

Module 2

GOALS AND PRINCIPLES OF IAS MANAGEMENT

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GOALS AND PRINCIPLES OF IAS MANAGEMENT

Objectives of this module:

1. Outline the goals and basic principles of IAS management
 2. Describe the steps in IAS management
 3. Indicate the points at which management action can be applied
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2.1 Management goals

This section gives an introduction to the principles of managing IAS. It is important that when managing IAS, the reasons why are well understood, so as to achieve effective results. Too often attention is focussed on the IAS itself, and not on the desired outcomes. Managing IAS is about achieving desired outcomes, which include:

The specific goals of management actions will vary considerably, depending on their design and purpose. However, the following over-arching management goals relate to systems aimed at controlling the introduction and spread of IAS:

- Minimise the risk of alien species introduction
- Minimise the ability of introduced species to establish and/or spread in new environments
- Minimise the impacts to ecosystems, economies or social welfare associated with any established IAS
- Ensure sustainability of practical and effective management practices
- Conserve/protect living resources and associated industries.
- Conserve indigenous biodiversity
- Achieve international cooperation and standardization of management practices



The ultimate goal of IAS management is to minimise threats to biodiversity, human health & welfare and economies

2.2 General management principles

There are a number of general management principles which underlie the approach taken to IAS management, and help to guide and prioritise management decisions. The following principles have been adapted from the 'Guiding principles for the prevention and mitigation of impacts of alien species that threaten ecosystems,

habitats or species' that were developed under the auspices of the Convention on Biological Diversity.

2.2.1 The precautionary approach

The precautionary approach states that “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” (Rio Declaration on Environment and Development, 1992).

Given the major uncertainties in predicting invasiveness, the difficulties in managing introduced species, and the complexity of regulating many of the pathways of unintentional introductions, the precautionary approach should be applied to:

- a) Decisions to intentionally introduce any species, but especially those known to be invasive elsewhere;
- b) Decisions on which management measures to impose on pathways of unintentional introductions;
- c) Decisions on eradication, containment and control measures being applied to alien species that have already become established.

In all cases, lack of scientific certainty about the various implications of an invasion should not be used as a reason for postponing or failing to take appropriate action.

2.2.2 Hierarchical approach



Prevention is better than cure!

Management measures may be applied at various points in the process of invasion, starting from prevention, to early detection and rapid response, to eradication, containment and long-term control. The further along in the process of invasion that the measure is applied, the more costly and less effective it is. In other words, although prevention measures may be costly, an analysis of the long-term costs and benefits (environmental, economic and social) will invariably show that they are less than the losses and costs which are incurred if the alien species are allowed to establish, and then require ongoing control. Any examination of benefits and costs should be done on a long-term basis. Applied management techniques should be safe to humans, the environment and natural resources, and should be ethically acceptable to the stakeholders in the area. This is commonly known as the hierarchical approach to management.

Prevention is therefore the most cost-effective and environmentally desirable option, and should be given priority in any IAS management strategy.

2.2.3 The ecosystem approach

This focus on structure, processes, functions and interactions is consistent with the definition of “ecosystem” provided in Article 2 of the Convention on Biological Diversity: “Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies, and is focused on many levels of biological organisation. The aim of this approach is to protect the essential structure, processes, functions and interactions among organisms and their environment. It also recognises that humans, with their cultural diversity, are an integral component of many ecosystems.

2.2.4 Sharing information

The importance and urgency of improving our capacity to address IAS threats, locally and globally, means we must use the best information available in designing and undertaking IAS management. IAS are cross-boundary problems by nature, and sharing information is valuable at national, regional and international levels.

Shared information is needed on IAS themselves, as well as on best practices for their management. This should include:

- Development of inventories and databases including species (native & introduced) distribution data
- Incident lists and case studies
- Potential threats to neighbouring countries
- Information on taxonomy, ecology and genetics of IAS
- Prevention and control methods where available
- National and regional guidelines
- National requirements/regulations regarding intentional introductions, such as imported species
- National requirements/regulations regarding unintentional vectors, such as ballast water controls



Sharing information on IAS builds cooperation and makes this global problem more manageable for everyone

2.2.5 User pays principle

This principle applies to requests for permits to introduce a new species. The user, or ‘responsible party,’ is the entity which seeks to conduct the activity which may result in an IAS introduction, and who will benefit from it. Therefore any costs associated with the process, and the burden of proof for demonstrating compliance with regulations should fall upon the user.

