

THE USE OF ECONOMIC MEASURES IN NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS:

**A Review of Experiences, Lessons Learned
and Ways Forward**

Lucy Emerton, October 2001



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List of Acronyms

BPSP	Biodiversity Planning Support Programme
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
COP	Conference of the Parties
GBF	Global Biodiversity Forum
GEF	Global Environment Facility
IUCN	The World Conservation Union
NBSAP	National Biodiversity Strategy and Action Plan
R-GBF	Regional Session of the Global Biodiversity Forum
SBSTTA	Subsidiary Body on Technological, Technical and Scientific Advice
SDC	Swiss Agency for Development and Co-operation
UNDP	United Nations Environment Programme
UNEP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

1.1. The Biodiversity Planning Support Programme

This document reports on a project reviewing the use of economic measures in National Biodiversity Strategies and Action Plans, carried out by IUCN — The World Conservation Union between September 2000 and September 2001. This project was funded by the GEF as part of the Biodiversity Planning Support Programme (BPSP), with co-finance provided by the Swiss Agency for Development and Co-operation (SDC) under the project Supporting Global Action to Conserve Biodiversity and Sustainably Use Biological Resources: Phase III.

The BPSP was co-ordinated by the United Nations Environment Programme (UNEP) and United Nations Development Programme (UNDP), and ran between May 1999 and December 2001. It had a mandate to provide technical assistance to national biodiversity planners as they develop and implement their National Biodiversity Strategies and Action Plans (NBSAPs).

The BPSP included various components, dealing with: information gathering and dissemination, guidelines and best-practice experience, and regional exchange and thematic workshops. These were implemented by a network of regional and global partners. The exchange of information and materials on biodiversity planning was facilitated by the BPSP regional information networks for Arab States, Caribbean, Latin America, North Eastern & East Central Asia, South & South East Asia, Eastern & Southern Africa & Indian Ocean, West & Central Africa, Pacific Island Countries, Central & Eastern Europe & NIS.

For the purpose of preparing thematic guidelines and best-practice experience, a series of reviews were carried out under the BPSP, dealing with key aspects of biodiversity planning related to national implementation of the Convention on Biological Diversity. These included:

- Integration of biodiversity into the national **agriculture sector** (carried out by ELCI, Environment Liaison Centre International)
- Integration of biodiversity into the national **fisheries sector** (carried out by the World Fisheries Trust)
- Integration of biodiversity into the national **forestry sector** (carried out by CIFOR, the Centre for International Forestry Research)
- Integration of biodiversity into the national **tourism sector** (carried out by PICE, the Program of International Consultancy on Ecotourism)
- Improved integration of biodiversity into **environmental impact assessment** procedures (carried out by Komex Clarke Bond Ltd)
- Use of **economic measures** in national biodiversity strategy and action plans (carried out by IUCN, The World Conservation Union)
- Improved **financial planning** in NBSAP preparation and implementation (carried out by TNC, The Nature Conservancy)
- Harmonisation of CBD implementation with other **biodiversity-related conventions** (carried out by FIELD, the Foundation for International Environmental Law and Development)

1.2. The economics thematic review

The rationale behind carrying out a review of the use of economic measures¹ in NBSAPs is that economic concerns are of central importance to biodiversity conservation. Economic forces underlie and explain much biodiversity degradation and loss, and economic instruments provide a useful set of tools for strengthening biodiversity conservation, sustainable use and equitable benefit sharing. If NBSAPs are to be effective they must be justifiable in economic terms. They also need to make efforts both to overcome the economic causes of biodiversity loss and to ensure that economic incentives are set in place which encourage biodiversity conservation. Equally, the goals and strategies specified in NBSAPs have to be acceptable to other “economic” sectors, decision-makers and planners, if they are to integrate biodiversity concerns into their own strategies, policies and plans.

Documenting experiences and lessons learned in the use of economic measures in NBSAPs, and providing guidance on best practices and methods for this, can thus make an important contribution to biodiversity conservation planning and management practice.

In line with other BPSp thematic reviews, the economics review consisted of four components:

- A **review of the existing global literature** for the theme, focussing on resources which are easily available at minimum or no cost. This annotated literature review, covering some 300 published references and 40 websites dealing with the economics of biodiversity, was produced as a separate document in March 2001, and can be downloaded from the BPSp website (<http://www.undp.org/bpsp/>). This component of the review provides much of the information upon which Chapters 3 and 8 of this document are based;
- **Case studies** to compile real-world experiences and best practices in the undertaking of the theme at regional, national or project level. Under the economics review, five case studies were carried out on the use of economic measures in NBSAPs in: Zimbabwe and Southern Africa, Uganda and Eastern Africa, Pakistan and South Asia, Vietnam and South East Asia, and Ecuador and the Andean Region. Economics technical support, training and awareness workshops were also provided for NBSAP teams as part of these case studies. Electronic copies of case studies in their original form are available from the review co-ordinator by email, Lucy.Emerton@iucnp.org. This component of the review provides much of the information upon which Chapter 4 of this document is based;
- A **workshop** to review the case studies and to share experiences among economists and biodiversity planners. This workshop was held June 2001 in Ecuador by IUCN, in collaboration with the Sociedad Peruana de Derecho Ambiental, Association for Biodiversity Information, Kew Botanical Gardens, UNEP and World Bank Institute. Over 50 participants attended the workshop, including both economists and biodiversity planners from Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, Egypt, Guatemala, Kenya, Mexico, Oman, Panama, Pakistan, Palestine, Paraguay, Peru, Uganda, Uruguay, Venezuela, Vietnam and Zimbabwe. Materials presented at the workshop, and its proceedings, are available from the IUCN South America website (<http://www.sur.iucn.org/>). This component of the review provides much of the information upon which Chapter 5 of this document is based;
- A **final report**, synthesising all of the above (this document).

¹ For the purposes of this review, “economic measures” are defined in line with the focus of the Convention on Biological Diversity: as the use of economic valuation and economic incentives. This document does not include consideration of financial resources for biodiversity, a third economic measure specified in the CBD (Articles 20 and 21), as they are the subject of a separate thematic review. It also does not deal in detail with the integration of biodiversity into the strategies, policies and plans of other (economic) sectors, mentioned in Article 6b of the CBD, as this is the focus of a number of other thematic reviews being carried out under the BPSp.

1.3. Documenting experiences, lessons learned and ways forward

This document brings together the component activities of the economics review — the review of literature on methodologies and experiences of using economics for biodiversity, the national and regional case studies on the integration of economics into NBSAPs, and the deliberations and recommendations of the global workshop on the use of economics for biodiversity planning. It summarises and synthesises this information in order to provide guidance on experiences, lessons learned and ways forward in the use of economic measures in National Biodiversity Strategies and Action Plans, illustrated with case studies and examples from different countries.

To these ends, this document contains sections dealing with the following topics and answering the following questions:

- 1. The background to the economics review:** Why and how was the review carried out?
- 2. Links between economics and biodiversity:** Why and how can economic measures be used to strengthen biodiversity conservation, and to support the objectives of the Convention on Biological Diversity?
- 3. Guidance on the use of economic measures for biodiversity planning:** How far do existing methods, tools and applications of biodiversity economics provide useful information for biodiversity planners?
- 4. Experiences, lessons learned and best practices in the use of economic measures in National Biodiversity Strategies and Action Plans:** As different countries have set in place national frameworks for biodiversity conservation, how have they actually applied economics techniques and tools in practice, and what can we learn from this?
- 5. Ways forward in NBSAP planning:** What are the opportunities and requirements for better using economic measures in support of biodiversity planning, especially in the context of the NBSAPs process?
- 6. Ways forward in NBSAP implementation:** What are the opportunities and requirements for better using economic measures in support of the implementation of biodiversity conservation, especially in the context of the NBSAP process?
- 7. The design of incentive measures:** A matrix of elements in the design and compilation of economic incentives for biodiversity
- 8. References:** List of key references and internet resources on the economics of biodiversity

2. Links Between Economics and Biodiversity

For a long time economists and conservationists found it difficult to speak the same language, let alone to work together towards a common purpose. Over recent years this situation has begun to change. Planners and policy-makers in both biodiversity agencies and economic sectors have begun to realise that there is actually a great deal of mutual benefit to be gained from co-operating with each other. Biodiversity conservation goals have come to be recognised as an integral component of economic growth strategies, and economic approaches and tools are increasingly being used in support of biodiversity conservation.

This chapter describes how economics provides a useful set of methods and measures for biodiversity conservation. Perhaps most importantly, unless it makes demonstrable economic and financial sense for people to conserve biodiversity, it is unlikely that individuals, households, industries, companies or governments will take action to do so. People will continue to degrade and deplete biodiversity in the course of their activities because they feel that it is more profitable and economically desirable to do so. This is reflected in many of the provisions of the Convention of Biological Diversity, and in the Biodiversity Strategies and Action Plans prepared in response to it — economics tools are beginning to form a progressively more important part of biodiversity planning and management processes.

2.1. Economics in the Convention on Biological Diversity

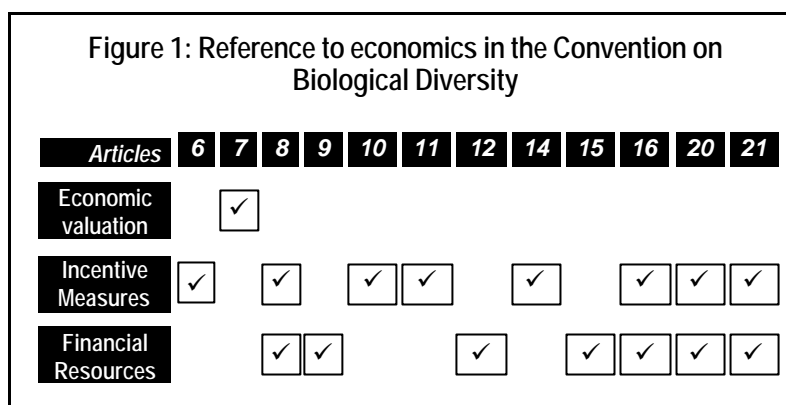
The linkages, and interdependence, between biodiversity and economics are well-recognised in the Convention on Biodiversity (CBD). Each of the main objectives of the CBD — conservation, sustainable use and equitable benefit sharing — require the use of economic measures for its implementation.

Four Articles of the CBD, in particular, make specific demands that Parties should use economic measures in support of biodiversity, including:

- **Article 7**, which calls on Parties to “**Identify** components of biological diversity important for its conservation and sustainable use” and to “**Monitor** ... components of biological diversity”, relating these requirements to the indicative list of categories set down in Annex I. In turn, these Annex 1 categories include ecosystems, habitats, species, communities, genomes and genes of **economic importance and value**.
- **Article 11**, which requires Parties to “adopt **economically** and socially sound measures that act as **incentives** for the conservation and sustainable use of components of biological diversity”.
- **Article 20**, which stresses the need to generate and allocate sufficient **funding** to biodiversity. This includes all Parties providing “**financial support and incentives** in respect of those national activities which are intended to achieve the objectives of this Convention”, and developed country Parties generating “**new and additional financial resources** to enable developing country Parties to meet the agreed full incremental costs to them of implementing measures which fulfil the obligations of this Convention”.
- **Article 21** establishes “a mechanism for the provision of **financial resources** to developing country Parties for purposes of this Convention” (currently the GEF) and calls for Parties to “consider strengthening existing financial institutions to provide **financial resources** for the conservation and sustainable use of biological diversity”.

The three economic measures specified in these Articles — valuation, incentive measures and financial resources — are thus seen as being key to biodiversity conservation, and repeated reference to their use is also made throughout other parts of the CBD (Figure 1).

Reflecting the importance accorded to economic measures in the CBD, valuation, incentives and financial resources have been a recurrent topic of discussion since the first meetings of the Conference of the Parties (COP) and the Subsidiary Body on Technological, Technical and Scientific Advice (SBSTTA). The



The deliberations of SBSTTA and COP have resulted in a series of recommendations, decisions and calls for action on the use of economic measures for biodiversity conservation (Figure 2).

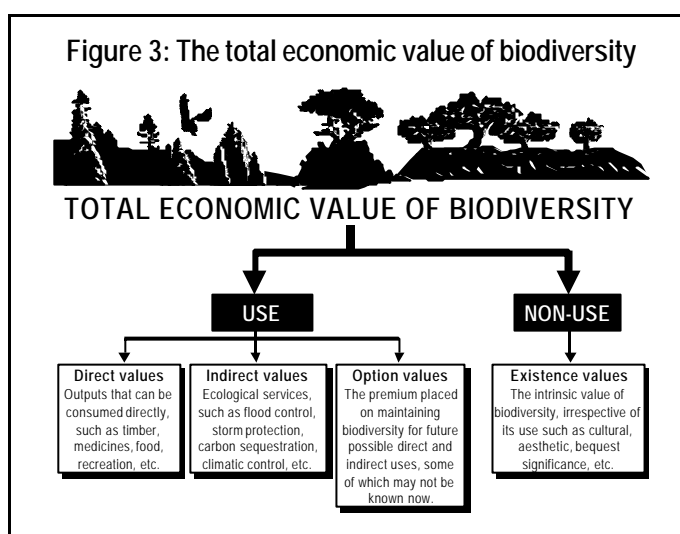
Figure 2: Decisions of the Conference of the Parties relating to economic measures

Decision	Valuation	Incentives	Finance
I/2: Financial resources and mechanism			
II/6: Financial resources and mechanism			
II/7: Consideration of Articles 6 and 8			
II/8: Preliminary consideration of components of biological diversity particularly under threat			
II/11: Access to genetic resources			
III/5: Additional guidance to the financial mechanism			
III/6: Additional financial resources			
III/9: Implementation of Articles 6 and 8			
III/10: Identification, monitoring and assessment			
III/11: Conservation and sustainable use of agricultural biological diversity			
III/12: Programme of work for terrestrial biological diversity: forest biological diversity			
III/14: Implementation of Article 8j			
III/15: Access to genetic resources			
III/18: Incentive measures			
IV/4: Status and trends of the biological diversity of inland water ecosystems			
IV/5: Conservation and sustainable use of marine biological diversity			
IV/6: Agricultural biological diversity			
IV/7: Forest biological diversity			
IV/8: Access and benefit sharing			
IV/9: Implementation of Article 8j and related provisions			
IV/10: Measures for implementing the CBD			
IV/12: Additional financial resources			
V/4: Progress report on the implementation of the programme of work for forest biological diversity			
V/6: Ecosystem approach			
V/8: Alien species that threaten ecosystems, habitats or species			
V/9: Global Taxonomy Initiative			
V/11: Additional financial resources			
V/15: Incentive measures			
V/16: Article 8j and related provisions			
V/24: Sustainable use as a cross-cutting issue			
V/25: Biological diversity and tourism			

2.2. Economic valuation of biodiversity

Economic valuation, implied in Article 7 of the CBD, is a key step in biodiversity assessment and planning. Economists and decision-makers have traditionally seen the value of biological resources in terms of the direct uses they support – the raw materials provided for human production and consumption (for example the timber value of natural forests or the fisheries value of coastal and marine ecosystems). This perception of biodiversity value is not only incomplete, but also leads to the danger that land and resource management systems will focus only on the commercial-level extraction of resources, often at the expense of other, less tangible, values. Because it under-values biodiversity, this definition also means that conservation is often difficult to justify in the face of other, often unsustainable, land and resource uses which appear to yield greater and more immediate returns.

Wider definitions which encompass the total economic value of biodiversity (Figure 3) have become increasingly important over recent years. Total economic value includes consideration of the broader benefits associated with biodiversity beyond direct, commercial uses, including non-marketed values, ecological functions and non-use benefits. As well as presenting a more complete picture of the economic importance of biodiversity, it clearly demonstrates the high and wide-ranging economic costs associated with the loss or degradation of biodiversity and its components, which extend far beyond the loss of direct use values.



Over the last decades a range of economic tools have been developed or refined with which to quantify the total economic value of biodiversity, and to express it in monetary terms (Box 1²). Increasingly, valuation tools are being used to justify biodiversity as a rational land and resource use, to point to ways of sustainably maximising and capturing its benefits, and to analyse better the economic impacts of biodiversity conservation and loss on different groups and sectors. Calculating economic values underlines the fact that biological resources and their diversity constitute far more than a static biological reserve. Biodiversity forms a stock of natural capital, which if managed sustainably can yield, in perpetuity, a wide range of direct and indirect economic benefits to human populations.

