convention on the Law of the Sea (Montego Bay, 1982)
<i>UNDP</i>	United Nations Development Programme
<i>UNEP</i>	United Nations Environment Programme
<i>UNESCO</i>	United Nations Educational, Scientific and Cultural Organization
<i>WHO</i>	World Health Organization
<i>WTO</i>	World Trade Organization

EXECUTIVE SUMMARY

Many international instruments reference the subset of alien species that may have undesired environmental or economic impacts. These range from legally binding treaties to non-binding technical guidance focused on particular pathways. Most instruments are specific to a sector, taxonomic group, type of environment or type of harm (e.g. injury to plant or animal health).

At global level, key instruments and organizations include the Convention on Biological Diversity (CBD), the Ramsar Convention, the Convention on Migratory Species, the International Plant Protection Convention, the Office International des Epizooties, the United Nations Food and Agriculture Organization, the International Maritime Organization and the World Health Organization. Many regional instruments reference alien species but only a few have developed guidance for effective implementation or specifically addressed regional issues. Examples include the Bern Convention (Europe), the Antarctic Treaty and the South Pacific Regional Environment Programme. At national level, all countries have at least a minimal system in place for regulating alien species introductions. Except for a few countries, these are rarely comprehensive and were not designed to conserve biodiversity against invasion impacts (except possibly in a limited way for protected areas).

There are gaps, overlaps and inconsistencies in existing instruments at all levels. Terminology is used differently in quarantine/primary production and environmental sectors: conservation treaties and laws often fail to define key terms and concepts. Scope is generally limited, in accordance with an instrument's particular objectives: the only instruments that cover all aspects of invasive alien species as they relate to biodiversity are the Convention on Biological Diversity and a very few national systems. Taxonomic coverage is weaker for lower taxonomic categories (under conservation instruments) and, in binding terms, almost non-existent for alien freshwater aquatic species. Coverage of pathways and vectors for unintentional introductions is patchy and usually non-binding.

Existing instruments call for action to prevent unwanted introductions, but most are weaker or silent on the question of eradication and control. Under international conservation instruments, relatively little has been done to elaborate on general treaty obligations and provide indicators for implementation, particularly at regional level. Important components, notably early warning and monitoring and transboundary cooperation, tend to be covered by generic provisions and not by alien-specific provisions. As in other areas of public international law in relation to damage to biodiversity, effective rules are lacking on liability and redress for possible transboundary damage generated by invasive alien species. This deficit may be partly addressed through a broader process initiated by the CBD Conference of the Parties in 2000.

Because alien species move through international transport and trade pathways, national measures to prevent or minimize risk of unwanted introductions have implications for the multilateral trading system. The World Trade Organization, primarily through the Agreement on the Application of Sanitary and Phytosanitary Measures, sets out binding principles and rules and recognizes sources of international standards that should, where available, be followed in national measures. Existing standards are focused on animal, plant and human life and health/food safety, and do not specifically address ecosystem function. Where no international standard exists or a higher protection level is sought, the State concerned must justify a national measure as it affects international trade through scientifically-based risk assessment.

Some cross-cutting areas are under-developed but offer potential for gains in efficiency and efficacy. These include improved integration and cooperation between sectors, institutions and countries; improved strategic planning on alien species issues; greater participation and engagement of stakeholders; review of incentive systems; and better use of existing generic environmental management tools and procedures, and the consolidation of national health/bio protection authorities (e.g., biosecurity).

I. INTRODUCTION: OBJECTIVES AND METHODS FOR THE REVIEW

1. This paper seeks to assess the efficiency and efficacy of existing instruments for prevention, early detection, eradication and control of invasive alien species and their impacts, in order to define options for consideration for the full and effective implementation of Article 8(h) of the Convention on Biological Diversity. It draws on research carried out for the Global Invasive Species Programme (GISP), coordinated by the Scientific Committee on Problems of the Environment (SCOPE), in which IUCN is a partner with CABI Bioscience, the United Nations Environment Programme (UNEP) and DIVERSITAS.
2. The paper focuses primarily on relevant global and regional instruments. Section II outlines key instruments in different sectors, as well as recommendations, guidelines or standards adopted by international organizations, and discusses the interface between these instruments and the multilateral trading system. Section III seeks to identify gaps, overlaps and inconsistencies between existing instruments with regard to the scope, components, procedures and standards of regulatory frameworks. Section IV considers cross-cutting factors that affect efficiency and efficacy, such as coordination, cost-effectiveness, administrative manageability and stakeholder participation and engagement.
3. National frameworks are not discussed in detail, although common characteristics and constraints are mentioned. This is for reasons of space and also because case studies and an analysis of national frameworks are now easily available (see the CBD Clearing House Mechanism at <http://www.biodiv.org> and Shine et al., 2000). The IUCN Guide (Shine et al., 2000) is the result of two years' work by IUCN's Environmental Law Programme, through its Environmental Law Centre (ELC) and the Commission on Environmental Law. It builds on reports from different biogeographic regions and thematic analysis prepared for the IUCN-ELC Workshop on Legal and Institutional Dimensions of Invasive Alien Species Introduction and Control (Bonn, 10-11 December 1999).
4. This paper does not review the content of the Interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species annexed to Decision V/8, as this document is subject to a separate review process. However, the Conclusions in Part V specifically address the potential role of the Interim Guiding Principles as one of the range of possible options.

II. OVERVIEW OF EXISTING INTERNATIONAL INSTRUMENTS RELEVANT TO INVASIVE ALIEN SPECIES

A. Identification and characterisation of existing international instruments

5. Isolated unilateral action by States is not enough to manage all activities and processes that generate introductions of potentially invasive alien species. Since the 1950s, consensus has developed on the need for internationally coordinated approaches for effective prevention and management. By the end of 2000, alien species were referenced in at least thirty-nine binding agreements and in a range of non-binding codes of conduct and technical guidelines (see annex I below).¹
6. Existing instruments were developed by different multilateral processes for specific purposes. This affects how they reference alien species. The earliest instruments aim to control the introduction and spread of pests and diseases to protect human, animal and plant health. Conservation treaties reference alien species for their possible impacts on native species and ecosystems. Technical guidance has been developed for some transport and production sectors that present known risks of unintentional introductions or escapes from containment. The most important instruments are outlined below, loosely grouped by theme.

1. All of these agreements do not refer to "alien species" per se, but to concepts believed to be consistent with the use of the term, (e.g. quarantine pests under the IPPC)

Conservation and sustainable use of biological diversity

7. The Convention on Biological Diversity (CBD) requires Parties “as far as possible and as appropriate, (to) prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species” (Art.8 (h)). It does not specify how Parties should implement this requirement, but other provisions provide general indicators on strategic and cross-sectoral planning, regulation or management of potentially damaging processes and categories of activities, involvement of local populations and the private sector, incentives and environmental impact assessment, transboundary notification and emergency planning.²
8. The Conference of the Parties (COP) initially referenced alien species in separate thematic decisions. In 1998, a unified approach was adopted. The COP, recognising the problems alien species may cause to indigenous and local communities and negative effects on local and national economies, designated this as a cross-cutting issue to be taken into account in each thematic work programme.³ The Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) has developed at its fifth meeting Interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species (Interim Guiding Principles) at the COP’s request.
9. The global Convention on Migratory Species (CMS) identifies exotic species as a factor that may endanger migratory species and requires Parties to take prevention and management measures. The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), developed under CMS, sets out detailed requirements in its legally-binding action plan.
10. Regionally, many multilateral environmental agreements (MEAs) require Parties to regulate alien species introductions. Coverage is strongest in Europe and the Antarctic. Under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), the Standing Committee has adopted decisions on definitions, implementation and coordinated responses. Under the Antarctic Treaty, the Madrid Protocol on Environmental Protection lays down stringent rules. In the South Pacific, a Regional Invasive Species Strategy has recently been developed.
11. At supranational level, some regional economic integration organizations (REIOs) address potential impacts of alien species on biodiversity, including the European Community.⁴ The Southern African Development Community (SADC) has included measures related to alien species in its draft Protocol on the Conservation, Sustainable Management and Sustainable Development of Forests and Forest Lands in the SADC Region.
12. The Council of IUCN-The World Conservation Union, a partner in the Global Invasive Species Programme (GISP), adopted in February 2000 Guidelines for the Prevention of Biodiversity Loss due to Biological Invasion to assist international organizations, States and other actors.

Aquatic ecosystems and resources

13. In marine environments and inland water systems, alien species can be hard to detect and organisms can disperse rapidly. Several international instruments therefore provide for preventive⁵ measures against unwanted introductions to marine or freshwater ecosystems.

2. Art.6 (a) and (b), Art.8 (l), Art.10, Art.11 and Art.14 of the CBD.

3. Decision IV/I(C1).

4. Directive 79/409/EEC on the Conservation of Wild Birds; Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora.

5. The term "prevention" is used loosely throughout this document to refer generally to exclusion. The concept of exclusion is technically distinguished by preventing entry OR preventing establishment, covered in the IPPC by the term "introduction" which is separated from the concept of "spread" which may or may not follow introduction.

14. The Conference of the Parties (COP) to the CBD requests Parties to raise awareness of the possible problems and costs that can be associated with the deliberate or accidental introduction of alien species to inland waters and to develop policies and guidelines to prevent and control such introductions, and to rehabilitate sites where possible. The COP recognizes the need to identify gaps in existing or proposed legal instruments, guidelines and procedures to counteract the introduction of and the adverse effects exerted by alien species in marine and coastal areas. It sets the aim of collecting, analysing and evaluating related information on national and international actions with a view to prepare for the development of a scientifically-based global strategy for dealing with the prevention, control and eradication of those alien species which threaten marine and coastal ecosystems, habitats and species.
15. The UN Convention on the Law of the Sea (UNCLOS) requires Parties to take all measures necessary to prevent, reduce or control pollution of the marine environment resulting from the intentional or accidental introduction of alien or new species to a particular part of the marine environment, which may cause significant and harmful changes thereto (Article 196). Regionally, environmental protocols to four conventions developed under UNEP's Regional Seas Programme contain specific requirements to prevent introductions to marine and coastal ecosystems (Eastern African Region, Wider Caribbean Region, Southeast Pacific and Mediterranean).
16. For coastal and inland wetlands, the Ramsar Convention COP has recognized the threat to their ecological character and to terrestrial and marine wetland species if alien species become invasive. Parties are urged, where necessary, to adopt legislation or programmes to prevent introduction of "new and environmentally dangerous alien species" into their jurisdiction and to develop capacity for identifying such alien species, including those tested for agricultural and horticultural use.⁶
17. Introductions to freshwater systems are addressed globally by the 1997 Convention on the Law of Non-navigational Uses of International Watercourses (not in force) and only a few regional instruments, such as fisheries instruments for the River Danube and Lake Victoria.
18. Alien aquatic species are addressed under the non-binding 1995 FAO Code of Conduct for Responsible Fisheries and the 1994 ICES/EIFAC Code of Practice on the Introductions and Transfers of Marine Organisms, which covers policies for ongoing introductions or transfers which have become an established part of commercial practice, measures to be taken prior to introductions and measures to prevent unauthorized introductions.
19. The International Maritime Organization (IMO) is actively addressing the impact of alien species in aquatic ecosystems. The IMO has adopted guidelines on the management of alien species transfer through ballast water and sediments, and together with GEF and UNDP, is implementing the Globallast Global Ballast Water Management Programme designed to assist developing countries in managing the introduction and impact of marine alien species. (see paragraphs 29 and 30 below).