Activity 2.1

PART A

Consider a farmer wanting to import a new species of pasture grass. Define who (individuals, companies, governmental departments, organisations or sectors of society) could benefit from the proposed introduction, who would lose if the species became invasive, and who would have to pay for managing the problem if it occurred? The list need not be exhaustive. Estimate the financial costs that are carried by each group, using a scale of 1 (low costs) to 10 (very high costs). Now answer this question: is it fair that an importer of potentially invasive species carries no costs associated with determining the safety of the proposed action?

PART B

Now, let us assume the grass is determined to be safe, non-invasive and good for pasture improvement. Great, we have a species of economic value that is safe to bring into the country. Everyone is happy, correct? But answer this question before you finally decide: after the first farmer had paid a lot of money to get approval, is it fair that all his neighbours can then import without paying the assessment costs? Think creatively to find the fairest, most equitable solution to resolve this dilemma?

Permits for intentional introductions should involve a fee structure that not only covers administration costs of management, including risk analysis, but which also addresses the issue of liability, should the species in question become invasive. There is also a need to introduce financial penalties for non-compliance with regulatory requirements in the case of both intentional and unintentional introductions. Furthermore, the risks associated with operating various known pathways (such as cargo handling or international flights) should be assessed, costed and paid-for by the users of the pathways. For example, airport departure taxes are a way of making those who travel pay for the procedures of screening for propagules at customs checks.



Parties wanting to introduce a new species must pay for the process of certification and provide security in case they are liable for damages

2.2.6 Cross-sectoral approach to management

IAS management is multidisciplinary by nature. Stakeholders within countries who should be involved in the planning and implementation of management strategies include:

- Environmental administrations
- Quarantine, border and port authorities
- Health & safety administrations
- Transport administrations
- Agriculture, forestry and fisheries managers

- Trade administrations
- Scientific institutions
- Non-governmental organisations
- Local communities

Coordination across all these sectors is one of the biggest challenges, and most important aspects of efficient IAS management. However, given the transboundary nature of IAS, to be effective, there must also be close co-operation and coordination with neighbouring countries and trading partners.



Coordinating responses to IAS across a range of stakeholders and relevant authorities is a key ingredient to successful management

2.3 Application of Management Tools

As described earlier, there is a hierarchy of interventions which can be used in managing invasive species. These interventions tend to be applied at different points in the process of IAS introduction and/or invasion. Preventative tools, for example, focus on all activities that lead up to a potentially invasive species arriving at, and crossing, a border. Other tools focus on getting rid of or controlling a species once it has breached that border.

The concept of a border is most often applied to a national boundary (country border). However, it is just as relevant to other boundaries within a country, such as between states or provinces, "pest free zones" within a country or ecological boundaries (e.g. an island, national park, etc.). For instance, although an invasive plant may be widespread in an area, efforts may be focussed on keeping a specific national park free of it.

2.3.1 Pre-Border

Pre-border interventions are intended to stop potentially invasive species before they leave their native habitats or before they are introduced (either intentionally or unintentionally). Pre-border management relies on working in close cooperation with trading partners, such that appropriate actions can be taken early in the process. For example, in the case of proposed intentional introductions, environmental impact assessments (EIAs) may be required before a permit is issued for import. Unintentional introductions via contaminated cargo can be prevented or reduced by enforcing controls on vessels before they leave port (e.g. rodent-free certificates for boats), or fumigating inside aircrafts before they land and requiring various treatments to destroy propagules in packaging. These latter procedures require liaison with shipping/transport companies.



Stopping species before they leave home is better than trying to catch them at the door

2.3.2 Border

Border control is the last line of defence for preventing incursions. This involves stopping potentially invasive species at the point of entry into a country or territory. Authorities are responsible for monitoring, measuring and enforcing compliance. Any inspections, quarantine or even treatment of species may be based on risk assessment practices at this point. Areas of IAS management where this applies include:

Vector Type	Associated Border Activity
Intentional Introduction:	
Agriculture or pet trade	Checks on appropriate permits, detailed inspections, quarantining of animals
Unintentional Introductions:	
Ballast water	Compliance monitoring, inspections, water sampling, enforcement controls
Tourism	Customs inspections of luggage, public announcements, enforcement controls, mitigation procedures (such as spraying insecticide inside the aircraft cabin)

These measures are all aimed at stopping unwanted species from getting to a new place, i.e. are aimed at preventing incursions. The next module (Module 3) goes into the theory and practice of prevention in depth.

2.3.3 Post-Border

2.3.3.1 Early detection and rapid response

The aim of early detection and rapid response (ED & RR) measures is to prevent the establishment and/or spread of potential IAS which have not been caught by the pre-border and border controls, i.e. to prevent them from developing into full-blown bio-invasions.