² Two other approaches to environmental valuation, not included in Box 1, may have some application to biodiversity. They however require such high levels of data and analysis that they are in fact rarely used in practice. This, and their relatively low relevance to developing countries, means that they have only limited suitability to biodiversity planning. The human capital approach to valuation sees people as units of economic capital, and their earnings as a return on investment. It focuses on the impacts of biodiversity degradation on human health, and the effects this has on individuals' and society's productive potential. By establishing a dose-response relationship between biodiversity loss and decreased human productivity it adds up the loss of earnings, and other (such as medical) costs in order to calculate costs associated with the loss of biodiversity. Hedonic methods look at the differentials in property prices and wages between locations, and isolates the proportion of this difference that can be ascribed to the quality and provision of biodiversity goods and services. It assumes that people are willing to pay higher prices for land and property, and accept lower wages and salaries, as a premium for living or working in an area which contains particular biodiversity.

Box 1: Commonly-used tools for valuing biodiversity, and examples of their application

- **Market prices:** The simplest and most straightforward way of valuing biodiversity goods and services is to look at their market prices — what they cost to buy or what they are worth to sell. Although this method can be useful, in many cases biodiversity has no market — or is subject to prices that are highly distorted. In these cases alternative valuation methods such as those listed below must be used.

Market prices were used to value the goods yielded by mangrove ecosystems in the Indus River Delta, Pakistan. Fuelwood and fodder use rates by adjacent villagers were assessed and quantified, and values were ascribed according to prevailing commodity prices in local markets (see Hecht 1999).

- **Effects on production:** Other economic processes often rely on biological resources as inputs, or on the essential life support provided by biodiversity services. Where they have a market, it is possible to look at the contribution of biodiversity to the output or income of these wider production and consumption opportunities in order to assess its value.

Soil erosion resulting from loss of natural vegetation in Eritrea was valued using effect on production techniques. Annual rates of soil loss resulting from deforestation and bush clearance were calculated, and related to decline in crop and livestock productivity and resulting income foregone (see Government of Eritrea 1998).

- **Replacement costs:** Even where biodiversity goods and services have no market themselves, they often have alternatives or substitutes that can be bought and sold. These replacement costs can be used as a proxy for biodiversity values, although usually represent only partial estimates, or under-estimates.

Venezuela's Canaima National Park safeguards a catchment feeding hydropower developments. The value of forest watershed services was calculated by looking at the cost of replacing hydroelectricity with petrol-based power generation. Such additional expenditure represents a minimum estimate of the value of the forest's catchment protection services for hydropower (see McNeely 1989).

- **Damage costs avoided:** The reduction or loss of biodiversity goods and services frequently incurs costs in terms of damage to, or reduction of, other economic activities. These damage costs avoided can be taken to represent the economic losses foregone by conserving biodiversity.

The Anolis lizard plays an important part in pest control for export crops in the Antilles because it feeds on insects. The market price of lost agricultural output to pests in the absence of services provided by the Anolis lizard was calculated in order to assess its value in terms of damage costs avoided (see Narain and Fisher 1994).

- **Mitigative or avertive expenditures:** It is almost always necessary to take action to mitigate or avert the negative effects of biodiversity loss, so as to avoid economic damage. These mitigative or avertive costs can be used as indicators of the value of conserving biodiversity in terms of expenditures avoided.

Coastal marshes and mangroves play an important role in shoreline stabilisation, erosion control, flood and storm protection on Mahé Island in the Seychelles. The value associated with these functions was calculated by applying a preventive expenditure approach. In the absence of wetlands services it would be necessary to construct groynes and flood barriers to offset or mitigate coastal erosion and damage to infrastructure, the cost of which was used as a proxy for the value of coastal marsh and mangrove services (see Emerton 1997).

- **Travel costs:** Biodiversity typically holds a high value as a recreational resource or destination. Although in many cases no charge is made to view or enjoy natural ecosystems and species, people still spend time and money to reach biodiversity areas. This spending — such as on transport, food, equipment, accommodation, time, etc. — can be calculated, and a demand function constructed relating visitation rates to expenditures made. These travel costs reflect the value that people place on leisure, recreational or tourism aspects of biodiversity.

The travel cost method was applied to value Dhaka Zoological Garden in Bangladesh. This was done by administering a questionnaire to visitors which collected data on origin, distance travelled, income and expenses. Several demand curves were constructed using regression analysis to describe the relationship between travel costs and number of visits, yielding information on willingness to pay per visitor (see Hecht 1999).

- **Contingent valuation:** Even where biodiversity has no market price, and no close replacements or substitutes, it frequently has a high value to people. Contingent valuation techniques infer the value that people place on biodiversity goods and services by asking them their willingness to pay for them (or willingness to accept compensation for their loss) under the hypothetical scenario that they would be available for purchase. Contingent valuation techniques are one of the few methods that can be used to assess the option and existence values associated with biodiversity.

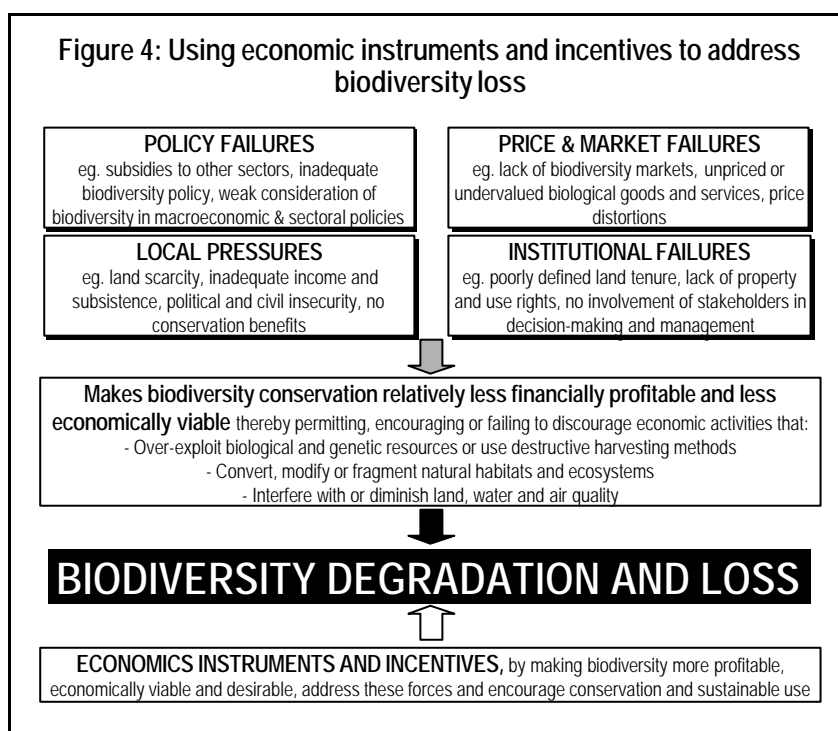
Contingent valuation was used to estimate the value of Kenya's elephants. A survey was administered to visitors to major National Parks and lodges asking such questions as "Would you be willing to pay \$100 (or more, or less) to contribute towards elephant conservation?" and "How much would the cost of your safari have to be reduced by if elephant populations decreased by a half?". Tourist consumer surplus accruing from viewing elephants was thus calculated (see Brown and Henry 1989).

2.3. Economic incentives for biodiversity

Setting in place economic incentives provides an important source of support and encouragement for biodiversity conservation, and is required in Articles 11, 20 and elsewhere in the CBD. Within the context of the Convention, an incentive is defined as “A *specific inducement designed and implemented to influence government bodies, business, non-governmental organisations, or local people to conserve biological diversity or to use its components in a sustainable manner. Incentive measures usually take the form of a new policy, law or economic or social programme.*” (UNEP/CBD/COP/3/24).

Because many of the benefits associated with biodiversity are undervalued they also tend to be ignored or under-emphasised by economic planners, policy-makers and managers. As a result, markets, prices, policies and institutions are frequently distorted in that they fail to take account of the full value of biodiversity (or the full costs associated with biodiversity loss) when they allocate goods and services. This results in a situation where biodiversity is under-priced, over-consumed and under-conserved because it appears to be a free or less economically desirable good that can be mined, converted, depleted or otherwise degraded at no cost, and whose conservation yields few economic or financial benefits.

It becomes more profitable and economically desirable for consumers and producers to degrade biodiversity than to conserve it in the course of their economic activities. In turn, direct causes of biodiversity loss as over-exploitation, destructive harvesting practices and the conversion and modification of natural habitats are permitted, or even encouraged, to take place because of underlying distortions and failures in the ways in which prices, markets and policies operate (Figure 4). Such distortions and failures present economic disincentives to biodiversity conservation because they make these degrading activities more profitable, or economically desirable.



The use of economic incentive measures attempt to overcome these direct and underlying causes of biodiversity loss. Economic incentives include instruments such as property rights, taxes, subsidies, charges, fees, market establishment, performance bonds and deposit systems (Box 2). Although such economic instruments have long been used in other sectors of national economies to achieve development goals, it has only recently been recognised that they also have a broad range of applications to biodiversity conservation. Economic incentives aim to change people’s behaviour by making sure that they take into account the real value of biodiversity and the broad costs associated with its loss when they make decisions, and thus encourage people to conserve biodiversity in the course of their economic activities.

Box 2: Broad categories of economic instruments for biodiversity conservation, and examples of their application

- **Property rights:** deal with the fact that market failure is due in part to the absence of well-defined, secure and transferable rights over land and biological resources. By establishing property rights biodiversity markets and scarcity prices should emerge, and permit the users and owners of biological resources to benefit from conservation or be forced to bear the on-site implications of degradation.

In one Marine Protected Area in St. Lucia, communities have been granted the right to manage an area that is owned by the state. Fees raised are placed in a separate government fund, which makes quarterly payments directly to the community institution for the management of the protected area (Geoghegan 1996). Since the late 1970s efforts have also been made to grant forest property rights to communities living in the hills of Nepal, where local user groups are legally assigned use and access rights over resources. Under this mechanism the direct users of forests write a management plan and rules. On approval of the plan, legal tenure of the forest is given over to the group (Pradhan and Parks 1995).

- **Markets and charges:** entail trading in biodiversity goods and services and giving them a price (or adjusting their existing prices and markets) which reflects their relative scarcity, costs and benefits. Creating markets ensures that biological resources are allocated efficiently and put to their best use according to people's willingness to pay.

In the Bazaruto Archipelago in Mozambique a number of new markets and enterprises have been promoted among local fishing communities as a way of stimulating sustainable biological resource use, and in order to compensate for the economic losses in land and natural resources incurred by the establishment of a National Park. These include eco-tourism and value-added artisanal resource use (Reina 1998). Coastal areas of the threatened Akamas Peninsula in Cyprus have been zoned by government as a non-development area. Under this scheme developers, instead of being compensated with cash for activities foregone, retain their rights to development but cannot exercise them on-site. These development rights can be traded for property in other areas, or sold to groups concerned with the conservation of the Akamas Peninsula (Panayotou 1994). Under an arrangement negotiated with Energia Global, a private electricity provider in Costa Rica, landowners in watershed areas are paid for the catchment services they provide which guarantees water supply to downstream hydropower reservoirs. Similar initiatives also exist, or are under development, in El Salvador (for watershed protection for flood control and disaster prevention) and Colombia (for generating hydrological benefits) (Chomitz et al 1998).

- **Fiscal instruments:** include various types of taxes and subsidies. They can be used to raise the relative price of biodiversity-degrading products and technologies in line with the costs of the damage they cause and discourage people from using them, and to decrease the relative price of biodiversity-conserving products in line with the benefits of conservation and encourage people to use them. Fiscal instruments are also a tool to raise budgetary revenues.

Exports of crocodile skins, mainly to Japan, earn significant foreign exchange in Papua New Guinea (Hunt 1997). To promote sustainable resource use, taxes levied on exports provided an important source of funding for control and monitoring operations by the Department of Conservation. Deforestation due to over-exploitation of firewood is a major problem in Eritrea. In order to encourage people to change their energy consumption patterns and consume less woodfuel the Eritrean government has implemented a series of fiscal reforms in the energy sector, including subsidies to kerosene, the promotion of energy-efficient woodfuel stoves and the dismantling of duties on imported solar technology (Government of Eritrea 1998).

- **Bonds and deposits:** are product surcharges which shift the responsibility for biodiversity depletion to individual producers and consumers. They are levied on activities which run the risk of harming biodiversity, and require the person carrying out these activities to pay a bond or deposit before they start against the possibility of this damage occurring. By charging in advance for possible biodiversity damage, bonds and deposits provide funds for covering the costs of this damage and ensure that producers or consumers cover the cost themselves, and also presents an incentive to avoid biodiversity damage and reclaim the deposit or bond.

A form of deposit bond on commercial forestry operations was established in the early 1990s in Congo, aiming to provide economic incentives for firms to avoid logging damage and encourage forest regeneration. This arrangement grants an "interim concession licence", requiring the satisfactory completion of various forestry planning and sustainable management operations, which are paid for in advance by the concessionaire via a bond (Panayotou 1994). In the Seychelles refundable deposits are already levied successfully on the organisers of all public events to ensure waste disposal and clean up after the event. In the development of Seychelles' National Biodiversity Strategy and Action Plan it was suggested that such measures could be further extended and targeted to the tourist industry, including refundable beach waste deposits which can be offset against cleanup costs. In order to minimise on reef damage from boats, it was recommended that a refundable mooring fee could be set against mooring at designated buoys and anchoring points in Marine Protected Areas (Government of Seychelles 1997).

3. Existing Guidance on the Use of Economic Measures for Biodiversity Planning

Despite the important role accorded to economics in the CBD and the repeated calls for its application and use in support of biodiversity conservation, the economics of biodiversity is a relatively new and untested discipline. For many Parties, the application of economic approaches and tools in the context of NBSAPs has been the first attempt to systematically identify or use valuation methods and incentive measures for biodiversity conservation at a national level. This chapter reviews the guidance on economic tools and techniques that has been made available to biodiversity planners as they attempt to develop and implement NBSAPs.

3.1. Guidelines for the preparation of NBSAPs

One of the first steps that most Parties have taken to fulfil their obligations under the CBD is to develop National Biodiversity Strategies and Action Plans (NBSAPs), as required by Article 6a of the Convention. Several sets of guidelines have been prepared to assist countries in this process (Box 3).

Box 3: Guidelines for preparing NBSAPs

- 1993 UNEP: *Guidelines for Country Studies on Biological Diversity*, United Nations Environment Programme, Nairobi
- 1995 WRI-UNEP-IUCN: *National Biodiversity Planning: Guidelines Based on Early Experiences Around the World*, World Resources Institute, United Nations Environment Programme and IUCN — The World Conservation Union, Washington DC, Nairobi and Gland
- 1998 IUCN: *Using Economics for Biodiversity Strategies and Action Plans in Eastern Africa*, IUCN — The World Conservation Union, Eastern Africa Regional Office, Nairobi
- 1999 FFI: *National Biodiversity Strategy and Action Planning: BSAP Preparation Materials. Compiled Materials for the BSAP Preparation Process*, Flora and Fauna International, Cambridge
- 1999 UNDP-BPSP: *A Guide for Countries Preparing National Biodiversity Strategies and Action Plans*, Biodiversity Planning Support Programme, United Nations Development Programme-Global Environment Facility, New York
- 2000 IUCN: *Usando la Economía para las Estrategias de Biodiversidad y Planes de Acción en América Latina*, IUCN — The World Conservation Union, Oficina Regional para América del Sur, Quito
- 2000 UNDP-GEF: *Guide for the Preparation of Action Plans Within the Framework of the Convention on Biodiversity*, United Nations Development Programme-Global Environment Facility, New York
- 2000 IEEF-UNDP-UNEP: *Guide to Developing a Biodiversity Strategy from a Sustainable Development Perspective*, Institut de l'énergie et de l'environnement de la Francophonie, Ministère de l'Environnement du Québec, United Nations Development Programme, United Nations Environment Programme, Québec

These guidelines provide comprehensive advice on many aspects of the development of Biodiversity Country Studies, Strategies and Action Plans. They also underline the need to incorporate economic measures into the NBSAP process. UNEP (1993) and UNDP-BPSP (1999) for instance highlight the central role of economic valuation when carrying out biodiversity assessments, and some recognition is also given to the fact that economic policies and forces underlie biodiversity loss in FFI (1999) and UNDP-BPSP (1999). Both WRI-UNEP-IUCN (1995) and UNDP-GEF (2000) point to the need to include economic criteria, incentives and financing mechanisms in biodiversity strategies and action plans. Economic aspects of biodiversity planning are implied, if not mentioned explicitly in IEEF-UNDP-UNEP (2000) in the course of presenting a framework for integrating cross-sectoral activities and sustainable development goals into NBSAPs, and FFI (1999) also makes the point that a strength of NBSAPs is that their integrated cross-sectoral approach can enable countries to act on the basis of a better understanding of how environmental, social and economic factors relate to each other.