6. Resolution VII/14 on Invasive Species and Wetlands (1999). Note that the Ramsar Convention itself, the earliest global MEA, does not reference invasive alien species.

Plant, animal and human health

20. Plant, animal and human health can be impacted by alien animals, plants and micro-organisms (virus, bacteria and fungi). Examples include transport of nematodes in non-sterile soil, micro-organisms and plant pathogens in laboratory cultures and various pathogens harboured in materials transported across national boundaries for trade.
21. The International Plant Protection Convention (IPPC ⁷) provides a framework for international cooperation to secure common and effective action to prevent the introduction of pests of plants and plant products, and to promote appropriate measures for their control. "Pest" is broadly defined as "any species, strain or biotype, animal life or any pathogenic agent injurious or potentially injurious to plants or plant products". This includes weeds and other pests that do not directly "attack" plants but adversely "affect" plant systems (cultivated or natural). Alien organisms that come within this definition are covered. Implementation is facilitated by nine regional plant protection organizations (RPPOs).
22. The IPPC was revised in 1997 primarily in response to the adoption of the 1995 WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement, see para. 35), which designates it as the international standard-setting body for plant health. Key changes include the creation of a secretariat and a dedicated decision-making body, the Interim Commission on Phytosanitary Measures ⁸, and formal powers to develop International Standards for Phytosanitary Measures (ISPMs). The standard setting procedure operates under interim measures adopted by the FAO Conference in 1997. The revised IPPC clarifies the principles of phytosanitary systems as they relate to international trade (Durand and Chiaradia-Bousquet, 1997).
23. Each Contracting Party to the IPPC must establish a national plant protection organization and adopt legislative and technical measures and procedures to identify pests and prevent their introduction and spread. Operational elements recommended for national phytosanitary systems include: import regulations (quarantine and post-quarantine controls); compliance systems for all movements that can help the transfer of pests; pest risk analysis to provide technical justification for import restrictions; surveillance systems; eradication and control systems; and export certification systems to ensure that exported products comply with the import requirements of trading partners.
24. The FAO Code of Conduct for the Import and Release of Exotic Biological Control Agents has been adopted as an ISPM under the IPPC. It sets out internationally agreed procedures for agents capable of self-replication for research, for field release for biological control or for use as biological pesticides. The Code is addressed to public and private entities, to be followed particularly where national legislation does not exist or is inadequate. It specifies respective responsibilities of government authorities and exporters and importers of such agents.
25. The Office International des Epizooties (OIE) is an intergovernmental organization that develops standards and guidance on pests and diseases of animals (but not animals themselves as pests). It is recognized as the standard-setting body on animal health under the SPS Agreement. Standards are set out in the International Animal Health Code for Mammals, Birds and Bees, including on import risk analysis and import/export procedures, and in the International Aquatic Animal Health Code which aims "to facilitate trade in aquatic animals and aquatic animal products". The latter specifies minimum health guarantees required of trading partners in order to avoid the risk of spreading aquatic animal diseases and contains model international certificates for trade in live and dead aquatic animals.

7. 1951, revised in 1979 and 1997 (latest revisions not yet in force).

8. Prior to this date, decision-making was conducted through the FAO annual Conference that approved a number of International Standards for Phytosanitary Measures.

26. Human health can be affected by alien species providing hosts for diseases.⁹ The CBD COP has recognized this by supporting cooperation with the World Health Organization (WHO).¹⁰ The WHO's World Health Assembly has adopted International Health Regulations¹¹ to prevent the international spread of infectious diseases to humans: these are being updated due to changes in disease epidemiology and control and increase in international traffic. As these have possible trade impacts, discussions have been held between WHO, WTO and Codex Alimentarius Commission (recognized under the SPS Agreement for standard-setting on food safety and human health).
27. The IMO Guidelines on Ballast Water and the Globallast programme (see para. 29 below) also address the impacts on human health from invasive alien species in aquatic ecosystems. The terms "harmful" and "pathogens" are included in the IMO Guidelines and their purpose includes preventing human health, epidemiological and aquaculture disease impacts from marine introductions.

International transport

28. The growth in international marine, air and overland transportation provides new pathways for unintentional introductions of alien species, some of which may become invasive.¹² Some technical guidance has been developed to reduce this risk through improved operational practices.
29. The International Maritime Organization (IMO), an implementing agency for regulation of safety and sea and prevention of pollution from ships, has adopted technical Guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens.¹³ These are intended to assist Governments, ships' masters, operators and owners, and port authorities to establish common procedures to minimize the risk of introducing harmful aquatic organisms and pathogens from ship's ballast water and associated sediments while protecting ship safety. The Guidelines are voluntary, but the IMO's Marine Environment Protection Committee (MEPC) has been requested to work towards completion of legally binding instrument on this subject. The MEPC Working Group is developing provisions for the new instrument on ballast water management to prevent the transfer of harmful aquatic organisms in ballast water.¹⁴ The proposed new instrument adopts a two-tier approach: the first tier will set out ballast water management procedures applicable to all ships, and the second tier will specify additional controls for discharge/uptake of ballast water that may be applied in certain designated areas. The IMO plans to hold a diplomatic conference in 2002 or 2003 to developing a new international convention.
30. In addition, the IMO has joined forces with GEF and UNDP to implement the Globallast Programme. This is a global technical cooperation programme designed to provide assistance to developing countries to implement the IMO Guidelines on ballast waters, and to prepare for the implementation of the IMO international legal instrument on ballast water, using a demonstration site approach.
31. The International Civil Aviation Organization urges members to use their civil aviation to assist in reducing the risk of introducing potentially invasive alien species, through civil air transportation, to areas outside their natural range. The ICAO Council is to work with other UN organizations to identify approaches that the ICAO might take to assist in reducing risk of such introductions.¹⁵

9. E.g. the human pathogen *Schistosoma mansoni* was introduced to Hong Kong in snail-contaminated aquarium plants exported from South America. The West Nile virus was possibly introduced to New York through an imported exotic bird: apparently transmitted to mosquitoes, it led to the deaths of seven people as well as heavy costs of insecticide control.

10. Decision V/8.

11. Geneva, 1969; amended in 1982.

12. About 80% of commodities are carried by ships, which provide many vectors (anchor chains, sediments, ballast water, hull-fouling) to transport alien organisms on a transoceanic scale. Some 10 million tons of ballast water are shipped annually, carrying diverse marine species with a planktonic life cycle and human pathogens. Ballast water is thus significant for global distribution of microorganisms and epidemiology of waterborne diseases affecting plants and animals.

13. Annex to Resolution A.868 (20), 20th IMO Assembly, 1997. These guidelines update the 1993 IMO Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ships' Ballast Waters and Sediments Discharges (IMO Assembly Res. A.774 (18)).

14. MEPC 45th Session, 2-6 October 2000. The draft provisions will be further considered at the next MEPC session, to be held in April 2001.

15. Resolution on Preventing the Introduction of Alien Invasive Species (Assembly Resolution A-32-9, 1998).

B. Relationship with the multilateral trading system

32. Alien species are introduced through trade intentionally (imported products¹⁶) or unintentionally (by-products, parasites of traded products, hitchhikers and stowaways in vessels, vehicles or containers that deliver products or services). Sometimes, they move naturally through adaptation and/or the occurrence of unusual conditions (e.g. locusts blown from Africa to the Americas with wind storms). Growth in trade volumes is widely considered to increase the risk of unwanted introductions.¹⁷ Quarantine and border controls for live species, commodities, packaging and other vectors are increasingly important issues in international trade.
33. Trade-related aspects of alien species control are not directly addressed in any MEA¹⁸ but some treaty institutions have begun to consider this dimension. Ramsar's COP urges Parties to address the environmental, economic and social impact of the movement or trade of alien species within their jurisdictions.¹⁹ The Bern Convention Standing Committee recommends that Parties regulate or even prohibit the deliberate introduction and trade in their territory of some non-native terrestrial vertebrates.²⁰ The FAO Code of Conduct for Responsible Fisheries recommends that States develop international agreements for trade in live specimens where there is a risk of environmental damage *inter alia* in importing States.²¹
34. International trade in products and services between Members of the World Trade Organization (WTO) is disciplined by the 1994 Uruguay Round of Agreements. This provides for binding rules, enforced by a compulsory dispute settlement mechanism, to ensure that governments extend non-discriminatory market access to each other's products and services, on the basis of transparency and a number of other important principles. WTO Agreements are not directly concerned with the content of environmental policies and measures, except to the extent that these may have a significant impact on international trade (Downes, 1999).
35. The 1995 WTO Agreement on the Application of Sanitary and Phytosanitary Measures is relevant to alien species characterized as pests or diseases to the extent that measures for their management affect international trade. A WTO Member may adopt national measures to protect human, animal or plant health/life from risks arising from the entry, establishment or spread of pests, diseases, or disease-causing organisms and to "prevent or limit other damage" within its territory from these causes.²² The Agreement requires the use of international standards as a basis for national measures, consistency in the application of appropriate levels of protection, least trade restrictive alternatives, acceptance of equivalent but different SPS measures and transparency through advance notification of SPS measures. If an international standard is not used, national measures must be justified by scientifically-based risk assessment.

16. Plants and animals for primary production systems; fish for aquaculture, sport fishing, aquaria; exotic pets.

17. e.g. imports into the United States increased by 50% between 1990-1997.

18. MEAs tacitly leave international trade issues to the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora, but CITES has quite different objectives as it is designed to protect endangered and rare species against any or unsustainable international trade.

The Cartagena Protocol on Biosafety (2000) deals with intentional transboundary movements, but only of living modified organisms.