ED & RR are important because no prevention system in the world can ever be 100% effective all the time. Sooner or later, any border control will fail to intercept a species hitchhiking or being smuggled. Early detection is also crucial in detecting the development of unforeseen invasive characteristics where a species was mistakenly judged to be "harmless" and cleared for introduction. A quick response is also needed when a species has been deliberately introduced for use in a contained situation (zoo, laboratory, etc) and then "escapes" into the wild. Early detection, coupled to rapid response is sometimes also called "preventative action", because it is aimed at preventing establishment and/or spread of species - however, it is a second line of defence only – and it should never be relied on *instead* of prevention of introduction.

Regular surveillance monitoring is the most important tool for early detection, and should be focussed primarily around high-risk entry points. Contingency plans should then be put in place **before introductions occur** – especially for high-risk species – to ensure that the authorities know how to respond and have the capacity to mount a rapid response when an invasive species is detected. Module 4 deals with ED & RR.

2.3.3.2 Eradication

When an IAS has invaded, a decision has to be made as to whether to eradicate or control it. Eradication is the removal of every single individual. This can be time-consuming and expensive, but it means that the impacts of the targeted species are eliminated. Eradication should only be attempted when likely to succeed, and when appropriate prevention mechanisms have been put in place to prevent the re-introduction of the same organism. Module 6 goes into the philosophy and techniques of eradication in detail.

2.3.3.3 Control & Mitigation

In situations where eradication is not feasible, the IAS population can be controlled and its impacts managed. Long-term control programmes can have many benefits but they are expensive and the IAS continues to have an impact, albeit reduced, upon biodiversity and other social or economic values. Module 7 describes tools and techniques for controlling and mitigation of IAS.



Once a species had gotten beyond the border, the best available management options are, in order of preference, early detection and rapid response, eradication or control and mitigation

2.4 Creating a supporting environment for effective IAS management

The management of invasive species requires coordination across a wide range of sectors. Moreover, although in the longer term there will be substantial benefits, it will generally require a re-allocation of resources. There may also be public resistance to the removal, or restriction of certain species. Therefore, if a country is to achieve effective management of invasive species, it is imperative that the government creates a supporting environment including appropriate institutional and legal frameworks, technical capacity and public awareness.

2.4.1 Legal & Institutional Issues

In the national context, legislative frameworks are necessary to give structure to principles and standards, and outline procedures for attaining policy objectives. Such frameworks not only help restrict and enforce management actions, but also help promote desired goals. It is important to understand how legal systems underpin mandates for action addressing IAS. Module 9 describes the need and best practices for creating a national IAS management strategy.

Another important function of national legislation is to establish the institutional mechanisms needed for appropriate implementation of regulations, ensuring compliance, monitoring success and failure, and promoting policies. Institutions are therefore the key to overseeing implementation and compliance, as well as to generating needed reforms.



An integrated and comprehensive national strategy for dealing with IAS requires a foundation of legislation and an institutional framework

2.4.2 Promoting Best Practice Management

Availability of best-practice management tools relies on the sharing of information, successes and failures by parties managing IAS at all levels. Lessons can therefore be learned on most appropriate management options and designs. There are many resources that advice on internationally accepted standards and guidelines for best practice management. The GISP Toolkit is one such guide to general IAS management strategies.

2.4.3 Raising awareness

In order to address the problems associated with IAS, a greater awareness of their impacts and the factors that contribute to biological invasions is needed. Equally important is the awareness that it is possible to 'fight back', and that the IAS can be addressed in many ways. In the long run, a heightened awareness will help modify values, beliefs and behaviour and will influence decision-making and facilitate addressing the problem. All sectors of society, from policy makers and institutions to schools and the general public, must be included when raising awareness about IAS. 'Raising awareness and support' must be an intrinsic part of any specific plan as well as overall strategy to address IAS issues. Module 10 deals with this in detail.

2.5 Key points of this module

- The ultimate goal of IAS management is to minimise threats to biodiversity, human health & welfare and economies
- Prevention is better than cure! Stopping species before they become invasive is a lot cheaper and safer than trying to deal with a full-blown invasion.
- Sharing information on IAS builds cooperation and makes this global problem more manageable for everyone
- Parties wanting to introduce a new species must pay for the process of certification and provide security in case they are liable for damages
- Coordinating responses to IAS across a range of stakeholders and relevant authorities is a key ingredient to successful management

- Stopping species before they leave home is better than trying to catch them at the door, which in turn is better than trying to deal with them once they are through
- Once a species had gotten beyond the border, the best available management options are, in order of preference, early detection and rapid response, eradication or control and mitigation
- An integrated and comprehensive national strategy for dealing with IAS requires a foundation of legislation and an institutional framework