Yet, even given the emphasis accorded to including economic analysis and measures in National Biodiversity Country Studies, Strategies and Action Plans, these documents provide remarkably little guidance as to how to ensure that this happens. Most guidelines make no attempt to describe the economic methodologies and tools that can be applied to biodiversity planning, although FFI (1999) does outline a framework for assessing the costs and benefits of conserving biodiversity in the context of National Reporting, and stresses the need to include economists within biodiversity planning teams. IUCN (1998 and 2000) are among the few documents that present methodologies for identifying and using economic measures in the NBSAP process, proposing a series of iterative steps for valuing biodiversity, identifying and overcoming economic causes of biodiversity loss, setting in place economic incentives, and generating and allocating financial resources. Unlike other guidelines prepared in support of NBSAPs, which present generic recommendations, these documents however refer only to two geographical regions — Eastern Africa and Latin America.

3.2. CBD documentation and workshops

Materials dealing with economics aspects of biodiversity conservation have also been prepared in direct support of CBD processes and meetings (Box 4). The main focus of these official papers is on incentive measures³, in line with SBSTTA recommendations and COP decisions. The third meeting of COP in 1996 invited Parties to share experiences on incentive measures and to make relevant case studies available. UNEP/CBD/COP/3/24 outlines the need for this information exchange and also includes some case studies. Leading on from this, a detailed framework for undertaking such case studies was discussed at SBSTTA 3 in 1997, and elaborated in the information document UNEP/CBD/SBSTTA-3/Inf. 17. This framework is based on work carried out by the OECD Expert Group on Economic Aspects of Biodiversity, which resulted in two handbooks for the design and implementation of incentive measures (OECD 1994, 1999).

Box 4: CBD-related guidance on the use of economic measures for biodiversity planning

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|------|---|
| 1994 | OECD, <i>Economic Incentive Measures for the Conservation and Sustainable Use of Biological Diversity: Conceptual Framework and Guidelines for Case Studies</i> , Organisation for Economic Co-operation and Development, Paris |
| 1996 | UNEP/CBD/COP/3/24, <i>Sharing of Experiences on Incentive Measures for Conservation and Sustainable Use</i> |
| 1997 | UNEP/CBD/SBSTTA-3/Inf.17, <i>Incentive Measures to Promote the Conservation and the Sustainable Use of Biodiversity: Framework for Case Studies</i> |
| 1998 | UNEP/CBD/COP/4/18, <i>Design and Implementation of Incentive Measures</i> |
| 1999 | OECD, <i>Handbook of Incentive Measures for Biodiversity: Design and Implementation</i> , Organisation for Economic Co-operation and Development, Paris |
| 2000 | UNEP/CBD/COP/5/14, <i>Compilation of information on incentive measures received from Parties, Governments, and relevant organizations</i> |
| 2000 | UNEP/CBD/COP/5/15, <i>Further Analysis of the Design and Implementation of Incentive Measures</i> |
| 2000 | UNEP, <i>Use of Incentive Measures for the Conservation and Sustainable Use of Biological Diversity</i> , United Nations Environment Programme, Nairobi |
| 2001 | UNEP/CBD/SBSTTA 7/11, <i>Proposals for the Design and Implementation of Incentive Measures</i> |

Documentation prepared for COP 4 in 1998 made a preliminary analysis of such case studies as had been submitted by Parties, Governments and other organisations (UNEP/CBD/COP/4/18), further extended during COP 5 (UNEP/CBD/COP/5/14 and 15). To date, 44 case studies, from various parts of the world, have been submitted to the Secretariat of the CBD (Box 8). Incentive

³ Several publications have also been prepared which deal with matters relating to financial resources and mechanisms. These are not considered in this document as this topic is the subject of a separate thematic review.

measures form item 5.3 of the provisional agenda of SBSTTA 7, to be held November 2001, and proposals for their design and implementation are further elaborated in UNEP/CBD/SBSTTA 7/11 (Chapter 7). In addition, in response to the call for case studies, UNEP has recently supported the publication of successful experiences concerning the use of incentives for the conservation and sustainable use of biodiversity in Latin America (UNEP 2000b).

Global Biodiversity Forums (GBFs), usually held prior to COP and SBSTTA meetings, have the aim of enhancing the implementation of the CBD by encouraging multi-stakeholder debate and the exchange of information and experiences. Various GBF sessions, at both global and regional levels, have included workshops touching on the use of economic measures for biodiversity (Box 5). Dealing much more with real-world experiences than with methodologies, these workshops have provided important practical information regarding the application of incentive measures and generation of financial resources for biodiversity conservation.

Box 5: GBF workshops dealing with economic measures for biodiversity

GBF 4	Montreal 1996 (preceding SBSTTA 2): <i>Incentives for Biodiversity: Sharing Experiences</i>
GBF 5	Buenos Aires 1996 (preceding COP 3): <i>Investing in Biodiversity</i>
GBF 8	Montreal 1997 (preceding SBSTTA 3): <i>Incentives, Private Sector Partnerships and Marine and Coastal Environments</i>
GBF 10	Bratislava 1998 (preceding COP 4): <i>Financial Innovations for Biodiversity</i>
GBF 11	Buenos Aires 1998 (preceding COP 4 to the UNFCCC): <i>Climate Change, Biodiversity and Finance</i>
GBF 12	Dakar 1998 (preceding COP 2 to the CCD): <i>Financial Innovations to Combat Desertification</i>
GBF 14	Montreal 1999 (preceding SBSTTA 4): <i>Building Biodiversity into Sectoral Strategies and Action Plans</i>
GBF 15	Nairobi 2000 (preceding COP 5): <i>Biodiversity and Poverty</i>
R-GBF	South and South East Asia, Colombo 1999 (prior to SBSTTA 5): <i>National Biodiversity Strategies and Action Plans in South and South East Asia: Experiences and Lessons</i>
R-GBF	Eastern and Southern Africa, Mombasa 2000 (prior to COP 5): <i>Harnessing Private Sector Investment in Biodiversity</i>

3.3. Published literature on economics and biodiversity

Published references to the application of economic approaches to biodiversity conservation first began to appear towards the end of the 1980s. Long before the economics of biodiversity became a mainstream topic in the literature, two authors had started to look for economic explanations of global biodiversity loss and to highlight and describe the need to deploy economic tools in order to ensure that sufficient incentives and finance are generated for biodiversity conservation (Norgaard 1987, McNeely 1988).

After the CBD entered into force, a wide array of new literature was published outlining economic approaches and methodologies for biodiversity conservation (Box 6). Most of these documents deal with general concepts, methodologies and frameworks for analysing economic aspects of biodiversity conservation. Fewer relate the ways in which economic measures have been developed and applied in the context of real-world biodiversity conservation planning and management practice.

There does, however, exist a large body of literature dealing with the application of economic tools to more general environmental conservation issues. These publications provide extremely useful information, methodologies and case studies which can be applied to biodiversity planning, policy and management. Although none of these documents provide coherent or integrated guidance on how economic methodologies and experiences can be adapted to the requirements of NBSAPs, they provide a firm basis for modifying such approaches to the case of national biodiversity planning.

The Use of Economic Measures in National Biodiversity Strategies and Action Plans:

A Review of Experiences, Lessons Learned and Ways Forward

Box 6: Key references on the economics of biodiversity

- Aylward, B. (1991). The Economic Value of Ecosystems: 3 - Biological Diversity. London, Gatekeeper Series GK 91-03, London Environmental Economics Centre: 10 pp.
- Barbier, E. B., J. C. Burgess, et al. (1994). Paradise Lost? The Ecological Economics of Biodiversity. London, Earthscan Publications Ltd.
- Barret, S. (1992). Some Economics of the Convention on Biological Diversity. London, Working Paper GEC 92-33, Centre for Social and Economic Research on the Global Environment.
- Bowles, I. A., D. Clark, et al. (1996). Encouraging Private Sector Support for Biodiversity Conservation: The Use of Economic Incentives and Legal Tools. Washington DC, Policy Papers Volume I 1996, Conservation International: 12 pp.
- Brown, K. and D. Moran (1993). Valuing Biodiversity: The Scope and Limitations of Economic Analysis. London, Centre for Social and Economic Research on the Global Environment: 30 pp.
- Brown, K., D. Pearce, et al. (1993). Economics and the Conservation of Global Biodiversity. Washington DC, Working Paper No 2, The Global Environment Facility: 75 pp.
- Cervigni, R. (1995). Incremental Cost and the Convention on Biological Diversity: A Simple Model. London, Working Paper GEC 95-32, Centre for Social and Economic Research on the Global Environment.
- Conway, T. (1998). A Framework for Assessing the Relationship Between Trade Liberalization and Biodiversity Conservation. Nairobi, United Nations Environment Programme and International Institute for Sustainable Development : 72 pp.
- Earthwatch Institute (1999). Business and Biodiversity. Oxford, Earthwatch Institute (Europe).
- Emerton, L. A. (2000). Economics and the Convention on Biological Diversity. Nairobi, IUCN - The World Conservation Union: 5 pp.
- Emerton, L. A. (2000). Using Economic Incentives for Biodiversity. Nairobi, IUCN - The World Conservation Union: 26 pp.
- McNeely, J. (1988). Economics and Biological Diversity: Developing and Using Economic Instruments to Conserve Biological Diversity. Gland, IUCN - The World Conservation Union.
- McNeely, J. (1996). Trade and the Convention on Biological Diversity: Internalizing the Costs of Trade on Biodiversity, Paper presented at Workshop on Trade Related Aspects of the Convention on Biological Diversity, Singapore, 11 December 1996: 8 pp.
- Myers, N. (1996). Perverse Subsidies, Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland: 11 pp.
- Norgaard, R. B. (1987). "Economics as mechanics and the demise of biological diversity." Ecological Modelling 38: 107-121.
- Panayotou, T. (1994). "Conservation of biodiversity and economic development: the concept of transferable development rights." Environmental and Resource Economics 4(1): 91-110.
- Pearce, D. and D. Moran (1994). The Economic Value of Biodiversity. London, Earthscan Publications Ltd: 172 pp.
- Perrings, C. (1995). Economic Values of Biodiversity. Stockholm, Reprint Series, Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: 87 pp.
- Perrings, C. (2000). The Economics of Biodiversity Loss and Agricultural Development in Low Income Countries. York, Environment Department, University of York: 26 pp.
- Perrings, C., C. Folke, et al. (1992). The Ecology and Economics of Biological Diversity: Elements of a Research Agenda. Stockholm, Beijer Discussion Paper No 1, Beijer International Institute of Ecological Economics, The Royal Swedish Academy of Sciences: 28 pp.
- Perrings, C. and D. Pearce (1994). "Threshold effects and incentives for the conservation of biodiversity." Environmental and Resource Economics 4: 13-28.
- Repetto, R. (1996). Macroeconomic Policies and Biodiversity Loss, Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland: 8 pp.
- Rubino, M. C., D. P. de Callejon, et al. (2000). Business and Biodiversity in Latin America. Washington DC, Discussion Paper, Environmental Projects Unit, International Finance Corporation: 53 pp.
- Simpson, R. D. and R. A. Sedjo (1996). Investments in Biodiversity Prospecting and Incentives for Conservation. Washington DC, Discussion Paper 96-14, Resources for the Future: 17 pp.
- Stone, D., K. Ringwood, et al. (1997). Business and Biodiversity: A Guide for the Private Sector. Gland, World Business Council for Sustainable Development and IUCN - The World Conservation Union: 68 pp.
- Swanson, T. (1992). The Economics Of A Biodiversity Convention. London, Working Paper GEC 92-08, Centre for Social and Economic Research on the Global Environment.
- Swanson, T. (1996). The Underlying Causes of Biodiversity Decline: An Economic Analysis, Paper presented at IUCN Workshop on Economics of Biodiversity Loss, April 1996, Gland, Switzerland: 14 pp.
- Tacconi, L. (2000). Biodiversity and Ecological Economics: Participation, Values and Resource Management. London, Earthscan Press Ltd.
- United Nations Environment Programme (2000). Use of Incentive Measures for the Conservation and Sustainable Use of Biodiversity. Nairobi, United Nations Environment Programme.
- Vallejo, N. and P. Hauselmann, Eds. (1998). From Theory to Practice: Incentive Measures in Developing Countries. Gland, Benefiting from Biodiversity Series, WWF - World Wide Fund for Nature.

Although none of these documents give coherent or integrated guidance on how economic methodologies and experiences can be adapted to the requirements of NBSAPs, they provide a firm basis for modifying such approaches to national biodiversity planning.

Valuation has accounted for far the greatest volume of published literature on environmental economics over the last decade. A wide variety of guides, manuals and compendia of case studies exist which deal with general methodologies for valuing environmental goods and services⁴, or the valuation of specific ecosystems⁵. A large number of case studies have also been published which document the practical application of environmental valuation techniques in various countries⁶ (also see Box 7). There is also a diverse, although less voluminous, literature on the relationships between economic policies, instruments, incentive measures and environmental conservation, referring both to general approaches⁷ and to examples of the use of incentive measures to address specific environmental management problems in different ecosystems and countries⁸ (also see Box 8).

⁴ Key texts include Dixon and Hufschmidt 1990, Pearce 1992, Rietbetgen-McCracken and Abaza 2000, Winpenny 1991.

⁵ Such as freshwater and marine systems (Bann 1997, Barbier 1991 and 1994, Barbier et al. 1997, Brouwer et al. 1997, Gren and Soderquist 1994, James 1991, Spurgeon and Aylward 1992), forests (Carson 1998, Chomitz and Kumari 1998, Godoy et al. 1993, International Institute for Environment and Development 1997, Richards 1994, Ruitenbeek 1992) and protected areas (Commission on National Parks and Protected Areas 1995, Dixon and Sherman 1990, Phillips 1998).

⁶ Including Africa (Abala 1987, Arntzen 1997, Bishop 1995, Bojo 1996, Brown and Henry 1989, Day 2000, Eaton and Sarch 1997, Emerton 1999a and 1999b, Higgins et al. 1997, Howard 1996, Kramer et al. 1997, Moran 1994, Navrud and Mungatana 1994, Norton-Griffiths and Southey 1995, Saichoono 1995, Turpie et al. 1999); Asia (Adger 1997, Casellini et al. 1999, Cesar 1996, Cesar et al. 1997, Janssen and Padilla 1996, Kumari 1996, Lee 1998, Othman and Abdullah 1991, Tejam and Ross 1997, Tri et al. 1996); Australia (Grey 1998); Latin America and the Caribbean (Cabrera et al. 1998, Furst 1996, Gammage 1997, Grimes et al. 1994, Peters et al. 1989, Sarmiento Gutierrez 1992, Smith et al. 2000, Windevoxhel 1992); Europe and North America (Bellu and Cistulli 1997, Bostedt and Mattsson 1995, Clayton and Mendelsohn 1993, Englin and Mendelsohn 1991, Feather et al. 1999, Gren et al. 1994, Langford 1997, Loomis 2000).

⁷ Key texts include Blackman and Harrington 1999, Emerton 1999, Fischer and Toman 2000, Grigalunas and Congar 1995, McNeely 1988, OECD 1994 and 1996, Panayotou 1994, Richards 1999, Rietbetgen-McCracken and Abaza 2000, Stedman-Edwards 1998, Vallejo and Hauselmann 1998.

⁸ For example in Africa (Barbier and Conroy 1989, Barbier 1991, Emerton and Mfunda 1999, Kramer 1994); Asia (Adhikari et al. 1998, Berg et al. 1998, Gilbert and Janssen 1997, Kumari 1995); the Pacific (Hunt 1997); Latin America and the Caribbean (Aylward et al. 1999, Dyer and Belausteguigoitia 1996, Loureiro and de Moura 1996, Umana 1996, UNEP 2000); Europe and North America (Brown 1998, Costa and Kennedy 1996, de Alessi 1996, European Environment Agency 1996, Merrifield 1996, National Center for Environmental Economics 2001, Organisation for Economic Co-operation and Development 1994 and 1999, Verbruggen et al. 1995).