19. Resolution VII/14.

20. Recommendation No. 77, 1999.

21. Section 11.2.10.

22. Abridged from annex A (Definitions).

III. GAPS, OVERLAPS AND INCONSISTENCIES IN EXISTING INSTRUMENTS

A. Terminology

36. Definitions are used in legal instruments to provide an agreed meaning for a particular term, clarify scope and provide legal certainty and consistency. However, alien species terminology presents particular challenges for scientists, policy-makers and lawyers. At present, there is no common glossary of relevant scientific terms and concepts.²³ In parallel, legal instruments at all levels use variable terminology, sometimes inconsistently or without adequate definitions. On the other hand, some, like the IPPC have a long history with the consistent use of specific terms and definitions that have been incorporated into national legislation worldwide.
37. Different terms are used for alien species generally (non-indigenous, non-native, exotic, foreign, new) and for the subset that cause damage (pest, weed, harmful, injurious, invasive, environmentally dangerous). There are marked differences in use of terms in different sectors. Sanitary and phytosanitary instruments use “pest” and “weed” terminology, backed by clear definitions, and do not distinguish by source or origin: this means they also cover native pests. Terms like “alien” and “invasive” are avoided because they are considered to be too emotive (Hedley, 1999). The IPPC uses the term ‘quarantine pest’ to distinguish by source and by level of damage. MEA requirements usually refer to “alien” or “exotic” species (almost never defined²⁴) in combination with harm/invasiveness criteria to identify those species that should be subject to controls. This generally excludes native species that become invasive.
38. There is also inconsistency in the coverage of “introduction” (the action or process that should/could trigger application of legal measures). Some instruments take a narrow approach that only covers intentional introductions of alien species for release (possibly just to a protected area). This has the effect of excluding introductions for containment/captivity and translocations between different parts of the same country, both of which can present high risks of escapes. Some MEAs are more explicit and cover unintentional as well as intentional introductions.²⁵ The IPPC covers “the entry of a pest resulting in its establishment” and defines each of these key terms.
39. The term “accidental” is widely used as a synonym for unintentional. However, many consider this terminology to be inappropriate and even misleading, at least in the context of pathways where risks associated with certain practices are well known and possible damage is foreseeable.
40. In most national legal systems, use of terms also varies by sector. Surprisingly often, key terms like “indigenous” or “new” are used in environmental legislation without a definition to guide implementing agencies and officials responsible for issuing permits. Gaps and inconsistencies of this kind can hamper cross-sectoral planning and coordination and undermine compliance.

23. See annex II below for a list of working definitions developed by GISP. However, these definitions have no internationally agreed status among the instruments under consideration.

24. Although the Bern Convention simply mandates strict control of non-native species, its Standing Committee has defined “species native to a given territory” to mean “a species that has been observed in the form of a naturally occurring and self-sustaining population in historical times” (Recommendation No. 57, 1997).

25. Under the Bern Convention, Recommendation No. 57 defines “introduction” to mean deliberate or accidental release, into the environment of a given territory (i.e. not just across political borders).

B. Scope

Taxonomic coverage

41. Biological invasions may be generated by all taxonomic groups and at all taxonomic levels. However, only the CBD and a very few national systems cover all aspects of invasive alien species as they relate to all levels of the biodiversity hierarchy. More commonly, scope is limited to higher taxa of alien animals and plants and rarely specifies coverage below the species level.²⁶ Rather than being an oversight, this can be a question of the emphasis which governments choose to place on certain taxa or taxonomic levels within the scope of the authority in agreements (e.g. the IPPC).
42. Coverage of alien freshwater species, notably for use in aquaculture, is generally non-binding and of limited scope. States have recognized the need to develop further measures in this area: the FAO Code of Conduct for Responsible Fisheries urges States to “cooperate in the elaboration, adoption and implementation of international codes of practice and procedures for introductions and transfers of aquatic organisms” (Article 9.3.2). A series of technical guidelines have now been developed under this Code.²⁷
43. Sanitary and phytosanitary instruments potentially cover all taxonomic groups and lower taxonomic categories, but only to the extent that these are injurious to animal or plant health as defined by the relevant instrument. The IPPC’s trigger for pest classification is “injurious to plants or plant products”. This covers alien organisms that could damage wild plants²⁸ but not explicitly those that may harm ecosystem function or plant genetic diversity.
44. Species-specific instruments, which can facilitate targeted interventions, are limited to the regional or sub-regional level. Examples include the AEWAs on non-native waterfowl, the Lake Victoria agreement on control of water hyacinth²⁹ and recommendations on eradication adopted under the Bern Convention.³⁰ Some regional plant protection organizations and regional animal health representations develop region-specific lists to assist national authorities.
45. There are also differences in legal treatment of living modified organisms (LMOs). Whereas these are tackled separately under the CBD³¹, several MEAs address alien and ‘new’ species together. Examples include UNCLOS, some protocols to Regional Seas Conventions and the International Watercourses Convention, as well as the FAO Code of Conduct for Responsible Fisheries. An IPPC preliminary working group concluded that if genetically modified organisms are found to be plant pests, they are covered under the IPPC, including its standards.³²

Ecosystem/biome coverage

46. Invasion processes affect all ecosystems, but the impact of particularly aggressive species is especially severe on the structure and function of vulnerable and isolated ecosystems.³³

26. But note the Madrid Protocol which mandates prevention measures directed at alien micro-organisms and Bern Convention Recommendation No. 57 (1997) which defines organisms belonging to non-native taxa (species or lower taxa) to include lower taxonomic categories, subspecies and varieties.

27. See in particular Aquaculture development (FAO Technical Guidelines for Responsible Fisheries. No.5, 1997).

28. Sometimes referred to as environmental pests, as opposed to agricultural pests or forestry pests.

29. Agreement for the Preparation of a Tripartite Environmental Management Programme for Lake Victoria (Dar es Salaam, 1994), concluded between Kenya, Uganda and Tanzania.

30. For background information, see for example Lambinon, J. 1997. Introduction of non-native plants into the natural environment. Council of Europe Publishing, Nature and Environment, n° 87.

31. Under Art.8(g) and the 2000 Biosafety Protocol.

32. Exploratory Working Group on the Phytosanitary Aspects of Genetically Modified Organisms, Biosafety and Invasive Species (FAO, Rome, 13-16 June 2000).

33. The Programme of Action for the Sustainable Development of Small Island Developing States, recognising the particular vulnerability of small islands, calls for strategic multi-level approaches to quarantine and biodiversity conservation. For background information, see for example Mooney and Hobbs (2000).

47. Introductions to marine and coastal ecosystems are covered generally by UNCLOS and Regional Seas Protocols. Non-binding guidelines have been developed to reduce risk of escapes from mariculture operations³⁴, introductions and transfers of marine organisms³⁵ and ballast water.³⁶ Introductions generated by land-based activities, including through sewage and runoffs, come within the scope of UNCLOS (Art.194) and are referenced under the 1995 Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities, but no substantive guidance has been developed to facilitate implementation.
48. Introductions to freshwater systems are covered by a CBD work programme³⁷ and by the FAO Code of Conduct for Responsible Fisheries. There is no coverage under binding instruments, except for the new 1997 International Watercourses Convention which mandates prevention measures where introductions to watercourses could have adverse transboundary impacts (not in force). Such introductions are not referenced in existing bi- and multilateral watercourse treaties.
49. Introductions to terrestrial systems are mainly carried out for agriculture, forestry, horticulture, landscaping or erosion control, and, internationally and nationally, are more closely linked to sanitary and phytosanitary frameworks. CBD work programmes now address alien species as they impact on forest biodiversity and agricultural biodiversity.³⁸
50. For dry and sub-humid lands, alien species are not referenced in the UN Convention to Combat Desertification (Paris, 1994). However, the CBD COP has designated management of invasive alien species as a targeted action in such lands and supports collaboration between the CBD and the Desertification Convention on the development of a joint work programme.³⁹
51. Some regional MEAs⁴⁰ only require Parties to prevent or control introductions to protected areas. This narrow focus is reflected in many national nature conservation laws. Although it is important to prioritize interventions for sensitive or unique ecosystems and habitats, a purely site-specific approach is inadequate given the characteristics of invasion processes.

Coverage of sectors and pathways

52. Alien species are introduced mainly through transport, including trade, tourism and travel, and sectoral activities related to biological production. Commercial, private and public activities are involved. Pathways may be inter-or intracontinental, transboundary or domestic. Vectors can be biotic or abiotic (e.g. used tyres). This is a complex picture in which much is poorly understood.
53. Quarantine systems are theoretically broad enough to cover all pathways that can involve the introduction of pests (passengers, mail, Internet transactions, means of transport...). In practice, there are wide variations in the scope and administrative remit of national systems essentially due to variations in priorities and resources. Many countries face serious constraints on inspection facilities, taxonomic capacity, access to information and human and financial resources. Particularly where there is no strategic framework for pathway assessment and management, regulatory oversight may focus on known high-risk pathways and pests that may endanger economically important activities. Neglected aspects may include background biota (e.g. in packaging) and consideration of possible impacts on biodiversity.

34. Work programme on marine and coastal biological diversity under the Convention on Biological Diversity (decision IV/5); FAO Code of Conduct for Responsible Fisheries.

35. 1994 ICES/EIFAC Code of Practice on the Introductions and Transfers of Marine Organisms.

36. IMO Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens (1997).

37. Decision IV/4 recommends that Parties should conduct inventories and impact assessments of alien species in such ecosystems and mitigate negative consequences of such species on inland water ecosystems especially at the watershed, catchment and river basin level.

38. Decisions IV/7 and V/5 respectively.

39. Decision V/23: Consideration of options for conservation and sustainable use of biological diversity in dryland, Mediterranean, arid, semi-arid, grassland and savannah ecosystems.

40. E.g. 1968 African Convention, 1989 Paipa Protocol.

53. Quarantine systems are theoretically broad enough to cover all pathways that can involve the introduction of pests (passengers, mail, Internet transactions, means of transport...). In practice, there are wide variations in the scope and administrative remit of national systems essentially due to variations in priorities and resources. Many countries face serious constraints on inspection facilities, taxonomic capacity, access to information and human and financial resources. Particularly where there is no strategic framework for pathway assessment and management, regulatory oversight may focus on known high-risk pathways and pests that may endanger economically important activities. Neglected aspects may include background biota (e.g. in packaging) and consideration of possible impacts on biodiversity.
54. No binding standards apply to international transport of invasive alien species. The IMO's 1997 Guidelines cover ballast water and sediments, but exclude other ship-associated vectors, such as hull-fouling and anchor chains. Voluntary aviation-related standards do not go beyond civil aviation. Land transport is not formally regulated to minimize transfer risks. For inland waterways, there seems to be no guidance on water-borne transport or risks associated with canal links connecting drainage basins or coasts.
55. Risks associated with development assistance and military and humanitarian programmes are not explicitly addressed at international level but they may fall within the ambit of some existing international agreements and national programmes (e.g. IPPC makes no distinction, but action may be and is commonly taken in these areas under plant quarantine programmes), though at national level there are some excellent examples of targeted prevention policies. Tourism pathways are now addressed in a limited way under the CBD.⁴¹

C. Components

56. The CBD obligation has three components (prevention, eradication, control) and the Interim Guiding Principles support a sequenced approach to their implementation.⁴² However, for practical effectiveness and efficiency, these components need to be part of a broader framework that starts even before prevention and continues beyond control and restoration programmes. Key elements of a comprehensive framework should include establishment and maintenance of a knowledge base on alien species, continuous monitoring and feedback, regular policy review and necessary updating and international cooperation including, in particular, the cooperation of the country that is the origin of the problem.