Box 7: Key applications of economic valuation to biodiversity goods and services

Reference	Country	Sector/ecosystem
Abala 1987	Kenya	Wildlife, Tourism, Protected Areas
Adger <i>et al</i> 1995	Mexico	Forests
Ahmad <i>et al</i> 1993	Malaysia	Tourism, Protected Areas
Ahmad 1993	Djibouti	Forests, Protected Areas
Andersson & Ngazi 1995	Tanzania	Marine and coastal, Fisheries, Protected Areas
Arntzen 1997	Botswana	Rangelands, Drylands, Wildlife, Protected Areas
Barbier <i>et al</i> 1991	Nigeria	Wetlands
Bellu & Cistulli 1997	Italy	Protected areas, Forests, Tourism
Bennett & Reynolds, 1993	Malaysia	Mangroves, Tourism
Berg <i>et al</i> 1998	Sri Lanka	Coral reefs, Fisheries, Tourism
Bishop 1995	Mali, Malawi	Agriculture
Bojo 1996	Eastern and Southern Africa	Wildlife
Bostedt & Mattsson 1995	Sweden	Forests, Tourism, Protected Areas
Brown & Henry 1989	Kenya	Wildlife
Brown <i>et al</i> 1996	Guatemala, Honduras	Forests, Tourism, Protected Areas
Cabrera <i>et al</i> 1998	Mexico	Mangroves
Casellini <i>et al</i> 1999	Vietnam	Wildlife
Cesar 1996	Indonesia	Coral reefs
Clayton & Mendelsohn 1993	USA	Wildlife, Tourism
Costanza <i>et al</i> 1989	USA	Wetlands
Day 2000	South Africa	Wildlife, Tourism
De Lacy & Lockwood 1994	Australia	Protected Areas
Dixon <i>et al</i> 1993	Netherlands Antilles	Marine, Tourism, Protected Areas
Durojaiye & Ikpi 1988	Nigeria	Protected Areas
Eaton & Sarch 1997	Nigeria	Wetlands
EFTEC 2000	Peru	Protected Areas
Emerton 1999	Kenya	Wildlife, Forests, Protected Areas
Englin & Mendelsohn 1991	USA	Forests, Tourism, Protected Areas
Gammage 1997	El Salvador	Mangroves
Grandstaff & Dixon 1986	Thailand	Tourism
Gren <i>et al</i> 1994	UK, Sweden	Wetlands
Grey 1998	Australia	Forests
Grimes <i>et al</i> 1994	Ecuador	Forests
Higgins <i>et al</i> 1997	South Africa	Fynbos, Tourism
Howard 1996	Uganda	Wildlife, Forests, Protected Areas
Kramer 1994	Madagascar	Forests, Tourism, Protected Areas
Lal 1990	Fiji	Mangrove
Langford <i>et al</i> 1997	UK	Wildlife, Marine
Lee 1998	Korea	Wetlands, Marine and Coastal
Loomis 2000	USA	Wildlife, Tourism, Protected Areas
Lynam <i>et al</i> 1991	Zimbabwe	Forests
Maille & Mendelsohn 1993	Madagascar	Tourism
Menkhaus 1993	India	Wildlife
Moran 1994	Kenya	Wildlife, Tourism, Protected Areas
Navrud & Mungatana 1994	Kenya	Wetlands, Wildlife, Tourism, Protected Areas
Norton-Griffiths & Southey 1995	Kenya	Wetlands, Wildlife, Tourism, Protected Areas
Othman & Abdullah 1991	Malaysia	Wetlands, Wildlife, Tourism
Peters <i>et al</i> 1989	Peru	Forests
Purushothaman <i>et al</i> 2000	India	Forests, Protected Areas
Ruitenbeek 1992	West Africa, Asia, South America	Forests
Saichoono 1995	Zambia	Wildlife, Tourism, Protected Areas
Smith <i>et al</i> 2000	Peru	Forests, Agriculture
Tejam & Ross 1997	Philippines	Marine and coastal,
Tobias & Mendelsohn 1991	Costa Rica	Forests, Tourism, Protected Areas
Tri <i>et al</i> 1996	Vietnam	Mangroves
Turpie <i>et al</i> 1999	Zambezi Basin	Wetlands, Protected Areas
Von Moltke & Spanninks 2000	China	Wildlife
Windevoxhel 1992	Nicaragua	Mangroves

Box 8: Key case studies on incentive measures presented to the Secretariat to the CBD

Black Sea:	Conserving Marine Biodiversity
Brazil:	Ecological ICMS: Economic Incentives Toward Biodiversity Conservation, A Successful Experience in Brazil
Brazil:	Incentive Measures for Conservation of Biodiversity and Sustainability: Case Study of the Brazilian Pantanal
Cameroon:	Case Study on Incentives: Ijim Mountain Forest Project
Canada:	Canadian Case Study on a National Tax Incentive Measure for Biodiversity
Chile:	Design of Policies Based on Economic Incentives and Disincentives for a Sustainable Management of Chilean Native Forests
Chile:	Safe Minimum Standards as Policy Instruments for Native Forest Resources
Colombia:	Incentive Measures for Conservation of Biodiversity and Sustainability: a Case Study of Colombia
Costa Rica, Panama:	Conservation Strategies and Incentive Mechanisms Implemented within the La Amistad Conservation Development Initiative (AMISCONDE) for Costa Rica and Panama
Costa Rica:	Estimation of Subsidies to Reverse Deforestation in Costa Rica
Costa Rica:	The Preservation Value of the Monteverde Park in Costa Rica
Côte d'Ivoire:	Forest Workers Cooperatives and Sustainable Use of Forest Resources in Côte d'Ivoire
Cuba:	Some Experiences in Cuba in the Implementation of Taxes to Protect Biological Diversity
Ecuador:	Estimated Opportunity Costs of Biological Diversity Conservation: The Case of Deforestation in the Sierra Region of Ecuador
Ecuador:	Incentive Measures for Conservation of Biodiversity and Sustainability: a Case Study of the Galapagos Islands
EU:	Agri-environmental Measures in the EU: Incentives for Biodiversity Conservation?
Germany:	Opportunity Costs of Conservation in Germany
India:	Respecting, Rewarding and Augmenting Indigenous Knowledge: Innovations and Practices for Conservation of Biodiversity
Indonesia:	Economic Analysis of Indonesian Coral Reefs Indonesia Incentive opportunities for coral reef management
Indonesia:	Slowing Tropical Forest Biodiversity Losses: Cost and Compensation Considerations
East Africa:	Who Gains? Who Loses? Biodiversity in Savannah Systems
Kenya:	Agriculture in Rangelands: A Case Study from Laikipia District in Central Kenya
Kenya:	Incentives for Biodiversity Management in Kenya: A Case Study of Community-Based Conservation Around Amboseli National Park
Kenya:	Local Livelihoods and Forest Biodiversity Loss: A Case from Kenya
Mexico:	Environmental Accounting System: The Mexican Experience
Mexico:	Incentive Measures for Conservation of Biodiversity and Sustainability: Case Study of the Indigenous Traditions in Mexico
Mexico:	Incentives to Campesinos: Creativity and Experimentation for the Conservation and Efficient Management of Biodiversity in the Center-Mountain Region of the State of Guerrero
Mexico:	Structural Adjustment, Market and Policy Failures: The Case of Maize
Nepal:	Forest Biodiversity Loss: A Case Study of Stakeholders, Conflicting Interests and Actions
Pakistan, India, Bhutan:	Incentives, Institutions and Innovations: Golden Triangle of Sustainable Conservation
Philippines:	The Foundation for the Philippine Environment as a Funding Mechanism for Biodiversity Conservation in the Philippines
Senegal:	NGOs and Biodiversity Financing: Senegal Case Study
South Africa:	Biodiversity Loss in Kwa-Zulu-Natal, South Africa: The Role of the Natal Parks Board
South Africa:	Parastatal Protected Areas: The Case of South Africa South Africa
South Africa:	Private Sector Mechanisms for Financing Biodiversity Conservation: Some Lessons from Southern Africa
South Africa:	The Use of Auctions as an Incentive Measure for Conservation
Southern Africa:	Promoting Investment in Environment in Southern Africa
Tanzania:	Village Action Planning in Tanga Tanzania: A Powerful Incentive for Managing Marine Resources
Thailand:	Joint Implementation, Carbon Offsets and Sustainable Forest Management
Uganda:	Incentive Measures for the Conservation and Sustainable Use of Biological Diversity in Uganda: A Case Study of the "Development Through Conservation" Project in Communities around Bwindi National Park
Uganda:	The Opportunity Costs of Protected Areas in Uganda
USA:	Charitable Giving in the United States United States Incentives for private contributions to conservation
USA:	Conservation easements
USA:	Incentives to Enhance Conservation of Endangered Species on Private Lands: The Case of Safe Harbor and the Red Cockaded Woodpecker in the U.S.
USA:	Oysters and the Willapa Bay

4. Lessons Learned and Best Practices in the Use of Economic Measures in National Biodiversity Strategies and Action Plans

As many countries are in the process of finalising their National Biodiversity Strategies and Action Plans, there are clear indications that economic analysis and tools have begun to be integrated into the biodiversity planning process. These experiences have yielded valuable insights and lessons learned about how economic measures can be used for biodiversity.

*Major **achievements and best practices** include, in Biodiversity Country Studies, the analysis of economic costs and benefits in order to justify the need biodiversity conservation, to understand the causes of biodiversity loss, and to identify where there are needs and niches to set in place economic incentives as part of NBSAPs. Many Biodiversity Strategies and Action Plans have accordingly integrated economic objectives and goals into their basic rationale, contain stand-alone activities to strengthen biodiversity economics capacity and information, and specify a range of economic instruments and incentives to be used in support of conservation actions in other biodiversity sectors. NBSAPs have also placed considerable emphasis on the need to ensure that biodiversity conservation goals, objectives and actions are mainstreamed into the sectors, strategies and plans of other economic sectors and development processes.*

*Experiences have however also pointed to a number of **challenges and constraints** to using economic tools and measures for biodiversity planning. Major obstacles have been weak in-country capacity, knowledge and information about economics aspects of biodiversity, and insufficient involvement of economists and development decision-makers in the NBSAP process. Perhaps for these reasons, there are fewer indications that the economic measures and actions specified in NBSAPs have actually been implemented in practice, that NBSAPs have yet entered into the agenda of mainstream development and economic decision-making, or that real progress has been made with sectoral integration of biodiversity..*

4.1. Experiences in the use of economics in Biodiversity Country Studies and National Assessments

4.1.1. Consideration of economic issues

Bringing in a detailed consideration of biodiversity economics at the start of the NBSAP planning process presents a strong foundation upon which to develop the subsequent strategy and action plan.

Biodiversity Country Studies or National Biodiversity Assessments provide the background information upon which NBSAPs are based. Although the extent to which economic issues have been addressed in biodiversity country studies and assessments varies greatly, in many cases detailed consideration has been given to the needs for economic measures, the role and value of biodiversity in the economy, the economic causes of biodiversity loss, and the sectors and groups who currently lack economic incentives to conserve biodiversity (Box 9). Such comprehensive analysis of the inter-linkages between economic factors and biodiversity helps to define the objectives, strategies and actions which will be contained in the NBSAP, and presents a sound basis for formulating biodiversity conservation activities.

Box 9: Consideration of economic issues in Papua New Guinea's Country Study on Biodiversity

Papua New Guinea's Country Study on Biological Diversity presents a good example of detailed consideration of the economic background, issues and recommendations that are required to formulate the NBSAP. Of the 21 chapters in the study, eight are concerned specifically with economic aspects:

- Chapter 2 outlines the *economic rationale for maintaining biodiversity*
- Chapter 4 analyses *economic structure and composition*
- Chapter 12 describes and quantifies the *direct productive values* of Papua New Guinea's biodiversity
- Chapter 13 describes and quantifies the *subsistence values* of Papua New Guinea's biodiversity
- Chapter 14 describes and quantifies the *indirect use values* of Papua New Guinea's biodiversity
- Chapter 17 identifies methods for *capturing global biodiversity values* to enable conservation in Papua New Guinea
- Chapter 19 addresses the need to *mainstream biodiversity into development planning*
- Chapter 21 reviews the *costs of biodiversity conservation*

(From Government of Papua New Guinea 1994)

4.1.2. Using economic valuation as a justification for biodiversity conservation

Economic valuation can provide a convincing, and much-needed, justification for biodiversity conservation.

Most Biodiversity Country Studies make some recognition of the importance of biodiversity to the national economy, and often use this as a basic justification for biodiversity conservation. In Cameroon, for example, the economic significance of biodiversity as a source of industrial inputs, state revenue and foreign exchange, and its contribution to poverty alleviation, household income and subsistence, regional, provincial and national economic activities are all used to present a strong argument for conserving biodiversity and for implementing the NBSAP (Government of Cameroon 1999).

Box 10: The value of biodiversity-based products in Ecuador's national economy

Work carried out in preparation for Ecuador's NBSAP made a detailed quantification of the value of biodiversity to the national economy. It argues that the economic potential of sustainable development in a country such as Ecuador, which is considered to be one of the most biodiverse in the world, is immense. Various data are presented which underline the importance of biodiversity to sustainable economic growth and national development.

Data is presented that shows that, since the mid 1990s, the contribution of biodiversity-based sectors (agriculture, forestry, fisheries and hunting) to national income has been growing steadily, and is now worth nearly one fifth of GDP.

	1994	1995	1996	1997	1998	1999	2000
Biodiversity-based sectors contribution to GDP (%)	17.1	17.2	17.5	17.6	17.3	18.4	18.0

Analysis of Ecuador's exports also shows the economic importance of biodiversity. Worth approximately \$500 million a year, biodiversity-based products now comprise more than one third of all fisheries and agricultural exports, and contribute a fifth of total export earnings.

	1997	1998	2000
Quantity ('000 tonnes)	322	285	311
Value (\$ million)	551	538	491
% of total export earnings	14	16	20

(From Government of Ecuador 2000)

Some Country Studies extend this analysis one step further, and attempt to place monetary values on biodiversity (Box 10), and use these values to provide an economic rationale for the NBSAP (Box 11). Various different estimates of the value of biodiversity are provided, ranging from analysis of the contribution of biodiversity-based sectors to national income, through the

calculation of specific biodiversity goods and services, to detailed analysis of the total economic value of biodiversity. In Oman a methodology was adopted by which to value the role of renewable natural resources in GDP, looking at the output of agriculture, fisheries and manufacturing sectors (Sultanate of Oman 2000). Norway's Country Study on Biodiversity quantifies the gains from biodiversity conservation by conducting cost-benefit analyses for selected domesticated and wild plant and animal species (Directorate for Nature Management 1992). In Samoa, an extremely detailed valuation exercise was carried out, which included a number of surveys to assess and quantify biodiversity benefits (Mohd-Shahwahid 2001). The Seychelles National Assessment also conducted a comprehensive valuation study as part of the National Assessment, showing that biological resources and ecosystems contribute one eighth of GDP, a quarter of national employment, a third of government revenues, three quarters of foreign exchange earnings and over 90% of exports (Government of Seychelles 1997).

Box 11: A cost-benefit analysis of implementing the CBD in China

China's Biodiversity Country study includes a detailed assessment of both the benefits and the costs of biodiversity conservation, finding that:

- The incremental benefits of conserving biodiversity in China are more than 55,000 million yuan a year from **direct use benefits**, including:
 - **Timber** resources of nearly 21,000 million yuan
 - **Grassland** resources for animal husbandry of nearly 12,000 million yuan
 - **Medicinal** materials and other forest and animal by-products of more than 3,000 million yuan
 - **Aquatic** resources of more than 4,000 million yuan
 - Conservation of **rare and endangered species** worth more than 500 million yuan
 - New **tourism** opportunities of nearly 15,000 yuan
- The incremental benefits of conserving biodiversity in China are more than 100,000 million yuan a year from **ecological services**, including:
 - **Water conservation** of nearly 55,000 million yuan
 - **Soil erosion control** of more than 16,000 million yuan
 - Increased **agricultural output** of nearly 13,000 million yuan
 - **Fixing sand against wind** of more than 5,000 million yuan
 - **Oxygen release and carbon dioxide fixation** of nearly 20,000 million yuan

Comparing the value of these benefits with the projected costs of biodiversity conservation, the study demonstrates that there is a net economic gain to China from implementing the CBD.

(From Government of China 1998)

4.1.3. Analysing the economic causes of biodiversity loss

Analysis of the full benefits and costs of biodiversity conservation, and of the economic structures and policies that influence these values, provides important information about direct and underlying economic causes of biodiversity loss.

Most Biodiversity Country Studies emphasise the links between economic activities and biodiversity, and especially highlight the ways in which economic activities cause biodiversity loss. For example, documents prepared in support of Ecuador's NBSAP mention a wide range of economic causes of biodiversity loss, including the recent economic crisis, a history of economic mismanagement and a series of economic policies which have together resulted in widespread poverty, have degraded natural habitats for agriculture, mining and energy, and have led to the unsustainable exploitation of forest, aquatic and marine resources (Government of Ecuador 2000). In Lebanon, the economic forces underlying illegal and unsustainable resource use, destructive harvesting practices, conversion of natural habitats and unplanned and polluting developments are identified as low budget allocations to biodiversity conservation, a history of agricultural subsidies, the absence of realistic charges and penalties for resource use, and poor integration of biodiversity concerns into macroeconomic and sectoral policies (Government of Lebanon 1999).

Valuation can provide additional information about the underlying economic causes of biodiversity degradation and loss. Some Country Studies make a detailed analysis of the ways in which biodiversity values are not adequately reflected in existing economic policies, markets and prices, meaning that people have few incentives or economic reasons to conserve biodiversity (Box 12). Zimbabwe's Biodiversity Country Study for example makes a clear link between economic policy failures and biodiversity loss, suggesting that distorted markets and prices have long given resource users the wrong signals about the relative benefits of biodiversity conservation and costs of biodiversity loss (Government of Zimbabwe 1998).

Box 12: The economic causes of biodiversity loss in Pakistan

A detailed analysis was made of the economic causes of biodiversity loss in Pakistan's Biodiversity Country Study. Various impacts of economic activities on biodiversity are cited, including habitat degradation from the over-exploitation of biological resources such as timber, fuelwood, fodder and pasture; soil erosion resulting from unsustainable agricultural practices, overstocking and deforestation; and wetland loss arising from water diversion and drainage for agriculture and hydropower. The study also links species and population losses to unsustainable hunting and trapping, over-fishing, high levels of plant extraction, agricultural intensification, pollution and introduced or invasive species.

The country study makes it clear that there exist in Pakistan a number of structural, or underlying, reasons for these unsustainable economic activities. Such indirect causes of biodiversity loss include high rates of consumption from a rapidly growing population, low primary productivity and economic returns in resource and land-based enterprises, market failures and externalities, failure to account for biodiversity values in economic decision-making and accounting, a history of inappropriate economic policies at macro and sectoral levels, high discount rates that favour immediate consumption, and economic globalisation processes that put pressure on the national economy.

(From Government of Pakistan 2000, Khan and Pervaiz 2001)

Although the majority of Biodiversity Country Studies make some effort to at least describe the high and wide-ranging economic benefits associated with biodiversity, attempts to quantify the costs of conservation rarely extend beyond consideration of the direct budgets and expenditures required to run government environmental agencies and national parks. Uganda's National Biodiversity Assessment is unusual in that it also looks at the indirect costs of biodiversity conservation, showing that of the nearly \$350 million a year estimated costs of conserving protected area biodiversity, more than 98% of these costs are comprised of the local opportunity costs of land use foregone and crop damage caused by wild animals (Government of Uganda 1999). This type of analysis of both biodiversity benefits and costs makes it possible to identify economic imbalances that can underlie or exacerbate biodiversity loss. In Eritrea, for example, the National Biodiversity Assessment found that in many cases the returns to biodiversity-degrading economic activities were far higher than those to biodiversity conserving-activities and that while the government and local communities bear many of the direct and opportunity costs of biodiversity conservation (over \$74 million a year), many biodiversity benefits (over \$134 million) are captured at low or zero cost by the private sector and global community (Government of Eritrea 1998). They conclude that these inequities result in a situation where neither the government nor local communities are economically able, and are sometimes unwilling, to conserve biodiversity.

4.1.4. Identifying the need for economic measures in the NBSAP

Biodiversity Country Studies, by documenting and analysing the links between biodiversity and the economy, point to the ways in which economic measures can, and should, be used to support biodiversity conservation in the NBSAP.

Ultimately, the Biodiversity Country Study or National Assessment attempts to draw conclusions about the topics and issues that should be included in the NBSAP, and to identify the means by which they can be addressed. Unfortunately, few country studies make detailed recommendations

about economic aspects of NBSAPs. Most focus only on describing the economic value of biodiversity and on outlining countries' broad economic context, without actually pointing to the needs and niches which exist for economic instruments to be used in support of biodiversity.

Notable exceptions do however exist, which provide clear recommendations about the use of economic measures for biodiversity conservation. Background assessment papers prepared in support of the Biodiversity Country Study for Zimbabwe, for example, use valuation to identify a wide range of economic conditions that are unsupportive of biodiversity conservation and need to be modified, and also propose various economic instruments that can provide incentives for conservation in forest, wildlife, aquatic and agricultural ecosystems (Government of Zimbabwe 1998). Similarly, work carried out in support of Ecuador's NBSAP presents a wide variety of examples of the types of economic incentives and measures that can be used to encourage local communities, private and public sectors to conserve biodiversity (Government of Ecuador 2000).

Box 13: The use of economic analysis to identify needs for economic measures in the Seychelles NBSAP

The Seychelles National Biodiversity Assessment included a detailed consideration of economics concerns in order to identify needs and priorities for the NBSAP. Analysis of the economic structure and policies of the Seychelles highlighted a number of economic pressures and threats influencing national biodiversity status, including the reliance of the economy on biodiversity-based activities such as tourism and fisheries and on biodiversity-impacting activities such as industry and manufacturing, the concentration of population, industry and settlements in a small and fragile coastal strip and an economy that has historically been heavily controlled by the state and has relied on price controls and market regulation, meaning that the price of most goods and services fail to reflect the value of biological resources and there are few incentives for producers and consumers to carry out economic activities in a way which does not deplete or degrade biodiversity.

In the light of the economic analysis of biodiversity costs, benefits and economic threats, the National Assessment recommends that five major categories of economic instruments should be incorporated into the NBSAP: the creation of new and improved markets, charge and fee systems, fiscal instruments, financial instruments, and bonds and deposits. It presents a detailed list of the types of economic instruments that the NBSAP could use to promote conservation and discourage degradation, targeting these to particular economic activities, sectors and conditions that currently threaten biodiversity:

- For the **tourism sector**, recommended instruments include the promotion of increased enterprises and sales as a way of generating income, the rationalisation and introduction of entry and user fees, the payment of a proportion of airport taxes and hotel levies to biodiversity conservation, the development of credit and funds for ecotourism development, and the imposition of beach waste deposits and refundable mooring bonds on tour operators.
- For the **fisheries sector**, recommended instruments include the introduction of fishing quotas and a variable licence fee scale, as well as the differentiation of tax rates for different types of fishing activities and equipment sales.
- For the **industrial sector**, recommended instruments include tradable pollution permits, the establishment of waste collection and disposal charges, effluent charges and pollution taxes, the provision of preferential credit and loans to clean technologies, and the introduction of refundable waste deposits and bonds on hazardous chemical use.
- For the **urban and construction sectors**, recommended instruments include transferable development rights between areas zoned for biodiversity conservation and for industrial/urban development, differential property and land-use taxes, provision of preferential credit and loans to revegetation and landscaping, and the introduction of reforestation and land restoration bonds on new developments.
- For the **biodiversity utilisation and trade sector**, recommended instruments include the promotion of species domestication and value-added enterprises, the introduction and rationalisation of user charges, the imposition of variable product taxes, and the provision of loans to sustainable biodiversity-based enterprises and businesses and compensation for loss of income where unsustainable utilisation activities are curtailed.

(From Government of Seychelles 1997)

Some country studies highlight needs to provide economic incentives for particular groups or sectors in order to persuade them to conserve biodiversity (Box 13). For example Namibia's Biodiversity Country Study lays much emphasis on ensuring that local communities benefit from biodiversity, presenting examples of the development of community-based wildlife enterprises and benefit-sharing arrangements around protected areas as a successful means of providing local economic incentives for conservation (Government of Namibia 1998). Background information

produced in support of Vietnam's Biodiversity Action Plan specifically targets the industrial and land use planning sectors, suggesting that adjustments in planning regulations such as fees, taxes, penalties, subsidies and economic zoning could provide greater incentives for biodiversity conservation at little cost, and could at the same time benefit the national economy (Casellini *et al* 2001). In Djibouti, the National Biodiversity Assessment makes strong recommendations about the need to set in place economic incentives for both rural populations and urban industries to conserve biodiversity, and also provides detailed proposals about the types of economic instruments that are most likely to be effective in leading to biodiversity conservation, given the special conditions and circumstance of the country (Box 14).

Box 14: Appropriate economic instruments for biodiversity conservation in Djibouti

Djibouti's National Biodiversity Assessment recommends a number of economic instruments that can be used for biodiversity conservation, looking in detail at the likely components of the NBSAP (institutional strengthening, sectoral integration, law and policy formulation, biodiversity monitoring, surveys and assessment, education and awareness, protected areas, community-based conservation, private sector engagement, sustainable use) and proposing specific economic activities and supportive economic instruments for each component. The National Assessment also notes that, although economic instruments are relatively easy to apply and enforce in a small economy like Djibouti, the country has a number of special characteristics and faces a number of unique conditions which should influence the choice of economic measures, and will which affect their appropriateness and effectiveness in the NBSAP:

- Djibouti is characterised by extreme **economic duality**, and is comprised of two distinct sub-economies (rural and urban) within which very different economic conditions pertain. It is likely that two sets of economic instruments will have to be formulated in order to deal with this heterogeneity. It will be important to set in place economic measures for biodiversity conservation which target both the commercial, market-based urban sector and the subsistence-based rural sector. It cannot be assumed that one set of biodiversity economic measures will simultaneously have relevance to both these sub-economies.
- **Consumer prices** are already extremely high in Djibouti. Any economic instrument for biodiversity conservation should not increase commodity prices, even those of biodiversity-depleting goods. Rather, economic measures which present positive incentives for biodiversity conservation by saving money, increasing production efficiency or contributing to consumer choice will be far more effective than those which use the price mechanism to penalise directly for biodiversity loss.
- Both urban and rural **poverty** is widespread in Djibouti, with extreme inequities in the distribution of income between a small elite and a large, poorer population. Economic instruments which more equitably balance the costs and benefits of biodiversity conservation, and redistribute income, may provide a means to help overcome these inequities. Conversely, there is little to be gained from using economic instruments which will further widen disparities in socio-economic status.
- In both of Djibouti's sub-economies **production and consumption opportunities are limited** and focused on a small number of commodities. Rather than increasing the reliance of the Djiboutian economy on these limited economic activities, instruments for biodiversity conservation should aim to strengthen the diversity, and sustainability, of different economic opportunities at national and local levels.
- Djibouti is in the process of **policy development and reform**, major aims of which are to strengthen and diversify the economy, to increase liberalisation and to decrease the role of the public sector. Economic instruments for biodiversity conservation should from the start be integrated with, and consistent with the goals of, these new macroeconomic and sectoral policies. In particular, biodiversity economic measures should support new policy by aiming to minimise the costs of conservation to government, increase decentralisation, privatisation and liberalisation and to contribute to national economic growth and development goals.
- The Djibouti economy is already **dependent on external financial assistance** and is **highly vulnerable to exogenous shocks**. Economic instruments for biodiversity conservation, if they are to be sustainable over the long-term, should decrease rather than exacerbate this dependence and vulnerability.

(From Government of Djibouti 1999)

4.2. Experiences in the use of economics in NBSAPs

4.2.1. Economics as a cross-cutting theme

Economic aims provide a basic rationale and component of biodiversity conservation in most countries, and as such cross-cut the goals, strategies and actions contained in NBSAPs

The majority of NBSAPs are based partly on economic goals and principles. For example the objectives of Vietnam's Biodiversity Action Plan include (i) protecting the country's endemic and vulnerable ecosystems that are threatened by economic activities, (ii) conserving biodiversity components that are both subject to economic over-exploitation and are being ignored in economic planning, (iii) promoting the sustainable utilisation of biodiversity so as to serve the country's economic targets (Government of Vietnam 1994). One of the two strategic objectives in Bolivia's NBSAP is to develop the economic potential of biodiversity (Government of Bolivia 2001). Incentives to promote biodiversity conservation and provide employment for local people are one of the main strategic goals of Oman's NBSAP, and recognition of the economic value of biodiversity is a guiding principle (Sultanate of Oman 2000).

Other economic concerns are also acknowledged at the start of most NBSAPs (Box 15), and used to point to the need to use economic measures, and address economic issues, in the strategies and actions that are subsequently specified for biodiversity conservation. For example The Marshall Islands NBSAP is based on the fundamental principle that all people have the right to development, based on conservation and resource management practices, and yet also recognises that major threats to biodiversity are arising from changing economic circumstances (Republic of the Marshall Islands 2000). Sri Lanka's Biodiversity Action Plan, citing poverty, unemployment and widespread dependence on subsistence agriculture as economic concerns that affect national biodiversity status, and highlighting the importance of biodiversity conservation to local, national and global economies, calls for the better incorporation of biodiversity values into all levels of economic decision-making as a priority action (Government of Sri Lanka 1998).

Box 15: Economics as a cross-cutting theme in NBSAPs in South Asia

Economics forms a cross-cutting theme and stated objective of national priorities, action plans and programs for biodiversity conservation in South Asia. This includes a clear recognition of the importance of using valuation to improve the economic justification and rationale for biodiversity conservation. Nepal's 1999 Biodiversity Country Study for instance notes that "the main challenge to conserving the biological diversity of Nepal lies in finding ways and means to bring substantial economic returns from the use of biodiversity". Likewise, one of the basic guiding principles for biodiversity management cited in Sri Lanka's 1998 national framework for action for biodiversity conservation is also that "the best long-term economic use of biodiversity is that which will maintain the ecological and cultural value of ecosystems".

The need to develop appropriate capacities and methodologies for biodiversity economics in order to achieve these goals is accordingly emphasised in NBSAP objectives, aims and actions. The 2001 draft NBSAP of Nepal emphasises the need to better understand the economic value of biodiversity as a key measure. One of Sri Lanka's 12 proposals for action on biodiversity conservation deals specifically with economic valuation. It notes that there is currently weak national capacity to carry out valuation, and that the development of this capacity should receive urgent attention alongside the development of appropriate valuation methodologies and mechanisms for incorporating these values into national decision-making. Similarly, the demonstration of biodiversity economic values and their integration into decision-making at all levels is an objective of Pakistan's 2000 NBSAP, which includes actions aiming to "develop, document and adopt standardised methodologies for economic valuation of biodiversity". One of its 25 objectives is concerned specifically with the use of incentive measures, including the provision of both direct and indirect economic incentives for biodiversity.

(From Emerton and Balakrishna 2001, Khan and Pervaiz 2001)

4.2.2. The use of economic instruments for biodiversity conservation

Economic instruments and incentives which aim to overcome the economic causes of biodiversity loss and provide a supportive economic environment for conservation are crucial to the success and long-term sustainability of NBSAPs.

With few exceptions, NBSAPs recognise that there is a need to overcome both the direct and the underlying economic causes of biodiversity loss. However, beyond identifying the broad need to set in place economic incentives for biodiversity conservation, and to overcome the perverse incentives and disincentives that drive biodiversity loss, very few NBSAPs actually specify which economic

measures will be used, or attempt systematically to include economic instruments as components of the programmes and projects they propose. Only a small number of NBSAPs provide detailed guidance on the range of, and requirements for, incentive measures to be used in support of biodiversity conservation (Box 16). The NBSAP of the Kyrgyz Republic, for example, includes a strategic component dealing with both incentives and disincentives in forestry, wildlife, environmental protection, business, industrial and resource use sectors (Government of the Kyrgyz Republic 1998). Many of the strategic areas of action in Ecuador's NBSAP are also based on providing economic incentives for biodiversity conservation, including sustainable use of indigenous species, commercial aspects of biodiversity utilisation and addressing industrial pressures on biodiversity, and a section is devoted to proposing a series of economic instruments that should be set in place to provide general support to biodiversity in the country (Government of Ecuador 2001).

Box 16: Economic measures in Estonia's Biodiversity Action Plan

Estonia's NBSAP contains an action plan for biodiversity conservation up to the year 2005, which contains a series of objectives and actions required to conserve biodiversity in major sectors. In each of these sectors, a detailed set of supportive economic measures are specified and costed, including:

- For **landscape aspects** in planning and land management:
 - implementation of land tax benefits with regulation/change in land use practice
- For **agriculture**:
 - payment of mowing compensation in accordance with management plans
 - payment of grazing compensation in accordance with management plans
 - subsidies for purchasing of undemanding farm animals to increase grazing pressure in semi-natural communities
 - facilitation of marketing products related to semi-natural communities (meat, milk, wool, handicrafts, juniper souvenirs)
 - subsidy system for stimulation of producers of breeds and varieties characteristic of Estonia
 - creation of market niches for Estonian horse, Torii horse and Estonian draught horse
 - creation of market niches for high-fat milk of Estonian rural cattle and for sheep farming products
 - subsidies during 2 year period of transition to organic agriculture and during further practice
 - creation of favourable credit opportunities for organic agriculture
 - applications of economic measures such as subsidies tax deductions for limitation of agricultural non-point pollution
 - support to agricultural producers for purchasing of equipment suitable for sustainable exploitation of water bodies
- For **forestry**:
 - compensations for economic restrictions and obligations following from protection of forest biodiversity
 - tax deductions on the use of practices for the protection of biodiversity of forests
 - introduction of national wood standard taking biodiversity protection into account
- For **hunting**:
 - differentiation of hunting permits based on size of large predator populations
 - economic incentives to stimulate the hunting of racoons and American mink
- For **fisheries**:
 - changing of fishing licence fee system reallocation of part of fees for biodiversity protection
 - subsidies and compensation to encourage the use of sustainable fishing methods
- For **industry**:
 - update the rates of compensation for damage caused by pollution
 - implementation of environmentally-friendly industry labelling system
 - direct incentives (grants, tax concessions, special borrowing terms etc) for environmentally-friendly industry
 - revision of rates of natural resource use taxes
- For **transport**:
 - compensation for environmental damage caused by transport infrastructure
 - imposition of road tax for heavy trucks and trailers
 - inclusion of environmental damage in fuel excise tax
- For **tourism**:
 - preferential loans and financial support for eco-tourism projects
- For **nature conservation**:
 - prevention of assessment of and compensation for economic damages caused by protected species
 - compensation mechanism for damages to habitats caused by protected species

(From Government of Estonia 1999)

4.2.3. Mainstreaming biodiversity into economic sectors and decisions

The successful implementation of NBSAPs, and their impact on biodiversity status, depends largely on the extent to which the conservation goals and actions they contain are accepted by decision-makers and planners in other sectors of the economy, and integrated into their own strategies, policies and plans.