1. Prevention

57. Action to prevent or minimize introductions of unwanted alien organisms is almost universally preferred, due to technical difficulties and costs of detecting, eradicating or containing introduced species that become invasive. All existing international instruments make provision for prevention. However, they vary widely in the extent to which they provide indicators and criteria for practical implementation of prevention measures.

41. Decision V/25 (Biological diversity and tourism) includes as potential impacts of nature-based tourism the increased risk of introduction of alien species by tourists and tourist transportation and the spread of pathogens from humans or companion animals to wild species.

42. Priority should be given to preventing entry; if entry has already taken place, actions should be undertaken to prevent establishment and spread; the preferred response would be eradication at the earliest possible stage; where eradication is not feasible or cost-effective, containment and long-term control measures should be considered.

Prevention under existing MEAs

58. Prevention is treated inconsistently across existing MEAs. The level ranges from strong⁴³ to weak.⁴⁴ Most instruments provide no indicators of where prohibitions or restrictions should be imposed, unless their scope is limited to protected areas. No procedures are generally established for cooperation with countries that are the source/origin of alien species that may impact on biodiversity.⁴⁵ There are no criteria to promote consistent decision-making, other than broad references to “threat”, “serious harm” or similar concepts.
59. For intentional introductions, only three instruments mandate permit-type controls. The 1982 Convention on Nature Conservation and Landscape Protection⁴⁶ requires Parties to prohibit the introduction of alien animal species into the wild without authorisation from the competent national authority, based on prior assessment of the consequences. The 1958 Convention on Fishing in the Danube prohibits the acclimatisation and breeding of new fish species, other animals and aquatic plants without consent from the Commission established under the Convention. Under the Madrid Protocol, a permit is required for the introduction of any animal or plant species not native to the Antarctic Treaty Region: it may only be issued for species listed in an Annex and must be subject to strict conditions for containment and eventual removal.
60. Where unintentional introductions are referenced in the context of biodiversity (not always the case), MEAs are nearly always silent on which pathways States should tackle and how. The Madrid Protocol is again an exception. It prohibits the introduction of named products that might contain alien microorganisms and diseases, including non-sterile soil and poultry products, and requires incineration or sterilisation of waste products that could contain alien biotic material.

Prevention under sanitary and phytosanitary agreements

61. Internationally and nationally, the use of import and export controls to prevent introduction of pests is long established. National plant and animal health services and Customs play a key role in implementation of border controls, import restrictions and other quarantine measures. International instruments, including the FAO Code for the Import and Release of Exotic Biological Control Agents, address the application of control measures at pre-export, pre-import and post-import stages. At a bilateral level, preventive measures may be negotiated between trading partners for application by the State of export.⁴⁷
62. Effective prevention also depends on restricting further imports and internal movements of alien species that present invasion risks: this is important to support containment strategies and prevent spread to other areas. This is potentially a gap under the IPPC whose provisions apply only where the species concerned is designated as a quarantine pest and thus subject to official control if established after the introduction. Where an invasive alien species is not regulated as a plant pest by an individual country, IPPC provisions regarding measures applied to trade do not apply (Quinlan, 2000). The IPPC does provide for regulation of non-quarantine pests⁴⁸ (pests on propagative material) and is not explicit about restrictions on pests with environmental impacts.

43. Prohibition under AEWA and the Alpine Convention Protocol, strict control under CMS and the Bern Convention.

44. The ASEAN Agreement, “endeavour to regulate, and where necessary, prohibit...”

45. CITES is the only MEA to mandate species-specific reciprocal controls between States of export and import. It would probably only apply to alien species introductions if a species protected in the exporting State was considered potentially invasive in the importing State. Under IPPC, cooperation with countries that are the source/origin of invasive alien species is possible e.g., through the phytosanitary certification.

46. Generally known as the Benelux Convention: its Parties are the Netherlands, Belgium and Luxembourg.

47. E.g. the United States draft management plan, developed by the federal Invasive Species Council, provides for strengthening consideration of alien species issues through bilateral and multilateral cooperation instruments with trading partners (version of October 2000).

48. Defined as “pests whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing party”.

Status of prevention measures in relation to the multilateral trading system

63. National sanitary and phytosanitary measures that may affect international trade must be consistent with WTO principles and rules for WTO Members, as expressed through the SPS Agreement. Where an international standard is set by an organization recognized under that Agreement, States should base national measures on that standard. A national measure that “conforms to” an international standard benefits from a (rebuttable) presumption of consistency with the Agreement. A national measure that sets a higher level of protection than the international standard or is adopted in the absence of an international standard should be justified by a scientifically-based risk assessment.⁴⁹
64. This raises questions about the scope of existing international standards, as they relate to possible impacts on biodiversity. The SPS Agreement currently recognizes standards set by IPPC (pests of plants and plant products), OIE (pests and diseases of animals) and Codex Alimentarius Commission (food safety and human health). This excludes taxa that are pests in their own right but are not vectors of disease or injury to plants, plant products and animals. The mandates of the three organizations are broad enough to cover certain environmental and societal impacts, but no standards adopted to date seem to take these dimensions adequately into account.
65. Under the IPPC, for example, existing ISPMs are mainly concept standards rather than species-based and there has been a greater focus on pests with economic implications. The draft standards on Pest Risk Analysis for Quarantine Pests might take greater cognisance of ecological issues and pests of the environment. However, some countries have been reluctant to support an extension to environmental issues, reflecting concern that pest risk analysis for pests affecting the natural environment is extremely difficult. Increased level of difficulty comes from lack of information and lack of familiarity with appropriate methodologies. It should also be recognized that operational capabilities to conduct pest risk analysis are limited (Hedley, 1999).
66. The SPS Agreement specifies that for matters not covered by these organizations, international standards may include “appropriate standards, guidelines and recommendations promulgated by other relevant international organizations open for membership to all Members, as identified by the Committee.” No other organizations have been recognized for standard-setting to date.
67. A second issue is how scientific uncertainty is taken into account in decision-making (what criteria and what levels of precaution are legitimate for different types and magnitudes of uncertainty) and the extent to which precautionary measures may be applied at national level. This is pertinent for alien species issues as there are a high number of unknown variables associated with determining the likelihood that an organism will survive transport to, establish and spread in a given location. These include possible time lag before an introduced species shows invasive characteristics.
68. Precautionary measures are advocated, required or allowed by several international instruments, including the CBD, the Cartagena Protocol on Biosafety and the FAO Code of Conduct on Responsible Fisheries. The approach is being progressively consolidated in international environmental law, but still needs much greater definition.
69. The SPS Agreement provides that where relevant scientific information is insufficient, provisional measures⁵⁰ may be applied until such time as the scientific evidence is available. An IPPC standard provides for States to take emergency measures of temporary application, whose validity must be subject to detailed pest risk analysis as soon as possible.⁵¹

49. See the report on procedures, criteria and capacities for assessing risk from alien species prepared for the sixth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (UNEP/CBD/SBSTTA/6/INF/6).

50. Provisional measures are a trade-facilitating mechanism that allows more conservative measures to be put in place in anticipation of reducing (or perhaps even increasing) the restrictiveness of measures in the future based on experience and the collection of new/better information. Emergency measures may or may not be provisional (that is they may or may not be based on sufficient information or a satisfactory risk assessment), but are put in place on an emergency basis (in advance of full notification and comment procedures) to address an immediate risk.

51. Respectively Art.5.7 and ISPM Principles of plant quarantine as related to international trade.

70. There are significant differences of interpretation between these different regimes. From a trade-related perspective, technical justification and transparency are considered necessary to avoid unjustified trade barriers (disguised as sanitary and phytosanitary measures), provide for uncertainty to be taken into account and build understanding on the part of government, industry, trading partners and citizens. From an environmental perspective, there is concern that risk assessment requirements might undermine the precautionary approach in situations where knowledge or predictive capacity is non-existent or insufficiently developed, making it impossible to perform a credible assessment of risk.⁵² This view holds that in such circumstances, a State should not be prevented from adopting precautionary measures for biosecurity purposes.

2. Monitoring and early warning

71. Monitoring and early warning are essential for rapid response to newly-detected invasions and should cover terrestrial and aquatic environments. Systems should be designed to monitor intentionally introduced species for signs of invasiveness and containment facilities holding alien species and to detect unintentionally or unlawfully introduced species.⁵³

72. No MEAs require monitoring of introduced species for impacts on biodiversity.⁵⁴ This gap has been addressed in recommendations adopted under some instruments: for example, Bern Convention Parties are recommended to monitor introduced populations of non-native terrestrial vertebrate species and assess the potential threat to biological diversity both within their territory and elsewhere (emphasis added).⁵⁵ The IMO ballast water guidelines recommend that Port States undertake biological monitoring in their ports and implement early warning and information dissemination systems. The IUCN Guidelines recommend that neighbouring countries consider the desirability of cooperative action to prevent alien potentially invasive species from migrating across borders, including agreements to share information and warnings and to consult and develop rapid responses in the event of such border crossings.

73. IPPC, OIE and Codex support the establishment of surveillance systems as part of national frameworks and provide a basis for emergency action and official control. Under the IPPC, elements should include identification of pests already present in a country and identification and surveillance of areas that are pest-free or from which a pest has been eradicated. In practice, national and regional capacity is critical to effective surveillance. It appears that few national plant protection organizations currently carry out regular surveillance because of the costs involved (Hedley, 1999).

74. Nationally, monitoring and early warning systems are often weak. Common constraints include lack of information about species already present (baseline data) and lack of centralized accessible information systems. Institutional fragmentation limits the ability of environment, veterinary, phytosanitary and health authorities to cooperate on prompt action. Some countries have no legal basis to conduct monitoring or control unless a species is first designated a pest. Relatively few attach monitoring conditions to permits or licences for containment/captivity of alien species. Emergency powers may be narrow and may not apply to biodiversity-related impacts. IPPC makes a distinction between general and specific surveillance. Systems for gathering and evaluating information for general surveillance are more easily implemented and sustained than surveys for specific pests. The link between surveillance and measures affecting trade is also important to highlight as a motivation for such systems.

52. This situation should be distinguished from capacity limitations (e.g. where competent national agencies do not have access to existing data or expertise in risk analysis) as this can be addressed through improved technical assistance.

53. Primarily through monitoring of 'weak links' (e.g. key ports of entry, disturbed ecosystems) and protected/pest free areas.

54. Though some have generic monitoring provisions, e.g. Art.7(c) of the Convention on Biological Diversity, Art.3 (2) of the Ramsar Convention on Wetlands.

55. Recommendation no.77, 1999. Ramsar resolution VII/14 states that prevention and early intervention are the most cost-effective control techniques. Monitoring is addressed in Principle 5, Interim Guiding Principles.