Beyond a broad emphasis on the need to ensure that macroeconomic and sectoral decision-makers integrate biodiversity into their policies, strategies and plans, very few NBSAPs specify how such integration will take place. Yet the acceptance of NBSAPs by economic planners and decision-makers is essential to the long-term viability and sustainability of biodiversity conservation. The few NBSAPs that address this matter in detail provide useful examples of the actions that may be used influence economic and development decision-making in favour of biodiversity and to harmonise NBSAPs with national development plans (Box 17). The Biodiversity Action Plan of Vietnam, for example, describes in detail its relationship with sectoral development plans, country masterplans and national priority programmes (Government of Vietnam 1994). Cuba's NBSAP has the goal of strengthening integration between biodiversity agencies and sectoral strategies and action plans (Government of Cuba 2001), and Argentina's NBSAP underlines the importance of inter-regional, as well as multi-sectoral, integration of conservation and development plans (Government of Argentina 2000).

Box 17: Integrating biodiversity into Oman's National Development Plan

In the course of outlining existing and on-going efforts for biodiversity conservation, Oman's NBSAP states that one of the key challenges facing biodiversity conservation is the establishment of positive linkages to economic development options, especially to the Sixth Five Year Development Plan for Oman for the period 2001-2005. The NBSAP notes that economic austerity, cutbacks in public expenditure, lack of international financial support, diversification of the economy away from oil to other productive sectors and accelerating privatisation have exerted high pressure on natural resources. The potential impacts of this new development plan on Oman's biodiversity is likely to be profound and far-reaching, including impacts from increased requirements of land for housing, industry, mineral exploitation, tourism development and the production of more food. Yet the NBSAP also underlines that biodiversity conservation also makes a major contribution to the development plan, and represents a vital investment in future sustainability of Oman's economic and social development.

The NBSAP goes on to note that the 5 year development plan has pledged to incorporate environmental considerations into planning, but that the success of this engagement requires the development of appropriate methodologies at macro and micro economic planning levels, and should involve sectors. The NBSAP thus argues that issues such as the lack of quantification of environmental impacts arising from misuse or overuse of natural resources, and the subsidies and investments that lead to environmental degradation are key to biodiversity conservation in the country. The NBSAP thus has the objectives of integrating biodiversity considerations into national and sectoral development plans, and of removing economic distortions such as subsidies and other fiscal measures that lead to resource misallocation or mismanagement. Priority actions specified in the NBSAP include to incorporate natural resource accounts into the national income accounts of Oman, and to incorporate environmental considerations into socio-economic planning.

(From Sultanate of Oman 2000)

A common theme, and one means to achieving integration into economic sectors and decisions, is the need to present reliable estimates of the economic value of biodiversity, in forms that can easily be understood and incorporated into economic planning and decision-making. Vietnam's NBSAP for instance recommends the application of natural resource accounting techniques to convince economic decision-makers about the economic importance of biodiversity (Government of Vietnam 1994). Sri Lanka's National Framework for Action for Biodiversity Conservation also calls for mechanisms for incorporating biodiversity values into national decision-making (Government of Sri Lanka 1998), and the Biodiversity Action Plan of Pakistan contains actions aimed at setting in place a system of environmental accounting at macroeconomic and sectoral levels (Government of Pakistan 2000).

4.3. Challenges and constraints to the use of economics in biodiversity planning

The experiences presented in this chapter make it clear that, over recent years, major achievements and advances have been made in using economics for biodiversity planning. Despite great variation between countries, most NBSAPs contain at least some recognition of economic aspects of biodiversity, make attempts to overcome economic causes of biodiversity loss, and recommend that economic measures be used in support of biodiversity conservation.

Box 18: Economic measures implemented following the adoption of Vietnam's NBSAP

Vietnam's 1994 Biodiversity Action Plan recommends a range of economic measures. A review of the extent to which these measures have actually been implemented shows that in many cases the Biodiversity Action Plan has been instrumental in promoting the use of economic tools and instruments for biodiversity conservation in Vietnam:

- **Economic valuation:** Although included as an important measure in the NBSAP, no concrete steps for implementation were given. Yet some attempts have been made to improve methodologies and information on the valuation of biodiversity since the NBSAP was adopted. At the provincial level, several Departments of Science, Technology and Environment attempted to value their natural endowment. This includes valuation of rare and endemic plant varieties in Hai Phong, valuation of coral reefs in order to point to better protection plans and the establishment of fees in Khanh Hoa, economic benefits of mangrove ecosystems in Thai Binh. Research institutes and universities also implemented several biodiversity valuation studies, including visitor willingness to pay for recreation in enhanced mountain landscapes, monetary value of benefits in Cat Ba and Tam Dao National Parks and Can Gio Natural Reserve, cost benefit analysis of mangrove rehabilitation in Nam Dinh Province, valuation of bamboo in Thanh Hoa Province, and NTFP marketing analyses of Ba Be National Park and Ke Go Nature Reserve. The Ministry of Finance is currently developing a country-wide method to assess and value the economic benefits of environmental policies for the period 2000-2010.
- **Economic incentive measures:** The NBSAP encourages the implementation of economic incentive measures, but provides little guidance on how to apply them. The Government Decree 02/CP for Forest Lands, implemented after the NBSAP, allows local people to be approached to undertake various conservation activities. In the case of watershed forests, Special Use forests, a fee for management and protection is paid to the contractor. In PA buffer zones large investments have been made in developing alternative livelihoods and provision of community benefits. The government is also progressively eliminating the subsidies that have had perverse impacts on biodiversity. Preferential taxation structures have been offered to reduce marine resources in near-shore areas, emerging fisheries laws stipulate that the State will allocate and lease land and marine areas to local households and specify a rehabilitation fund for aquatic living resources to be financed from fisheries taxes, fees and penalties. Subsidies are provided to farmers owning rare animals or plants in Hai Phong, direct payments are provided to farmers protecting watershed forests in Nghe An Province, and the Department of Science, Technology and Environment is investigating the possibility of tax exemptions for the owners of eco-shrimp ponds and is also studying the creation of an environmental fund for switching from destructive fishing techniques. The National Institute for Science and Technology Policy and Strategy Studies has recently made recommendations for the development of resource taxes aimed at protecting and developing mountain biodiversity. There are plans to introduce a certification and eco-labelling scheme for organic agricultural products.
- **Modifying national economic policies:** The NBSAP has made a major contribution towards biodiversity conservation being integrated into sector and locality environmental protection plans. However for a long time the same integration has not been apparent in development plans and programmes. Since the NBSAP, various ministries have been attempting to integrate environmental and economic policies, strategies and plans. The Ministry of Planning and Investment is integrating environmental concerns at early stages of decision-making and planning. The Department of Planning of the Ministry of Agriculture and Rural Development is attempting to select and prioritise investment in projects with a positive impact on biodiversity. The Ministry of Trade is currently studying the integration of biodiversity conservation into macroeconomic policies and plans. The Ministry of Finance is starting to analyse and assess the environmental impacts of financial decisions and policies, taxation policies and funds for biodiversity conservation. The NEAP 2001-2005 has recommended that each Ministry should establish units responsible for ensuring that environmental priorities are incorporated into sector-specific plans, work programmes and budgets at central and Provincial levels.

(From Casellini 2001, Government of Vietnam 1994)

Mention of economics tools and measures in NBSAPs however tends to remain very general, and broad references and statements about the importance of taking account of economic concerns are rarely translated into concrete actions. In only a small number of NBSAPs are any economic measures specified or elaborated in detail. Rather, most NBSAPs are primarily focussed on

“technical” aspects of biodiversity conservation, and contain few economic measures — either in a supportive role or as stand-alone activities. There are very few examples of countries where the adoption of the NBSAP has actually been followed by the implementation of economic measures for biodiversity conservation (Box 18).

4.3.1. Capacity and awareness

One reason for the weak inclusion of economic measures has been that economists are rarely included as part of NBSAP teams. National biodiversity planning is still seen largely as the preserve of natural scientists. This is exacerbated by the fact that in many countries there is little awareness, capacity or experience in biodiversity economics. Even in cases where economists were involved in the NBSAP process, and economic analysis was carried out as part of the Biodiversity Country Study or National Assessment, their recommendations and insights are often not included in subsequent NBSAPs. For example both Uganda’s and Zimbabwe’s NBSAPs, although accompanied by detailed economics assessments, paid only scant attention to economic instruments and incentives (Mabugu 2001, Shah 2001).

Yet the NBSAP process can in itself serve as an important step in building national biodiversity economics expertise. For example, work on the economic valuation of biodiversity carried out as part of the preparation of Samoa’s NBSAP was found to provide important materials for building capacity and awareness among decision-makers (Mohd-Shahwahid 2001). Likewise, training workshops, awareness seminars and capacity building for NBSAP teams and other government partners formed a central part of National Biodiversity Assessments in Ecuador, Djibouti, Eritrea and Sudan (Emerton 2001, Shah 2001).

4.3.2. Experiences and information on the use of economic measures for biodiversity

Another constraint is that countries often have little prior experience in using economic instruments and measures for biodiversity conservation, upon which they can draw when formulating NBSAPs. Economic tools have not traditionally formed a part of conservation strategies, policies and plans, and economic planners and decision-makers — who typically rely heavily on the use of economic instruments to achieve macroeconomic and sectoral development goals — rarely incorporate conservation targets into their work. Many biodiversity planners do not have access to information about how economic measures have been used for biodiversity conservation in other countries and sectors, or do not feel that these experiences are transferable to their own NBSAP. NBSAPs in both Ecuador (Government of Ecuador 2000) and Oman (Sultanate of Oman 2000), for example highlight the lack of country-specific data and experiences on the application of economic techniques and tools to biodiversity as a major gap in national biodiversity knowledge.

4.3.3. Integrating biodiversity into economic planning and decision-making

An additional — and possibly the most urgent — challenge facing biodiversity planning teams is to ensure that the goals, strategies and actions contained in NBSAPs are accepted by, and integrated into, mainstream economic and development planning. In many countries few people outside the conservation sector have any knowledge of the content or goals of the NBSAP. Yet it is macroeconomic and sectoral planners who decide the wider economic policies, activities and conditions under which people conserve or degrade biodiversity in a country, and which ultimately determine whether the NBSAP will be effective in practice. Efforts to integrate NBSAPs goals and recommendations into the strategies, policies and plans of these other sectors are rare. Kenya and Uganda are among the few countries where such attempts have been made. Here, follow-up work carried out after the development of NBSAPs has attempted to draw out conclusions and recommendations geared specifically to macroeconomic and sectoral decision-makers and to relate these to Poverty Reduction Strategies and Plans, the main policy documents currently driving macroeconomic and sectoral policies and planning at the national level in many developing countries (Gichere 2001, Moyini 2001).

5. Ways Forward and Requirements for Using Economic Measures in NBSAP Planning

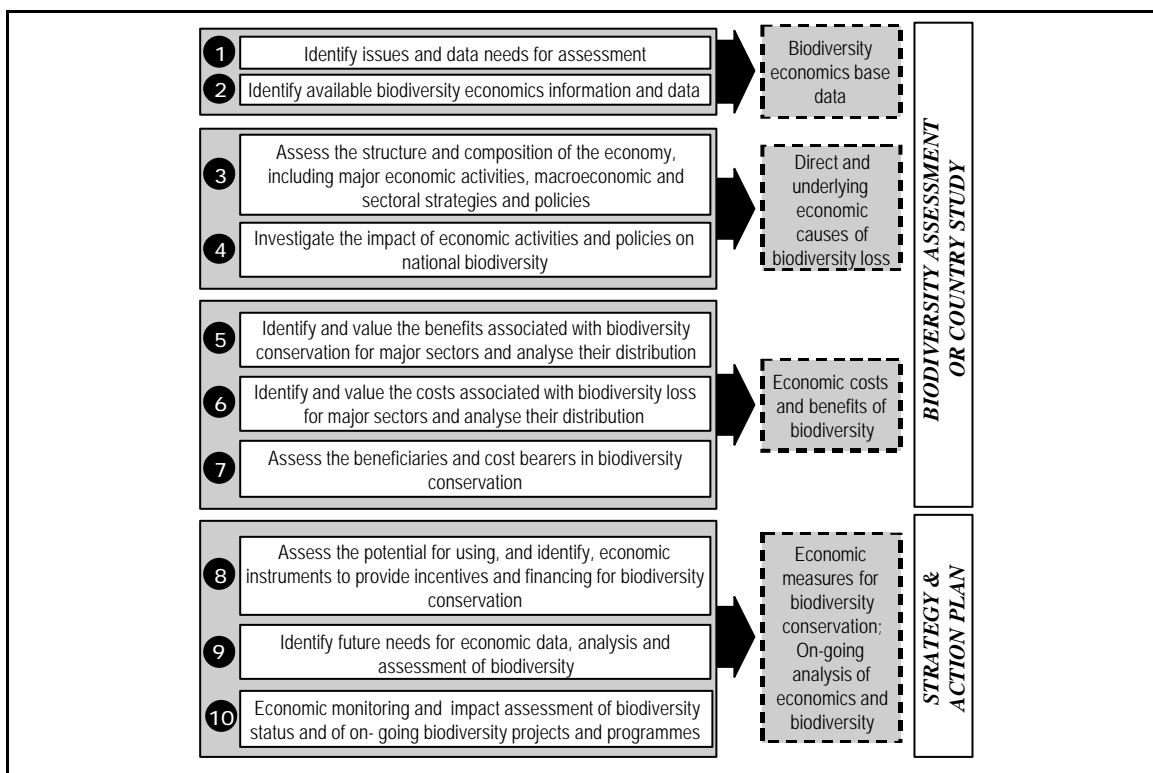
Most countries are in the final stages of preparing their NBSAPs, or have already adopted them. Although a wide range of useful methodologies, literature and practical experiences exist which outline the ways in which economics can be used in support of the Convention on Biological Diversity, it is clear that this information remained inaccessible or unknown to many biodiversity planners during the process of NBSAP development. This chapter synthesises available information and experiences and outlines the requirements and stages for ensuring that economic concerns are integrated into the NBSAP.

5.1. A framework for biodiversity economic planning

A major challenge, and prerequisite to NBSAP implementation, is to set in place some kind of framework which integrates biodiversity conservation with economic concerns. A first stage is to ensure that economic analysis is applied to the two components of the NBSAP process: National Assessments or Country Studies, and Strategies and Action Plans themselves. At a minimum, this involves dealing with the economic values of biodiversity, the economic threats to biodiversity, and the needs and niches for the use of economic incentives and instruments for biodiversity.

Many countries have already generated all or most of this information in the course of developing NBSAPs. Where this is not the case, it is relatively straightforward to carry out an economic analysis of biodiversity (Figure 5). These basic steps in the economic analysis of biodiversity are detailed below, and need only minor modification to be applicable to the analysis and implementation of any biodiversity-related or biodiversity-impacting policy, strategy or plan.

Figure 5: Economic steps in the NBSAP process



5.2. Economics in the National Biodiversity Assessment or Country Study

The main aim of applying economic approaches in the National Biodiversity Assessment or Country Study is to assess the current economic status of biodiversity in a country. It is possible to demonstrate the economic value of biodiversity, to identify the economic causes of biodiversity loss, and to point to needs for economic measures for the conservation of biodiversity. All of this information is necessary for the development of a Biodiversity Strategy and Action Plan.

Steps 1 and 2: Identifying data requirements

There is often little information available on biodiversity economics, because it is such a new discipline. A very important first step is to broadly define the type of data that will be required in the economic assessment of biodiversity, and to identify where such data may be sourced.

1. Identify issues and data needs for the assessment: Economic aspects of the National Biodiversity Assessment or Country Study will cover a number of key areas, although the particular focus of these areas will vary for different countries. Before starting to collect and analyse information on biodiversity economics it is necessary to identify these areas of focus, including:

- What components of biodiversity are particularly important or under threat?
- What are the main sectors of the economy, especially those that use or impact on biodiversity?
- Which major human groups use, depend or destroy biodiversity in the course of their economic activities?
- What are the main examples of the application of economics to biodiversity?
- Which are the major institutions or agencies involved in biodiversity conservation?

2. Identify sources of biodiversity economics information and data: Information on economic aspects of biodiversity is typically difficult to access, and spread over a large number of documents. Identifying sources of such information involves:

- Searching existing books, journals and articles for information on economic aspects of the country's biodiversity;
- Identifying the types of data that are routinely collected and analysed by government statistical, economic planning and sectoral departments, especially those relating to prices, basic macroeconomic indicators, volumes of production, earnings, revenues, employment, etc;
- Finding out what kinds of project reports and unpublished research papers have been produced by donors, NGOs, universities and research institutes on the economics of biodiversity;
- Accessing country, sector, development, statistical and environmental reports produced by multilateral agencies such as the World Bank and UN Agencies.

Steps 3 and 4: Analysing direct and underlying economic causes of biodiversity loss

One of the most important sets of activities in a Biodiversity Strategy and Action Plan will be those which aim to overcome the direct and underlying economic causes of biodiversity loss. A variety of literature, listed in Chapter 8, provide guidance and examples on identifying the economic causes of biodiversity, including Angelsen and Kaimowitz (1999) on forests, Blockhus et al (1999) on perverse subsidies, Fischer and Toman (2000) on subsidies, Foley et al (1999) on forests, Perrings 2000 on agricultural development, Repetto (1996) on macroeconomic policies, Stedman-Edwards (1998) on root economic causes, Swanson (1996) on economic causes.

The two steps described below provide the information necessary to identify which economic policies and activities are leading to biodiversity degradation in a country.

3. Assess the structure and composition of the economy: A country's basic economic attributes — such as its population, livelihood systems, and economic policies, sectors and performance — determine how people use and manage biodiversity. Collecting information about the structure and composition of the economy involves asking questions such as:

- How is the human population distributed: where do they live, within which ecosystems?

- How do the human population earn their livelihoods: what activities do they depend on to generate income and subsistence?
- What is the country's economic history: What are the major sectors in the national economy now, and how have they changed over the last decades? Have there been any major economic crises or shocks (such as civil unrest, unemployment, foreign exchange crises, collapse of domestic or international markets)?
- What has been the macroeconomic and sectoral policy focus: What are the country's economic policy goals now, and how have they changed over the last decades? What kind of economic instruments (such as nationalisation, trade promotion, market interventions, taxes and subsidies, exchange rates, interest rates, the elements of structural adjustment programmes) have been used to stimulate particular economic sectors or activities?

4. Investigate the impacts of economic activities and policies on biodiversity: Once a country's economic structure and composition is known, conclusions can be drawn about the impact of these economic conditions, policies and activities on biodiversity. In particular, it should be possible to identify the main economic causes of biodiversity loss. This involves asking questions such as:

- Now and in the past, which economic sectors and activities depend directly on biodiversity (such as fisheries, forestry or wildlife), and do they lead to its degradation because they use unsustainable harvesting methods or over-exploit biological resources?
- Now and in the past, which economic sectors and activities (such as agriculture, energy, mining, industry and tourism) impact on biodiversity through their secondary effects because they impact on ecosystem integrity and environmental quality?
- How have past and current economic conditions led to biodiversity being degraded (for example through poverty, population migration, needs for foreign exchange earnings, economic crisis and stagnation)?
- How have past and current economic policies caused biodiversity loss (for example by encouraging biodiversity-degrading activities, by manipulating and distorting prices through subsidies or market interventions, by taxing biodiversity-friendly activities, by withholding funds from biodiversity conservation, by failing to set in place realistic fines and penalties for biodiversity loss)?

Steps 5, 6 and 7: Identifying and quantifying the economic benefits and costs of biodiversity, and highlighting their distribution

Information on the economic values associated with biodiversity, both positive and negative, indicates the basic economic status of biodiversity in a country. It is also central to the development of the NBSAP. Key references which present guidelines for biodiversity valuation include Aylward (1991), Barbier et al (1994), Pearce and Moran (1994), Perrings (1995), (see Chapter 8).

The three steps described below provide the information necessary to analyse the costs and benefits associated with conserving biodiversity in a country.

5. Identify biodiversity economic benefits and their distribution: Identifying, and where possible quantifying, the economic benefits of biodiversity provides a strong argument for conservation. Unless it can be demonstrated that biodiversity has a high value, and makes a demonstrable contribution to national development and economic goals, it is often difficult to justify a NBSAP to other sectors of the economy, or to economic planners and policy-makers. This involves asking questions such as:

- What are the major economic benefits associated with biodiversity in the country? This should include consideration of the direct, indirect, option and existence values associated with biological resources, ecosystems and their diversity, as illustrated above in Figure 3.
- In what form, and to what groups and sectors, do these values accrue? For example, are they manifested as contributions to household income, industrial earnings, government revenues, exports, foreign exchange earnings, savings in private or public expenditures? What is the contribution of biodiversity to national income and national development indicators such as GDP, sectoral earnings and employment?
- How far can these biodiversity economic benefits be valued, and expressed in monetary terms? How much are different components of the total economic value of biodiversity worth?

6. Identify biodiversity economic costs and their distribution: Biodiversity conservation also gives rise to costs. It is equally important to be able to identify the type and magnitude of these costs, in order to plan for ways of funding or offsetting them as part of the NBSAP. This involves asking questions such as:

- What are the major economic costs associated with biodiversity conservation in the country? This should include consideration of the direct costs of managing and conserving biodiversity (e.g. expenditures of government departments and NGOs), the opportunity costs (alternative economic opportunities foregone, such as unsustainable land and resource uses in protected areas, or polluting industrial production technologies), and any costs that the conservation of biodiversity imposes on other economic activities (for example wild animal damage to agriculture, human health impacts).
- In what form, and to what groups and sectors do these costs accrue? For example, are they manifested as losses to local livelihoods, industrial profits, government revenues, private or public expenditures?
- How far can these biodiversity economic costs be valued, and expressed in monetary terms? How much are different components of the total economic cost of biodiversity worth?

7. Identify the beneficiaries and cost-bearers in biodiversity conservation: The way in which these biodiversity costs and benefits are distributed between different groups and sectors presents both an explanation of the economic reasons why biodiversity is degraded, as well as pointing to the needs for redistributive economic instruments within the NBSAP. This involves asking questions such as:

- Who are the main economic beneficiaries of a country's biodiversity? For example international tourists, international companies, domestic enterprises, local consumers of resources, government, particular sectors, etc?
- Who are the main economic cost-bearers in biodiversity conservation? For example government and NGO conservation agencies, local communities, etc?
- Is it possible to quantify the economic gains or losses accruing to any of these groups from biodiversity?
- Are there any particular groups who lose out, overall, from the presence of biodiversity?
- What does the distribution of biodiversity economic costs and benefits mean? Does it mean that there are particular groups who gain large benefits from biodiversity at low or zero cost? Are there any particular groups who degrade biodiversity at low or zero cost, and who bears the costs associated with this biodiversity loss? Are there particular groups who therefore have few economic incentives to conserve biodiversity? Are there particular groups who lack the funds to finance the costs associated with biodiversity conservation?

5.3. Conclusions from the economic assessment of biodiversity

The seven steps that comprise economic aspects of the National Biodiversity Assessment or Country Study should result in a number of conclusions about the linkages between economics and biodiversity. In turn, these conclusions will set the basis for integrating economic tools and measures into the National Biodiversity Strategy and Action Plan:

- Why biodiversity conservation is an economically desirable use of funds, resources and land for the country: the economic justification for the NBSAP
- The role that the country's biodiversity plays in international, national and local economies and for different groups such as local communities, industries and the private sector, and government.
- The implications of biodiversity degradation for a country in terms of loss of economic benefits.
- The economic costs of biodiversity conservation that need to be covered or offset in the NBSAP.
- The economic policies, markets and activities that cause biodiversity degradation and loss and need to be addressed in the NBSAP, in both environmental and non-environmental sectors.
- How biodiversity costs and benefits are distributed between different groups and sectors, and where this contributes to biodiversity loss because it results in financial shortfalls or economic disincentives.

- The need to include economic and financial measures in the NBSAP, and how these need to be targeted at particular groups, sectors, economic policies and activities.

5.4. Economics in the National Biodiversity Strategy and Action Plan

The main aim of applying economic approaches in the National Biodiversity Strategy and Action Plan is to demonstrate that biodiversity conservation can be economically worthwhile to the various groups upon whom its conservation depends, to help overcome the economic causes of biodiversity degradation and loss, and to ensure that adequate and sustainable funding exists for biodiversity conservation. Integrating economic concerns and measures into the NBSAP involves 3 stages, described below.

Step 8: Recommending economic measures for biodiversity conservation:

The conclusions drawn in the economics component of the National Biodiversity Assessment or Country Study should point clearly to areas where economic measures for biodiversity conservation are required in the NBSAP. It is also necessary to analyse other strategies and actions specified in the NBSAP in order to ensure that each is viable in both economic and financial terms. General guides for setting in place economic measures for biodiversity conservation are available which deal with incentive measures (Bowles et al (1996), Emerton (2000), McNeely (1988), OECD (1999), National Centre for Environmental Economics (2001), Vallejo and (Hauselmann 1998)), financing mechanisms (Bayon et al (2000), McNeely (1999), McNeely and Weatherly (1995)) as well as those describing economic measures for biodiversity conservation for particular regions, including Eastern Africa (Emerton (1998)), Latin America and Caribbean (Emerton and Ferrin (2000), Huber et al (1998), UNEP (2000a)), Pacific Islands (Hunt (1997)). All are detailed in Chapter 8.

Recommending economic measures for biodiversity conservation involves:

- Identifying economic instruments and financing mechanisms that can support the broad objectives and goals of the NBSAP.
- Identifying specific actions to overcome or mitigate the direct and underlying economic causes of biodiversity loss.
- Identifying specific programmes of work that are needed to improve economic and financial conditions for biodiversity conservation, identify and pilot economic instruments and financing mechanisms or share experiences about their use.
- Identifying targeted economic instruments and financing mechanisms that can be used to strengthen the implementation of other actions specified in the NBSAP.
- Ensuring that economic instruments and financing mechanisms are appropriate. There is a broad range of economic and financial measures that can potentially be used for biodiversity conservation. Not all will be useful within the context of a particular country's NBSAP or its broader economic, political and social conditions. The choice of economic and financial measures for a NBSAP should always be cross-checked so as to ensure that they will be implementable in practice: for example whether they are consistent with (and support) a country's broader economic and development goals, whether they involve significant costs to implement, whether they are politically acceptable, whether they support social and equity considerations, etc.

Step 9: Identifying future needs for economic data, analysis and assessment:

Very few countries have a system in place for collecting and analysing biodiversity economics information. It is also likely that much of the background information about biodiversity and economics that is produced as part of the National Biodiversity Assessment and Country Study will be of a very preliminary nature. Thus, actions aimed at improving the state of knowledge on biodiversity economics costs, benefits, incentives and financing, are likely to form an important part of the NBSAP. This includes:

- Actions aimed at collecting and analysing information about issues in the economics of biodiversity that are currently lacking, including building capacity to collect and analyse such data;
- Actions aimed at setting in place systems to assess economic aspects of biodiversity on an on-going basis, which can be applied within the context of monitoring the NBSAP (see below, Step 10), and influencing future biodiversity and economic policies, strategies and plans.

Step 10: On-going monitoring of economic and biodiversity status:

The role of economics does not end with the production and adoption of a NBSAP, but continues after its implementation. Economic forces and conditions, and biodiversity status, continuously undergo change. It is necessary to assess the economic impacts of changes in biodiversity status, to track the effects of changing economic conditions on biodiversity, and to monitor the effectiveness and impacts of the economic and other measures set in place as part of the NBSAP so that they can be reviewed on an on-going basis.

6. Ways Forward and Requirements in Using Economic Measures for NBSAP Implementation

Countries are now beginning to implement National Biodiversity Strategies and Action Plans, and to set in place a range of new biodiversity-related institutions, policies, programmes and projects. Perhaps the most urgent need currently facing biodiversity planners is to ensure that the economic measures and actions specified in their NBSAPs are actually translated into practice, and that biodiversity concerns are integrated fully into the agenda of mainstream development and economic planning and decision-making. Unless it is possible to present a strong economic justification for biodiversity, and to take practical steps to guarantee that there are economic gains from conservation, there is a serious risk that the implementation of NBSAPs will have little impact over the long-term. The report concludes by proposing a series of steps to assist in designing and implementing economic aspects of NBSAPs, which draws on available guidance, experiences and lessons learned and emphasises the need for conservation and economic planners and decision-makers to work together to ensure that economic measures are used to support biodiversity conservation over the long-term.

6.1. The risks of failing to use economic measures in support of NBSAP implementation

Over the last two decades many countries have been almost continuously engaged in environmental planning, formulating a series of national plans for conservation. Much time, effort and funds have been invested in developing National Conservation Strategies, National Environmental Action Plans, National Environmental Adjustment Programmes and now NBSAPs. Many of these documents have never been implemented, but have merely led on to another round of environmental planning. There is an ever-present danger that NBSAPs, like so many environmental conservation strategies and plans formulated in the past, will never reach a stage of implementation.

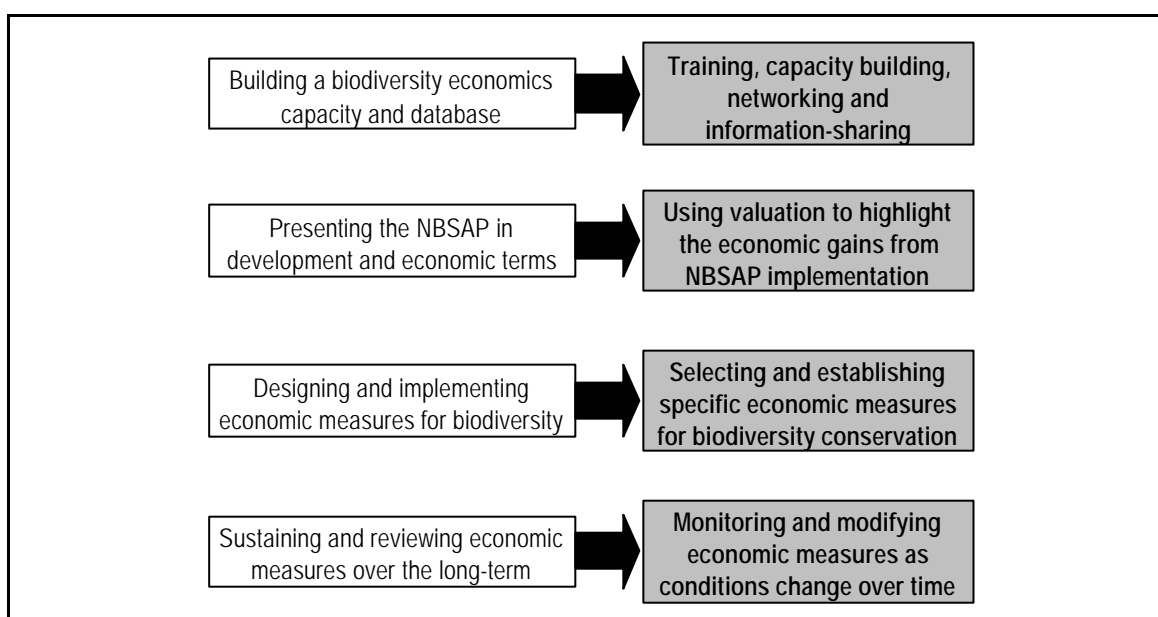
The extent to which NBSAPs are able to influence the ways in which economic sectors operate will be a crucial determinant of their successful implementation. A common omission in earlier national conservation plans was their assumption that implementation depended only on actions, policies and programmes within the environmental sector. NBSAPs have at least gone some way in recognising that other sectors, too, must become fully engaged if biodiversity is to be conserved.

Yet, although there is already a great deal of support for conservation from other sectors, goodwill alone is not enough to ensure that biodiversity will be conserved. The NBSAP must be shown to make demonstrable economic and development sense. Biodiversity conservation is not the first priority of most sectors — other goals such as income and employment generation, economic development, poverty alleviation and social equity are more important. The greatest potential for using economic measures in support of NBSAP implementation is that they can help to ensure that biodiversity conservation becomes an economically desirable option. This requires that NBSAP goals and strategies are seen to be acceptable and beneficial in broader economic and political terms, that biodiversity programmes and projects are shown to make a proven contribution to wider national development and policy goals, and that concrete steps are taken to set in place positive and enabling economic incentives to support the implementation of each component of NBSAPs. Failing to do this may seriously compromise the viability, effectiveness and sustainability of NBSAPs, meaning that — like so many of the environmental strategies, policies and plans that preceded them — they run the risk of having no long-term impact at all.