3. Eradication and control

75. Where an alien species has become invasive, options to prevent its establishment and spread include eradication (where feasible and cost-effective), containment or long-term control measures.⁵⁶ This component is missing from several MEAs⁵⁷, but is covered by the CBD, CMS⁵⁸, Ramsar⁵⁹ and the Convention for the Conservation of the Biodiversity and the Protection of Wilderness Areas in Central America (Managua, 1992).⁶⁰ Detailed guidance and recommendations for eradication and control are set out in the IUCN Guidelines approved in 2000.
76. MEAs do not usually distinguish “eradication” from “control” or provide guidance on implementation: this gap is most marked for the marine environment. The Bern Convention is unique for its suite of recommendations on eradication/ control of named alien species, such as *Caulerpa taxifolia*⁶¹, American Ruddy Duck *Oxyura jamaicensis*⁶² and some terrestrial vertebrates.⁶³ The latter also considers societal implications of eradication.
77. Sanitary and phytosanitary agreements mandate zonation (OIE) and pest-free areas (IPPC⁶⁴) as part of broader requirements for pest containment/control. The 1997 revised IPPC provides for managed risk, pest free areas⁶⁵, consistent with the recognition of pest free areas under the SPS Agreement.⁶⁶ National plant protection organizations manage these identified pest-free areas and areas of low pest prevalence and undertake pest eradication from specific areas.
78. Environmental risk analysis of eradication/control techniques is not systematically referenced in existing instruments or guidance. However, the FAO Code for the Import and Release of Exotic Biological Control Agents⁶⁷ recognizes that exotic biological control agents can have an adverse impact on ecosystems and other species and recommends the creation of emergency procedures to take action where an introduction goes wrong and has unintended environmental consequences.
79. National legislation is usually weaker on eradication/control than on prevention. Existing law often “focuses on the front lines, but pays little attention to the enemy that has arrived and is spreading within” (Miller, 1999). Constraints are again linked to institutional fragmentation, narrow mandates and lack of a strategic framework for prioritized remedial action. More specifically, there may be legal obstacles to control measures for live animals and plants, as many modern conservation laws confer protection on all wild species without reference to native/alien criteria.⁶⁸ This usually means that culling or control measures can only be carried out for species formally designated as “pests”, “noxious weeds” or “nuisance species”. Procedures for updating relevant regulations and species lists may be too slow to support rapid intervention. However, in the case of plant protection, nearly all IPPC-based national legislation includes provisions for domestic emergency action without immediate changes in legislation.

56. The sequenced approach supported by principle 2 of the Interim Guiding Principles.

57. For example ASEAN, regional seas protocols.

58. Article III.4 mandates measures to control or eliminate already introduced exotic species that may endanger migratory species. The AEWAs concluded under CMS provides that where non-native waterbird species have already been introduced, appropriate measures must be implemented to prevent these species from becoming a potential threat to indigenous species (Article III (2) and Annex 3 of the binding Action Plan).

59. Resolution VII.14 calls on Parties to establish programmes to control or eradicate invasive species.

60. This mandates the adoption of mechanisms to control or eradicate all exotic species which threaten ecosystems, habitats and wild species.

61. Recommendation on controlling proliferation of *Caulerpa taxifolia* in the Mediterranean (No. 45, 1995).

62. Recommendation on the conservation of the White-headed Duck (*Oxyura leucocephala*) (No. 61, 1997).

63. Recommendation on the Eradication of Non-Native Terrestrial Vertebrates (No.77, 1999) states that methods of eradication should be as selective, ethical and without cruelty as possible, consistent with the aim of permanently eliminating the invasive species and notes that feral animals of domestic species and commensal non-native species can be some of the most aggressive and damaging alien species to the natural environment, especially on islands. Parties should assess the feasibility of eradicating populations representing a threat to biological diversity, monitor effects of eradication on native species and actively involve interested parties.

64. An ISPM on pest free areas was endorsed in 1995.

65. Art.IV.2.e.

66. Art.6.

67. Adopted as ISPM no.2 under the IPPC.

68. See de Klemm (1996) and Shine et al. 2000 (Chapter 6.1).

4. Restoration

80. Mitigation should not be carried out in a vacuum. The overarching aim of prevention/control frameworks should be to protect environmental and socio-economic interests against complex impacts of invasive alien species. In this perspective, restoration of degraded habitats, and possibly re-introduction of native species⁶⁹, can not only enhance biological diversity but also increase the resilience of ecosystems against future invasions.⁷⁰
81. No binding instruments explicitly link invasive alien species control with rehabilitation of degraded ecosystems. Although the CBD and some MEAs provide generally for biodiversity restoration, there is no guidance on how to integrate prevention and control with rehabilitation programmes. The Bern Convention (Europe) and the Barcelona Protocol (Mediterranean) seem to be the only MEAs that cover the re-introduction of native species as well as the control of alien species.

D. Transboundary aspects

82. Invasion processes ignore political boundaries between countries and between subnational units (provinces, states, cantons, Länder...). Invasive alien species can move across boundaries within shared ecosystems and to adjacent ecosystems: alien species translocated to another country may become invasive for the first time. Consistent with the ecosystem approach as developed under the CBD⁷¹, legal frameworks need to support coordinated approaches and consultation between different jurisdictional units on prevention, early warning and mitigation.
83. Under customary international law, a State that plans to undertake or authorize activities that may have measurable effects on the environment of another State must inform and consult with that State.⁷² This principle is formulated in several treaties including, in a regional framework, the Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (Espoo, 1991).⁷³ This sets out substantive and procedural requirements for assessment of transboundary impacts of certain activities. All stakeholders, including the public in the affected area, should be informed and have an opportunity to participate in EIA procedures and decision-making.⁷⁴
84. Most MEAs do not specify State responsibilities towards neighbouring countries regarding alien species, though several have generic requirements for transboundary cooperation.⁷⁵ There is a lack of specific agreed rules to be applied between countries, including on treatment of risk as it may affect another country.⁷⁶ The Benelux Convention is the only treaty to mandate consultation with neighbouring states prior to intentional introductions (of alien plants).⁷⁷ Bern Convention Parties should inform governments of neighbouring states if accidental introductions have occurred, and set up mechanisms for inter-State co-operation, notification and consultation in order to co-ordinate precautionary and control measures for invasive species.⁷⁸

69. Consistent with ecological safeguards set out in IUCN Guidelines for Re-introductions (1995): see also de Klemm (1996).

70. Recovery plans for endangered species may provide for eradication or control of harmful alien species (see e.g. OTA 1993). In many cases, recovery may not be feasible e.g. when local species have been exterminated in isolated ecosystems.

71. Decision V/6 on ecosystem approach sets out twelve principles for its application. Decision V/8 on invasive alien species recommends that Parties and relevant bodies apply the ecosystem approach in their work on invasive alien species and strongly encourages Parties to develop mechanisms for transboundary cooperation, including the exchange of best practices.

72. Principle 19 of the Rio Declaration provides that "States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant transboundary environmental adverse effect and shall consult with those States at an early stage and in good faith".

73. A treaty elaborated in the framework of the UN Economic Commission for Europe by 24 European States, Canada, the United States and the European Community: not yet in force.

74. For more detail, see the report on procedures, criteria and capacities for assessing risk from alien species prepared for the sixth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (UNEP/CBD/SBSTTA/6/INF/6).

75. The most detailed is Article 14, paragraph 1, of the Convention on Biological Diversity, which covers notification, consultation and emergency planning.

76. The work programme for marine and coastal biological diversity under the Convention on Biological Diversity (decision IV/5) does address the issue but more generally: it urges "particular attention to transboundary effects" of alien species and genotypes that threaten marine ecosystems, habitats and species.

77. Council of Ministers decision, 17 October 1983.

78. Recommendations R (84) 14 and No.77 (1997).

85. Under the IPPC, pest risk analysis is used to justify national measures (in the absence of an international standard). However, there does not appear to be any requirement to analyse risk as it may affect another country (i.e. where a pest may have transboundary impacts), although the Convention does contain measures to prevent or limit the spread of pests between countries.
86. Coverage is more specific at non-binding level. The FAO Code of Conduct for Responsible Fisheries recommends that States consult with neighbouring States, as appropriate, before introducing non-indigenous species into transboundary aquatic ecosystems. They should also make efforts to minimize the harmful effects of introducing non-native species into waters, especially where there is a significant potential for the spread of species into waters under the jurisdiction of other States as well as waters under the jurisdiction of the State of origin.⁷⁹
87. At national level, administrative boundaries can impede efficient action on invasive alien species. Coordination and harmonisation are particularly important in federated or regionalized States where law-making and enforcement powers are shared between national and subnational governments. These are also key issues in the relationship between REIOs and member States. Development and implementation of consistent rules is necessary to avoid situations where stringent measures adopted in one unit are undermined by weaker measures across a boundary.⁸⁰

E. Responsibility, liability and redress

88. In international law, States have the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction. For alien species, the question is whether States may be liable for transboundary environmental effects of activities involving the export of alien species or the spread of existing invasives or pests.
89. Existing public international law is under-developed, generally and on the possible liability of States for invasion-related damage. The lack of clear rules is a serious gap because it means that biodiversity-related prevention and control obligations are not underpinned by a deterrent element. Leaving aside the Interim Guiding Principles, the Bern Convention seems to be the only MEA under which liability for invasion impacts has even been referenced.⁸¹
90. The counterpart to liability is redress (availability of remedies for victims of environmental damage).⁸² No MEA described above addresses this dimension. The Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment (Lugano, 1993) establishes a system of strict liability for damage caused to persons, property and the environment by activities carried out in a professional capacity which are considered as dangerous owing to their very nature. These include the production, culturing, handling, storage, use, destruction, disposal and release or any other operation dealing with genetically modified organisms or micro-organisms that present a significant risk for man, the environment or property. However, the Convention does not apply to other types of introduced species nor does it cover carriage operations.

79. Paragraphs Art. 9.2.3 and Art. 9.3.1. See also the 1994 ICES/EIFAC Code of Practice.

80. For example, where a species lawfully imported into one unit crosses a political boundary and becomes invasive in a unit that prohibits its import.

81. The preamble to recommendation No.77 (1999) on non-native terrestrial vertebrates uses the formulation "Considering that the species introduced into the territory of a State can easily spread to neighbouring States or entire regions and that the damage which may be caused to the environment of other States gives rise to the liability of that State".

82. Note that principle 13 of the Rio Declaration calls on States to develop national law regarding liability and compensation for the victims' environmental damage and to cooperate in the development of further international law on the subject.

91. The acknowledged deficit on liability and redress in relation to damage to biodiversity is being generally addressed under the CBD. In 2000, the COP renewed an invitation for Parties, governments and relevant organizations to provide information on national, international and regional measures and agreements. The Secretariat will also review information on the work of the International Law Commission and the development and application of liability regimes under other multilateral instruments.⁸³ The sixth meeting of the COP (2002) is to consider a process for reviewing Art.14.2, including the establishment of an ad hoc technical expert group.
92. On dispute resolution, there is an imbalance between instruments directly referencing alien species and the procedures established within the multilateral trading system. Dispute resolution procedures under MEAs are relatively weak.⁸⁴ Under the IPPC as revised in 1997, Parties may provide input to dispute settlement, but unless a broad approach is adopted, it is considered unlikely that disputes can be resolved below the level of the WTO (Hedley, 1999). In contrast, the WTO system provides a compulsory mechanism for resolving disputes brought by one Member against another in relation to any of its Agreements.
93. There is intense debate about how far MEA provisions can or should be taken into consideration by the WTO mechanism when it determines the compatibility of national measures with WTO rules. Many experts believe that the WTO Appellate Body would have to take the Biosafety Protocol into consideration when resolving trade disputes on LMOs, provided that the States concerned are Parties to both instruments.

IV. ASSESSMENT OF OTHER FACTORS RELEVANT TO EFFICIENCY AND EFFICACY

A. Institutional capacity and coordination

94. At all levels, separate infrastructures exist for environment, agriculture, fisheries, international trade and other key sectors, except in a very few countries. Alien species tend to be tackled in a piecemeal way by different personnel for different objectives, under separate laws and regulations. This makes it difficult to implement a cross-cutting approach to prevention and mitigation. Coordinating processes are needed at and between these levels and sectors⁸⁵ to ensure sectoral consistency and more efficient use of available resources and tools.

Global level

95. Institutional linkages between relevant organizations have expanded over the last five years.⁸⁶ Tools to operationalize cooperation, such as memoranda of cooperation or agreement, are now routinely used between conservation treaty secretariats and can provide a flexible basis for joint work programmes.⁸⁷ At present, such tools have only limited application between biodiversity-related and other sectors. Dialogue on trade and environment has been initiated on a more systematic basis between UNEP and WTO. The FAO and CBD have cooperated on agricultural biodiversity planning through joint workshops.⁸⁸

83. Including the Antarctic Treaty, the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and the Biosafety Protocol (decision V/18).

84. With the exception of the International Tribunal for the Law of the Sea established under UNCLOS

85. As recommended inter alia by the United Nations/Norway Conference on Alien Species, The Trondheim Conferences on Biodiversity (1-5 July 1996) and the Joint FAO-CBD Workshop on Farming Systems Approaches for the Conservation and Sustainable Use of Agricultural Biological Diversity and Agroecosystems (Rome, 19-20 June 1997).

86. As endorsed by decision V/8. At the GISP phase I synthesis meeting in Cape Town, September 2000, a liaison group was convened of CBD, Ramsar, IMO, FAO, IPPC, WTO, UNESCO, GISP and national representatives from different biogeographic regions.

87. Cooperation between the Convention on Biological Diversity and the Ramsar Convention on Wetlands has recently led to the approval of the second joint work programme, which specifically references cooperation on invasive alien species.

88. Joint FAO-CBD Workshop on Farming Systems Approaches for the Conservation and Sustainable Use of Agricultural Biological Diversity and Agroecosystems (Rome, 19-20 June 1997); Liaison Group on Agrobiodiversity Assessment (Rome, December 1998).

96. In capacity terms, IPPC and OIE are supported by regional organizations or representations, and have well-established links with national quarantine services.
97. The CBD, and the more active MEAs, work through national focal points and informal regional groupings. Some are supported by broadly-based scientific committees that provide technical guidance to the respective COPs. However, MEA treaty secretariats are small and poorly resourced. Under present arrangements, they lack the infrastructure and capacity to generate and maintain databases, detailed technical standards or advisory services.
98. Through the Globallast programme, IMO has developed institutional links with GEF, UNDP, WHO, the World Maritime University, the UN Train-Sea-Coast programme, the global shipping and port industries and international environmental non-governmental organizations (NGOs), to co-ordinate activities at the global level.

Regional and subregional level

99. Regional and subregional cooperation is essential for effective frameworks, particularly where there are geographically and evolutionarily isolated ecosystems. Efficiency can be increased by sharing information, ensuring basic consistency in policies, legislation and practice and cooperating on risk analysis (e.g. of trade and transport pathways that concern several countries in the region) and eradication/control programmes.⁸⁹
100. Practical cooperation under regional environmental instruments is weak, except under the Bern Convention and the South Pacific Regional Environment Programme. The SPREP Regional Invasive Species Strategy provides for a regional system of information collection and exchange as well as collaboration on preparation of black lists of invasive species. It could support future development of harmonized legal frameworks for border controls and mitigation strategies.⁹⁰ In the Mediterranean, the Barcelona Convention institutions and the FAO have recently initiated cooperation on alien species issues: regional guidelines will be considered in 2001.⁹¹
101. The IPPC's nine RPPOs vary widely in their operational capabilities. Several ISPMs have been developed by RPPOs and presented for discussion at ICPM meetings, generally because the topic was of urgent interest to that particular region. However, some RPPOs do not have the infrastructure to play an effective role in information collection or dissemination and discussion of ISPMs (Hedley, 1999). The 1997 revised IPPC provides for REIOs to become Parties, which may facilitate regional input into the development of new standards.
102. The IMO Globallast programme calls for developing and implementing regional and sub-regional arrangements, including regional cooperation, institutional strengthening and capacity building activities.
103. At least three REIOs may develop regulations or recommendations on certain aspects of trade in alien species.⁹² However, there are currently no guidelines on how a REIO wanting to develop a strategic/regulatory framework for alien species issues might tackle trade-related aspects of invasive alien species prevention and control.

89. The COP has strongly encouraged regional and multilateral cooperation, including exchange of best practices (Decision V/8).

90. This may be a good precedent for other regions with islands. In the Wider Caribbean, a legal basis for regional policy development on invasive species exists under Art.12, Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Kingston, 18 January 1990).

91. The Regional Activity Centre for Specially Protected Areas, Tunis, which administers the 1995 Barcelona Protocol, is developing guidelines with FAO technical assistance to help Parties implement the Protocol's requirements on alien species and genetically modified organisms.

92. Those established under the North American Free Trade Agreement and the treaties establishing the European Community and Mercosur (Southern Cone countries of South America). The regional plant protection organization for the latter region (Comite Regional de Sanidad Vegetal para el Cono Sur) has close links to Mercosur and produces regional standards for the five member countries. The Andean Pact, a REIO comprising Bolivia, Colombia, Ecuador, Peru and Venezuela, probably has equivalent powers, and has already adopted binding standards for access and benefit sharing for genetic resources.

National ministries and agencies

104. Quarantine and border control services are usually located in the ministry for agriculture, forestry and fisheries or equivalent. Under older sectoral legislation, officials may not have powers to detain species and consignments presenting risks to the natural environment but not to agriculture or forestry.⁹³ This gap will not be filled by conservation agencies if their role in border control is limited to enforcing CITES-related controls.⁹⁴ Within national territory, such agencies may have a stronger mandate for prevention and mitigation, although it is often limited to protected areas.
105. A coordination process should allow different sectoral dimensions of alien species issues to be taken into account. It can enhance efficiency by integrating procedures, reviewing budget allocations to minimize duplication and support synergies in expenditure, and identifying priorities for capacity-building. The process should also ensure that national contributions to international meetings and negotiations (environment- or trade-related) are checked for internal consistency.
106. Few countries have initiated coordination processes, though the number is growing. New Zealand has adopted special legislation and created a Cabinet portfolio and dedicated biosecurity agencies.⁹⁵ Other countries have focused on improving inter-agency involvement and mainstreaming alien species issues in key sectors. The United States' Federal Invasive Species Council includes representation from eight federal departments and agencies: it has reviewed existing legal and institutional frameworks and is circulating a draft national management plan for public comment.⁹⁶

B. Strategic planning, review and assessment

107. Alien species issues tend to have low visibility in national environmental or biodiversity plans and even less in cross-sectoral planning. To enhance efficiency and efficacy, the COP has urged Parties, other Governments and relevant bodies to give priority to the development and implementation of invasive alien species strategies and action plans.⁹⁷
108. A key element of strategic planning should be the review of existing legal and institutional frameworks and practices to identify constraints and promote cost-effective measures for prevention and mitigation, including closure of regulatory gaps and loopholes. The Ramsar COP has adopted guidance on review methodology and specifically recommends that Parties carry out such a review with regard to alien species in wetland ecosystems.⁹⁸ There may be scope for carrying out a review at a regional scale if legal and administrative systems have commonalities.
109. Strategic environmental assessment of policies, programmes and projects that may provide new pathways for alien organisms⁹⁹ is essential for efficient prevention but is currently under-used. Although several countries require some type of impact assessment before authorising intentional introductions, almost none provide for assessment of cumulative and global effects of relevant programmes and projects or for systematic consideration of their implications for biodiversity in decision-making and planning. Specific tools for invasion pathway analysis and integrated vector management are also under-developed. Without such approaches and techniques, it is harder to identify some types of risk and make appropriate modifications early on so as to maximize the effectiveness of prevention strategies.¹⁰⁰

93. But note that some countries, such as Australia, have long-standing quarantine policies for considering effects on the environment as well as the primary production sector. Newer laws are usually more broadly-based.

94. States that are party to CITES should have specialist capacity for this purpose, in the form of a Management Authority and a Scientific Authority.

95. Minister of Food, Fibre, Biosecurity and Border Control; Biosecurity Act 1993 and Hazardous Substances and New Organisms Act 1996, under which the Environmental Risk Management Authority was established. Chief Technical Officers for biosecurity have been appointed in all key ministries.

96. See National Invasive Species Council (2000) and United States Department of State/DCI Environment Center (2000).

97. Decision V/8.

98. Resolutions VII/7 and VII/14 respectively. See also Ramsar Handbook 3, Reviewing laws and institutions to promote the conservation and wise use of wetlands.

99. For example, new transport routes and infrastructure, including inter-basin hydrological links; new commodity movements; new trade agreements and practices.

100. The Conference of the Parties has now called for use of impact assessment and strategic environmental assessment in the alien species context (decision V/18).

C. Participation and engagement of stakeholders

110. Stakeholders involved in or affected by alien species-related activities need to be engaged and, where appropriate, accountable. Appropriate communication strategies need to be developed, tailored to different target audiences and groups, including enforcement personnel.
111. Contacts with some vector-responsible groups¹⁰¹ are under-developed at international level. The position is improving but it is difficult to get an accurate picture of how effective such contacts are. The ICPM have contact with seed trader groups and some transport bodies, but its capacity to develop new international links is limited: links that do exist are mainly brokered at national level. National links, though important, may not be enough on their own to provide leverage for improved global trading and transport practices. IMO has active participation from and engagement of the shipping industry, which participates in all IMO committees including the MEPC and its Ballast Water Working Group, and the Globallast Global Task Force.
112. A small but growing number of countries have developed contacts with target groups. Australia and New Zealand show increasing cooperation between regulatory agencies and key sectors on the development or review of legal instruments and quarantine/import health standards.¹⁰² Voluntary codes of practice have been developed by some national nursery industries, sometimes facilitated by NGOs such as The Nature Conservancy. In South Africa, the forestry sector has adopted an environmental code of conduct to manage the spread of alien plants, which includes special restrictions around wetlands and watercourses.
113. Existing instruments give little guidance on how to engage target audiences close to the ground.¹⁰³ By way of exception, Bern Convention Parties in Europe are recommended to seek the involvement and co-operation of all interested parties prior to eradication of alien vertebrates, including organizations and operators at the origin of a release, local and regional authorities and scientific communities.¹⁰⁴
114. Consistent with the ecosystem approach as developed by the CBD¹⁰⁵, management should be decentralized to the lowest appropriate level. At present, few local authorities have a specific mandate for alien species control although there are good examples of site-specific initiatives for weed management areas. Under New Zealand's biosecurity legislation, all regional councils have legal duties for eradication and control and are required to draw up their own black lists of noxious weeds not yet present in the relevant region, as a basis for rapid response action (Christensen, 1999).
115. There are few examples of legally-backed programmes involving local communities. The best known is South Africa's Working for Water Programme, developed after a benefit-cost analysis of water consumption by alien plants and administered by the Ministry for Water. Local inhabitants, mainly women, are employed for large-scale manual eradication of alien plants¹⁰⁶ in water catchments. Societal components, in the form of public health education, child care and nursery education, have also been incorporated into the programme.

101. For example, timber and plant traders, aquarium and sport fish traders, the pet industry and so on.

102. For example, Australia's ballast water regulations were developed with cross-industry group support. For broader background information, see e.g. Sharp (1999).

103. Article 10(d) of the Convention on Biological Diversity generally requires Parties to support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced.

104. Standing Committee recommendation No. 77, 1997. This also recommends, where appropriate, the use of public awareness and education campaigns informing the general public of the threat represented by introduced non-native species for the indigenous wildlife and its natural habitats in order to gain public acceptance of eradication/control measures.

105. Decision V/6.

106. Estimated to consume about 6.7% of the country's water resources (Wilgen, 1999).

D. Structure of existing incentive systems

116. There are currently few deterrents to the export, import or use of invasive alien species and those who take the risks are seldom those affected by the consequences of a harmful introduction (Hedley, 1999). There are also few positive incentives for importers, users and other stakeholders to develop alternative practices based on locally-available native species or undertake land management practices to promote ecosystem resilience.
117. GISP research found that existing market mechanisms and other economic instruments are not sufficiently developed to provide deterrents for alien species introductions as they relate to biodiversity (Perrings et al., 2000). In most countries, tools are not in place to generate sustainable funding for public investment in alien species prevention and control programmes. This is a serious deficit, particularly for developing countries, and calls for priority research into innovative new approaches. Drawing on precedents in other areas of environmental management and in the agricultural and forestry sectors, options could include the wider application of introducer/user fees,¹⁰⁷ the use of environmental insurance or performance bonds for activities known to present a risk, or levies attached to the product, transporter or transoceanic passenger.¹⁰⁸
118. In the primary production, transport and trade sectors, public funding through subsidies, tax incentives and grants should be reviewed to identify and phase out “perverse incentives”.¹⁰⁹ Without such action, supported by Article 11 of the CBD, the effectiveness of regulatory frameworks on alien species may be seriously undermined.

E. Suitability of existing tools, procedures and information systems

119. All countries already have planning and regulatory tools for management of land and natural resources, supported by administrative infrastructure and expertise. For efficiency and efficacy, it is important to maximize use of existing tools and procedures to achieve the conservation and sustainable use of biodiversity.
120. Generic environmental management tools rarely reference alien species risks or cover a broad enough range of activities. Impact assessment regulations and criteria need to address economic, environmental and societal implications of activities and processes involving alien species. Operating and siting rules for installations conducting potentially hazardous operations should cover premises where alien species are held in containment or captivity.
121. Cost-effective administration also requires streamlined regulatory procedures, at national and local level. In some cases, applicants for import or movement permits or operating licences have to go through several different applications to different regulatory authorities. Complex systems can impede transparency and effective public participation: they may also deter compliance.

107. User fees are widely employed in plant health and to a certain extent in animal health. Much of the US budget on quarantine issues is now derived from user fees.

108. E.g. Some members of the IMO use port dues as a charging mechanism to fund national control and monitoring. See further Jenkins, P. Who should pay? Economic dimensions of preventing harmful invasions through international trade and travel (paper presented to the GISP Human Dimensions Workshop, Cape Town, September 2000, available from pjenkins@cspinet.org).

109. These are measures instituted for other sectoral objectives that may have the effect of encouraging introduction and spread of unwanted alien species. A 1998 estimate for the United States considered that out of US \$1.898 billion spent on subsidies related to agriculture, road transport, fisheries and forestry and fossil fuels, \$1.456 billion were perverse (Myers, N. with Kent, J. 1998. Perverse Subsidies: Tax \$s Undercutting our Economies and Environments Alike. IISD, Winnipeg).

122. Quite often, suitable tools are in place but under-used. Competent authorities usually have general powers under quarantine/agricultural legislation to adopt import/movement regulations for designated ‘noxious weeds’ and to require farmers and landowners to control such weeds. However, implementing regulations are not always issued promptly or publicized and applied. The potential of such tools should not be neglected. In South Africa, older weed control regulations have recently been extended to impose a regulatory duty on landowners to clear listed alien species. It is prohibited to subdivide, sell or develop land unless it is clear of these weeds.¹¹⁰
123. Lastly, the legal implications of using information systems for regulatory purposes need further consideration. There is consensus on the need to enlarge databases on known and potential invasives and to make this information accessible as part of global capacity-building on invasive alien species.¹¹¹ However, some kinds of information may have commercial or political repercussions, where it leads to refusal of certain commodities or species.¹¹² This raises legal questions about possible liability of those entering data in a database (although disclaimer clauses could of course be used). One approach might be to establish an advance screening system for verification of “official” data by governments or international organizations, as opposed to scientific/technical information, which would not require prior screening.

V. CONCLUSIONS RELEVANT TO THE IDENTIFICATION OF OPTIONS FOR FULL AND EFFECTIVE IMPLEMENTATION OF ARTICLE 8(h)

124. Capacity to address environmental, economic and social challenges posed by invasive alien species is not remotely sufficient. From the legal and institutional perspective, this paper has highlighted the complexity of existing regimes as well as strengths, gaps and inconsistencies.
125. It can be noted that stronger international frameworks may not be seen as a priority for two groups of countries: those that have advanced biosecurity frameworks and those that have suffered less to date from alien species impact. In response, it should be recalled that because long-distance pathways present significant risks of unwanted introductions, more effective and consistent global approaches are needed to phase out weak links and reinforce national and bilateral efforts. International concertation is essential to tackle information deficits on taxonomy, pathways, risk analysis and mitigation techniques and to improve financial and technical assistance.
126. The task facing policy-makers is how to strengthen capacity to protect native biodiversity against invasion impacts without adding extra complexity or duplicating what already exists. These conclusions outline the following options and actions, which are not necessarily mutually exclusive:
- (a) Further development of the Interim Guiding Principles;
 - (b) Development or enlargement of an international instrument or instruments; and
 - (c) Additional actions.

110. Regulations adopted in 2000 under the Conservation of Agricultural Resources Act 1983.

111. E.g. the Global Invasive Species Database and Early Warning System developed within the GISP.

112. The IPPC experienced difficulties of this kind and has now replaced its own database with an independent experts’ database. Together with various donors, it is now developing an Information System on Food Safety and Animal and Plant Health. This will be generated from information provided by countries but each country is responsible for maintaining its part of the site.

A. Further development of the Interim Guiding Principles

127. Guiding principles were developed by the SBSTTA pursuant to Decision IV/1/C. In amended form, as Interim Guiding Principles for the prevention, introduction and mitigation of impacts of alien species (IGPs), they were annexed to Decision V/8. Parties, Governments and relevant organizations were urged to apply the IGPs, as appropriate, in the context of activities aimed at implementing Article 8(h) and in the various sectors, and to submit written comments to be taken into account when the SBSTTA considers further elaboration of the IGPs prior to the sixth meeting of the COP.
128. The IGPs represent an important initiative by the COP to promote normalized principles, approaches and tools for alien species introductions and prevention and mitigation measures. The ongoing discussion process provides an open forum for sectoral and legal input from all biogeographic regions and from intergovernmental and non-governmental constituencies.
129. In their current form, the IGPs can make a constructive contribution to policy formation. They identify overarching principles that should provide a common foundation for regional, bilateral and national measures, including sequenced priorities for prevention, early warning, eradication and control. They explain how differentiated measures are needed to control intentional and unintentional introductions. They seek to clarify how key principles supported by international law should be applied to the specific context of alien species, including the precautionary approach, the responsibility of States as potential sources of invasive alien species and the need for inter-State cooperation and capacity-building. Education and public awareness measures are also given prominent treatment.
130. Important matters still need to be addressed. An acknowledged gap relates to terminology. Another is the absence of any reference to establishment or strengthening of appropriate legal and institutional frameworks or to the need for periodic review of existing frameworks, practices and incentive systems. The issue of burden of proof (IGP 10) is likely to need further consideration. There may need to be more explicit reference to disease organisms as invasive alien species.
131. The Interim Guiding Principles are non-binding, which has certain advantages. It may be easier to formulate more advanced approaches and concepts that can gradually gain wider acceptance. On the other hand, there are obvious limitations to a non-binding instrument. It can promote harmonisation but cannot require Parties to implement basic common norms for legislation, decision-making criteria, environmental and risk assessment procedures and management and control measures.¹¹³ In their current form, the IGPs cannot provide for capacity-building and financial assistance or deal more specifically with liability and redress (though the latter issues are being separately addressed through a comprehensive process under the Convention on Biological Diversity: see decision V/18).

113. It should be noted that that the International Maritime Organization initially promoted voluntary guidelines on ballast water management but, because relatively few States acted on these by adopting appropriate regulations, has now mandated its Marine Environment Protection Committee to develop a draft binding instrument for possible adoption in 2002 or 2003 (see paragraph 29 above).

B. Development or enlargement of an international instrument or instruments

132. There should be a strong rationale for developing any new instrument, given the number already in place. This rationale might come from a consensus that existing international infrastructure impedes efficient and effective action on alien species, due to the level of dispersal and the varying protection objectives, scope, approaches, tools and operational links of relevant instruments. If this rationale is accepted, there would appear to be three possible options:
- (a) To adopt a framework agreement to provide an overarching frame of reference for all sectors concerned by invasive alien species issues, including transport, primary production, public health and conservation;
 - (b) To design one or more new instruments to fill the gaps in existing frameworks identified in this paper and elsewhere. This is effectively the approach being taken by the IMO with regard to ballast water¹¹⁴, and through non-binding measures, by FAO, ICAO, ICES/EIFAC and other organizations described above;
 - (c) To seek some kind of accommodation or enlargement of existing sanitary, phytosanitary, food safety and public health instruments, to build a closer interface with biodiversity parameters. If this were feasible, it could have efficiency benefits by maximising existing mechanisms and expertise, particularly in the area of standard setting and risk analysis methodology, and to use regional networks and national capacity to the full. Moreover, IPPC, OIE and Codex Alimentarius Commission already interface with the multilateral trading system as their standards are formally recognized under the SPS Agreement.

C. Additional actions

133. Formal cooperation mechanisms may be considered between intergovernmental bodies in different sectors. These could provide for development of joint work programmes in areas of common interest, to minimize duplication and maximize efficient use of available resources. Periodic joint conferences could be held to facilitate harmonisation of relevant systems.
134. Streamlining at this level would need to be accompanied by closer integration between national agencies and services and more consistent national inputs to international processes. In addition, countries could make better use of existing opportunities to raise the profile of invasive alien species issues in international policy circles. For example, government representatives to WTO forums have apparently not tabled discussion of alien species movements in international trade. Interlinkages of this kind are important to raise awareness of issues and risks in trade-related bodies and associations and in other branches of government.
135. On the substantive side, useful materials are already available to States wishing to adopt or strengthen national legal frameworks and to develop bilateral and subregional coordinated approaches. Useful elements are outlined in the IUCN Guidelines with examples of innovative State practice, in the IUCN Environmental Law Centre's *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* by Shine et al. (2000) (UNEP/CBD/SBSTTA/6/INF/8).
136. Lastly, some of the difficulties associated with terminology could be addressed through less formal channels. Key international organizations might cooperate in producing a glossary of equivalent terms that can draw on existing materials (e.g. the IPPC's Glossary of Phytosanitary Terms) and treaty definitions, before attempting a full standardisation of terms which would be difficult.

114. It should, however, be noted that this will not cover all shipping-associated vectors: under current approaches, separate instruments will be needed to address risks associated with other vectors on the same vessels.

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ANNEXE I MAJOR GLOBAL INSTRUMENTS RELATED TO INVASIVE ALIEN SPECIES

Instrument	Status	Relevant Provisions/Resolutions	Species / Ecosystems Covered	Vectors/ Pathways Covered
<p>1. Convention on Biological (Nairobi, 1992) http://www.biodiv.org</p> <p>Interim Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species</p> <p>Cartagena Protocol on to the CBD (Montreal, 2000)</p>	<p>Binding (1993) (1993) (Parties - 179)</p> <p>Non-binding guidance (2000)</p> <p>Date of adoption 29.01.2000</p>	<p>To prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species Art. 8(h).</p> <p>The safe transfer, handling and use of living modified organisms resulting from modern biotechnology that may have adverse effects on the and sustainable use of biological diversity (Art. 1)</p>	<p>All</p>	<p>All (no specific provisions)</p>
<p>2. United Nations Convention on the Law of the Sea (Montego Bay, 1982) http://www.un.org/Depts/los/losconv1.htm</p>	<p>Binding (1994) (Parties - 135)</p>	<p>To prevent, reduce and control pollution of the marine environment resulting... the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes. (Art. 196)</p>	<p>Marine environment</p>	<p>No Specific Provision</p>
<p>3. Convention on Wetlands of Wetlands of International Importance especially as Waterfowl Habitat (Ramsar, 1971) http://www.ramsar.org</p>	<p>Binding (1975) (Parties - 123)</p>	<p>COP7/Resolution VII.14 "Invasive Species and Wetlands" (No specific provisions in the Convention text)</p>	<p>Wetlands, and wetland species</p>	<p>No Specific Provision</p>
<p>4. Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979) http://www.wcmc.org.uk/cms/</p>	<p>01.11.1983 (Parties - 70)</p>	<p>To prevent, reduce or control factors that are endangering or are likely to further endanger Appendix 1 species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species. Art. III (4) (c)</p>	<p>All species and their habitats</p>	<p>No Specific Provision</p>

<p>5. Convention on the Law of the Non-Navigational Uses of International Watercourses (New York, 1997) http://www.un.org</p>	<p>Not in force</p>	<p>to prevent the introduction of species, alien or new, into an international watercourse, which may have effects detrimental to the ecosystem of the watercourse resulting in significant harm to other watercourse States. (Art. 22)</p>	<p>International watercourse marine and freshwaters</p>	<p>no specific provisions</p>
<p>6. International Plant Protection Convention (Rome, 1951, Revised in 1997) http://www.fao.org</p> <p>7. International Standards for Phytosanitary Measures: Principles of Plant Quarantine as Related to International Trade</p> <p>Guidelines for Pest Risk Analysis</p> <p>Code of Conduct for the Import and Release of Exotic Biological Control Agents</p> <p>Requirements for the Establishment of Pest Free Areas</p> <p>Glossary of Phytosanitary Terms</p> <p>Guidelines for Surveillance</p> <p>Export Certification System</p> <p>Determination of Pest Status</p> <p>Guidelines for Pest Eradication Programmes</p> <p>Requirements for the Establishment of Pest Free Places of Production and Pest Free Production Sites</p>	<p>Binding (1952) (Parties - 111) 1997 revision not in force.</p> <p>Standards recognized by WTO</p>	<p>Creates an international regime to prevent spread and introduction of plant and plant product pests premised through the use of sanitary and phytosanitary measures. (Relationship to Invasive Species being explored, 2000)</p>	<p>Quarantine pests of plants and plant products.</p>	<p>Trade in agricultural products</p>

<p>8. The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (Marrakech, 1995) http://www.wto.org/english/tratop_e/sps_e/spsagr.htm</p>	<p>01.01.1995 (Parties - 132)</p>	<p>Provides a uniform framework governing the adoption of sanitary and phytosanitary measures applied to protect human, animal or plant life or health.</p>	<p>Pests and diseases affecting human, plant and animal health</p>	<p>Trade in goods and products</p>
<p>9. International Health (Geneva, 1982, adopted by the 22nd World Health Assembly in 1969, amended by 26th World Health Assembly in 1973, and the 34th World Health Assembly in 1981) http://www.who.int</p>	<p>Under revision (expected completion: 2002)</p>	<p>Purpose is to ensure the maximum security against the international spread of diseases. Goals are to: (1) detect, reduce or eliminate sources from which infection spreads; (2) improve sanitation in and around ports and airports, and (3) prevent dissemination of vectors.</p>	<p>Diseases affecting human health. Specifically cholera, plaque and yellow fever</p>	<p>International traffic</p>
<p>10. Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens. (Resolution A.868 (29)1997, International Maritime Organization) http://www.imo.org</p>	<p>Non-binding. Binding instrument under preparation (completion expected 2002)</p>	<p>Provides guidance and strategies to minimize the risk of unwanted organisms and pathogens from ballast water and sediment discharge.</p>	<p>Marine and Coastal areas</p>	<p>Ballast Water through shipping</p>
<p>11. Code of Practice on the Introductions and Transfers of Marine Organisms (ICES/EIFAC 1994)</p>	<p>Non-binding</p>	<p>Recommends practices and procedures to diminish risks of detrimental effects from marine organism introduction and transfer, including those genetically modified. Also applicable to freshwater organisms. Requires ICES members to submit a prospectus to regulators, including a detailed analysis of potential environmental impacts to the aquatic ecosystem.</p>	<p>All aquatic ecosystems</p>	<p>Direct introductions, including for fisheries and aquaculture</p>
<p>12. Code of Conduct for Responsible Fisheries (FAO, 1995) http://www.fao.org/fi/agreem/codecond/ficonde.asp</p>	<p>Non-binding</p>	<p>Sets out principles and international standards for responsible fishing practices, including aquaculture, including: Pre-introduction discussion with neighbouring states when non-indigenous stocks are to be introduced into transboundary aquatic ecosystems.; Harmful effects of non-indigenous and genetically altered stocks to be minimized.</p>	<p>Aquatic ecosystems</p>	<p>Direct introductions, including for fisheries and aquaculture</p>

<p>13. Preventing the Introduction of Invasive Alien Species. Resolution A-32-9, International Civil Aviation Organization (ICAO) (1998). http://www.icao.int/icao/end/res/a32_9.htm</p>	<p>Non-binding</p>	<p>To reduce the risk of introducing, through civil air transportation, potentially invasive species to areas outside their natural range.</p>	<p>All species</p>	<p>Air transport</p>
<p>14. The Biological and Toxin Weapons Convention (signed in 1972, and entered into force in 1975) http://projects.sipri.se/cbw/docs/bw-btwc-mainpage.html</p>	<p>Binding</p>	<p>To prohibit the development, production and stockpiling of biological and toxin weapons, and destroy them for the protection of populations and the environment.</p>	<p>Microbial and other biological agents used as weapons</p>	<p>Various</p>

ANNEXE II

WORKING DEFINITIONS USED BY THE GLOBAL INVASIVE SPECIES PROGRAMME (GISP)

Alien species (synonyms: non-native, non-indigenous, foreign, exotic): a species, subspecies, or lower taxon introduced outside its normal past or present distribution; includes any part, gametes, seeds, eggs, or propagules of such species that might survive and subsequently reproduce.

Biosecurity: The management of risks posed by organisms to the economy, environment and people's health through exclusion, mitigation, adaptation, control, and eradication.

Casual alien species: Alien species that may flourish and even reproduce occasionally in an area, but which do not form self-replacing populations, and which rely on repeated introductions for their persistence (Richardson et al., 2000).

Containment: keeping the IAS within regional barriers.

Eradication: the extirpation of the entire population of an alien species in a managed area; eliminating the IAS completely.

Establishment: the process of a species in a new habitat successfully reproducing at a level sufficient to ensure continued survival without infusion of new genetic material from outside the system.

GMO/LMO: A genetically-modified organism/living modified organism is a species whose genetic makeup has been purposefully altered by human technology. When the resulting organism is sufficiently different from its nearest relative to be considered a “new species”, then it can be considered an alien species. These are addressed under Article 8(g) of the CBD.

Intentional introduction: the purposeful movement by humans of a species outside its natural range and dispersal potential (such introductions may be authorized or unauthorized) (IUCN, 2000) (c.f. unintentional introduction).

Introduction: the movement, by human agency, of a species, subspecies, or lower taxon (including any part, gametes, seeds, eggs, or propagule that might survive and subsequently reproduce) outside its natural range (past or present). This movement can be either within a country or between countries (IUCN, 2000).

Invasive alien species: an alien species whose establishment and spread threaten ecosystems, habitats or species with economic or environmental harm. These are addressed under Article 8(h) of the CBD.

Native species (synonym: indigenous species): a species, subspecies, or lower taxon living within its natural range (past or present), including the area which it can reach and occupy using its own legs, wings, wind/water-borne or other dispersal systems, even if it is seldom found there.

Naturalized species: alien species that reproduce consistently (cf. casual alien species) and sustain populations over more than one life cycle without direct intervention by humans (or in spite of human intervention); they often reproduce freely, and do not necessarily invade natural, semi-natural or human-made ecosystems.

Pest: “Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products” (IPPC).

Suppression: reducing population levels of the IAS to an acceptable threshold.

Unintentional introduction: a species utilising unwitting humans or human delivery systems as vectors to disperse and become established outside its natural range (IUCN, 2000).

Weeds (synonyms: plant pests, harmful species; problem plants): Plants (not necessarily alien) that grow in sites where they are not wanted and have detectable negative economic or environmental effects; alien weeds are invasive alien species.