6.2. A framework for using economic measures to support NBSAP implementation

Information about the economic benefits and costs of biodiversity, the direct and underlying economic causes of biodiversity loss, and the economic instruments and incentives required for biodiversity conservation, collected as part of the development of the NBSAP (as outlined in section 5.1 above), provides the basis for incorporating economic measures into, and engaging other economic sectors in, NBSAP implementation. Using economic measures to support NBSAP implementation involves a number of activities which are designed to ensure both that NBSAP goals and concerns are integrated into mainstream economic thinking, and that economic concerns are included within NBSAP actions (Figure 6).

Figure 6: Steps in using economic measures to support NBSAP implementation



6.3. Building a biodiversity economics capacity and information base

Some level of biodiversity economics capacity is required if economic measures are to be used in support of NBSAP implementation. Many countries still lack environmental or natural resource economics expertise. Although economic analysis carried out as part of the preparation of Biodiversity Country Studies, Strategies and Action Plans should have gone some way towards building such experience, it may be necessary to identify additional opportunities for training and capacity building — possibly as part of the actions recommended by the NBSAP itself. Often, economists drawn from Ministries of Finance and Planning already have much of the technical knowledge and experience required to design and set in place economic instruments and incentives, and can provide useful assistance and support in NBSAP implementation.

A wide range of useful guidelines, case studies, toolkits and manuals exist which deal with economic aspects of biodiversity conservation. Key references and literature are listed in Chapters 3 and 8 of this publication. Although no single document provides a comprehensive or step-by-step summary of the requirements and techniques for using economic measures in support of NBSAP implementation, together they yield valuable insights and information. As there is great variation in the scope and applicability of economic measures for biodiversity conservation, it is also essential that country-specific information and experiences collected during the course of NBSAP implementation are documented and shared.

6.4. Presenting the NBSAP in development and economic terms

One of the most important aspects of using economic measures in support of NBSAP implementation is that it involves active collaboration and co-operation between planners and decision-makers in both biodiversity and economic sectors. NBSAPs are usually written with conservation and scientific audiences in mind. Even popular versions of NBSAPs rarely target economic decision-makers and planners. An important step in ensuring that NBSAP goals and actions enter into the agendas of macroeconomic and sectoral decision-makers, and in setting in place the supportive economic measures to implement them, is to provide information about how the NBSAP is of relevance and importance to development and economic goals.

Valuation is an especially useful tool for building a constituency for the NBSAP among development and economic decision-makers. It can also help to highlight economic aspects of the NBSAP for conservation and scientific audiences. Soon after the NBSAP is finalised, it is desirable that key biodiversity goals and actions should be presented (and justified) in development and economic terms, through the provision of practical, policy-relevant and preferably quantified information on topics such as:

- The role of biodiversity in national and sectoral income and output;
- The contribution of biodiversity to key economic indicators such as employment, domestic and international trade, foreign exchange earnings and public revenues;
- The economic implications of, and reasons for, biodiversity degradation and loss;
- The potential financial and economic gains from implementing the NBSAP;
- The ways in which the NBSAP contributes to broader development goals, such as poverty alleviation, social equity, food security, export promotion, employment generation and rural livelihood diversification.

Once interest in the NBSAP has been established among economic decision-makers, more concrete steps can be taken in planning for its implementation. Biodiversity and environment departments do not have the sole responsibility for executing NBSAPs. In many cases it is other sectoral and line agencies who will ultimately be charged with implementing economic measures (or with reforming or dismantling existing economic measures that conflict with biodiversity conservation goals). For this reason, and in order for NBSAPs to be fully mainstreamed into broader economic and development planning processes, it is important to achieve at least some degree of harmonisation and consistency between NBSAPs and sectoral strategies and plans. This usually requires both that NBSAP programmes and projects are re-phrased or re-emphasised in terms of broader development goals or current macroeconomic plans, and also that the programmes and projects of economic sectors are modified in the light of biodiversity conservation concerns.

6.5. Designing and implementing economic measures for biodiversity

Very few NBSAPs do more than state their intention to use economic measures for biodiversity, and in many cases no economic measures at all are specified. Detailed design and selection of economic instruments and incentives is rarely carried out until after the NBSAP has been adopted. This has a number of advantages — it means that the choice of economic measures can be informed by the final content, scope and goals of the NBSAP, and also provides the opportunity for groups and sectors who were not part of the original NBSAP planning team to participate in the development of economic measures.

Once NBSAPs have been set within a broader development context, and a dialogue established with sectoral planners and decision-makers, it is possible to select, design and set in place economic measures for implementation. These include instruments both to support and reinforce the

biodiversity conservation activities specified in the NBSAP, and to overcome or counterbalance threats to biodiversity in other sectors of the economy. Detailed guidance has been presented by the CBD and other organisations on the design and implementation of incentive measures (see UNEP/CBD/SBSTTA 3/Inf./17 and 7/11, COP/4/18, COP/5/15, OECD 1999). According to these documents, some of the key elements in the design economic measures for NBSAP implementation are:

- Economic measures should closely **target** particular groups, sectors or products;
- Economic measures should have **clear and measurable aims**, results and outputs;
- Economic measures should be based on the **ecosystem approach**, and subscribe to the precautionary principle;
- Economic measures should be designed to ensure that expected **benefits are greater than or equal to the costs** of implementation, administration and enforcement;
- No single economic measure, alone, is likely to be sufficient — a **mix of mutually supporting incentives and disincentives** should be applied;
- **Participation and understanding** among a wide group of stakeholders is essential to the design and implementation of economic measures for biodiversity;
- Incentives should be **appropriate to, and consistent with**, broader cultural, political and economic goals;
- Economic measures require sufficient **funding, expertise and administration**;
- The ultimate success of economic measures is contingent on proper **monitoring and evaluation** of their impacts;
- Economic measures do not stand alone, but need to be accompanied by a range of **other technical, legal, social and institutional** actions and measures.

Figure 7 presents examples of the types of information and decisions involved in identifying economic measures for NBSAP implementation, and Chapter 7 provides further details on the design and implementation of incentives.

Figure 7: A matrix for identifying economic measures for NBSAP implementation

	Required result(s)	Target	Proposed economic measure(s)	Implementation responsibilities
Economic measures to counterbalance threats in other sectors				
e.g. <i>Industrial pollution of wetlands</i>	<ul style="list-style-type: none"> • Reduce wetland pollution • Increase proper treatment of industrial wastes 	<ul style="list-style-type: none"> • Industries 	<ul style="list-style-type: none"> • Pollution and effluent charges or tradable permits • Waste disposal and cleanup fees • Bonds on waste disposal and hazardous chemical use • Credit and loans/tax deductions for clean production and waste disposal investments 	<ul style="list-style-type: none"> • Environment agencies • Municipal councils • Urban planning departments • Water and sewerage corporations • Private sector
Economic measures to support NBSAP activities				
e.g. <i>Promotion of sustainable NTFP utilisation activities</i>	<ul style="list-style-type: none"> • Increase relative profitability of sustainable NTFP utilisation • Replace unsustainable forest resource use 	<ul style="list-style-type: none"> • Primary harvesters • Processors and cottage industries • Resource traders • Resource consumers 	<ul style="list-style-type: none"> • Rationalisation of licence fees • Increased fines and penalties • Credit and loans for new/efficient technologies • Development of new and value-added markets • Differential product and sales taxes • Eco-labelling 	<ul style="list-style-type: none"> • Forestry Department • Agricultural extension agencies • Banks and financial institutions • Private sector • Forest-adjacent communities

6.6. Sustaining and reviewing economic measures over the long-term

Once set in place, economic measures for biodiversity must be sustained over the longer-term. Just as most other sectors of the economy operate within the context of defined budgeting and planning periods, so the NBSAP should be seen as a rolling investment plan which need to be reviewed and reformulated on a regular basis. Monitoring plans are usually set up as part of the NBSAP, and it is essential that economic conditions and impacts are included in this.

Economic instruments and incentives are targeted very closely to particular groups, sectors, threats and conditions. All of these are subject to change over time. Economic measures in the NBSAP therefore need to be periodically re-examined both in the light of shifts in biodiversity threats and status and on the basis of wider economic and development changes. Examples of the types of information gathered to inform the monitoring and review of economic measures are provided below in Figure 8.

Figure 8: Checklist of questions for use in monitoring and reviewing economic measures

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| <ul style="list-style-type: none">✓ What have been the impacts of the economic measure on biodiversity conservation goals and indicators?✓ Is the economic measure still effective?✓ Is the economic measure still required?✓ Do different economic measures still mutually support and reinforce each other?✓ Have target groups or sectors changed?✓ Have economic or market conditions changed?✓ Have national development goals and economic priorities changed?✓ Have new threats to biodiversity arisen?✓ Is it necessary to engage new partners in implementing the economic measure?✓ Is the economic measure still acceptable and appropriate?✓ Is the economic measure increasing social inequity or worsening the incidence of poverty?✓ Are the transaction, enforcement and participation costs in implementing this measure still tenable?✓ Is there a need to provide other social, institutional, legal or technical support for the economic measure? |
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<p><i>How do economic measures for biodiversity need to be modified and improved?</i></p>
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7. Elements in the Design and Implementation of Incentive Measures

In Decision V/15 the Conference of the Parties established a programme of work to promote the “development and implementation of social, economic and legal incentive measures for the conservation and sustainable use of biodiversity ... in order to (a) support Parties, Governments and organisations in developing practical policies and projects; (b) develop practical guidance to the financial mechanism of effective support and prioritisation of these policies and projects”. As a first step, this involved the development of a matrix by the Secretariat to the CBD, identifying the range of instruments available, their purpose, interaction with other policy measures and effectiveness, with a view to identifying and designing relevant instruments in support of positive measures, and to elaborate proposals for the design and implementation of incentive measures for consideration by SBSTTA and by the COP. The document UNEP/CBD/SBSTTA 7/11 advances this work, and further discusses other elements of the design and implementation of incentive measures.

SOME ELEMENTS ASSOCIATED WITH THE DESIGN AND IMPLEMENTATION OF INCENTIVE MEASURES	
1. IDENTIFY THE PROBLEM: PURPOSE AND ISSUE IDENTIFICATION	<p>Goals of the incentive measures. An incentive measure should have a defined purpose. Consistent with decision V/15, the purpose of incentive measures is to achieve one of two goals: the conservation of biodiversity, as well as the sustainable use of the components of biodiversity.</p> <p>Underlying threats to biodiversity. The identification of the proximate and underlying causes of threats to biodiversity and its components is necessary to select the appropriate measure to stop or reverse degradation. Policies that create incentives without removing the underlying causes of biodiversity loss (including perverse incentives) are unlikely to succeed. Therefore, prior to embarking on an exercise to develop incentive measures for conservation or sustainable use, it is important to undertake a thorough study to identify and evaluate the respective and mutually reinforced impacts of any underlying pressures. These include threats generated by social or economic forces. In some cases social and economic issues are at the root of unsustainable practices and, while addressing market and policy failures with incentive measures may help to correct this behaviour, this may not address core problems such as lack of resources or poverty. This might also include the identification of existing incentive measures or perverse incentives that might threaten biodiversity.</p> <p>Identification of relevant experts and stakeholders. As well as including experts, scientists and policy-makers, the range of stakeholders should extend to members of the indigenous and local communities impacted by a measure who might have practical knowledge associated with the issue and could be key players in its successful implementation</p> <p>Establish processes for participation. In order to ensure that incentive measures are developed in a manner that is participatory and promotes effective policy integration and stakeholder participation, processes should be established to facilitate intergovernmental dialogue as well as dialogue with relevant stakeholders including indigenous and local communities.</p> <p>Set clear targets. An incentive measure should have a target that is, where possible, measurable. Indeed, the ultimate success of any incentive measure is contingent upon the successful monitoring and evaluation of its impact. Without indicators of success or failure, it is unclear how to adapt so as to address failings and reinforce success through corrective action.</p>

<p>2. DESIGN</p>	<p>Ecosystem approach. The design of incentive measures should be based on an ecosystem approach as defined in the framework of the Convention, notably in decision V/6 of the Conference of the Parties, e.g., a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.</p> <p>Precautionary approach. Combined with the ecosystem approach, a precautionary approach requires that programmes on incentive measures err on the side of caution when scientific knowledge is uncertain or where ecological consequences might be irreversible.</p> <p>The efficiency principle. Programmes on incentive measures should be designed to ensure that expected social benefits are greater than or equal to the cost of implementation, administration, and enforcement. The social and institutional context of a country can impact these costs considerably.</p> <p>Internalization. In light of the fact that in some cases the underlying cause of biodiversity loss is market failure, internalization should be considered a guiding principle for selecting appropriate incentive measures to arrest or reverse the loss. Internalization refers to incorporating external costs and benefits into the decisions of producers and consumers. External costs and benefits are essentially environmental "side effects" of economic activities and incentive measures should strive to internalize a greater proportion of these effects in the calculation of decision makers and consumers.</p> <p>Comprehensibility. While recognizing the interaction of many factors, incentive measures should remain as simple and focused as possible, allowing for faster implementation and clearer assessment of their effect. They should be easily understood by all stakeholders.</p> <p>Equity: distributional impacts. In designing incentive measures, it is important to ensure that the definition of beneficiary communities is inclusive and equitable. A participatory approach to the development and implementation of incentive measures can help ensure that these issues are considered.</p> <p>Creation of value for indigenous and local communities. Stakeholders should see the value in biological diversity for subsistence, cultural or commercial purposes. Incentive measures should be designed to meet the social and economic development needs of indigenous and local communities.</p> <p>Mix of measures. No single measure is likely to be flexible and rigorous enough to address all aspects of a specific concern and a combination of incentive measures may be necessary in order to realize both the public benefits of protecting biodiversity and the private benefits brought about by the sustainable use of its components.</p>
<p>3. BUILD SUPPORT AND PROVIDE CAPACITY: FACILITATING IMPLEMENTATION</p>	<p>Physical and human capacity. This includes scientific and technical capacity, as well as capacity related to administrative, educational, and training and communications-related issues. In many cases, in the implementation phase of incentive measure, there will be an ongoing need for training of trainers, managers and other workers, public education programmes and other forms of human capacity-building. In other cases there may be a need for physical capacity-building, including installing monitoring equipment or other infrastructure needs. Training will often be a necessary component for the effective implementation of incentive measures.</p> <p>Institutional arrangements. Institutional arrangements are required to encourage dialogue and communication between policy makers within government and stakeholders outside of government at the national and local levels. Ensuring that avenues exist for intra-governmental dialogue between</p>

	<p>relevant ministries and agencies with an interest in biodiversity is important as government agencies will often share responsibilities in the implementation of incentive measures where attention to the enabling of macro-economic and biodiversity policy and of legal environments is required. For local and indigenous communities to be equal partners in the implementation of incentive measures, considerable time may have to be devoted to the development of community institutional structures.</p> <p>Stakeholder involvement. Even after the design of a measure, stakeholders can be key to ensuring that it is implemented effectively on the ground. Therefore, ongoing access to information and communication such as meetings at the local level to explain the incentive, organizing training workshops or establishing control and follow up systems with appropriate government agencies might all be important elements to consider in the successful application of incentive measures. This includes the involvement of all stakeholders including nongovernmental organizations who, by virtue of their mode of operations and their close proximity to rural communities, can gain the trust of grassroots populations, putting them in a strategic position to encourage the effective implementation of incentive measures. In the long run, such an approach can reduce costs associated with implementing and monitoring incentive measures, where relevant groups feel as though they have a stake in a successful outcome and accountability has been established through shared responsibility for the successful implementation of a measure. Relevant stakeholders can play an important role in building the capacities of local institutions in order to enable them to better negotiate the terms and conditions of the incentive measures.</p> <p>Funding Capacity is needed in varying degrees to finance incentive measures including capacity for implementation.</p>
<p>4. MANAGE, MONITOR AND ENFORCE</p>	<p>Administrative and legal capacity. The ultimate success of any incentive measure is contingent upon successful monitoring, enforcement and evaluation of its impact. Adequate capacity to manage, monitor and enforce incentive measures rests in part on adequate stakeholder involvement and the existence of sound institutions. It also depends on available administrative and legal capacity. There are specific requirements for administrative and legal capacity associated with the monitoring and enforcement of certain incentive measures. The levels and type of capacity will vary depending upon the measure. Legal and regulatory measures, for example, tend to require considerable administrative capacity for effective monitoring and enforcement. On the other hand, community-based measures and other economic incentives require less. Incentives for biodiversity conservation are unlikely to achieve their objective, unless the capacity exists to monitor, enforce and assess these policies at local, national and international levels.</p> <p>Funding Adequate funding should be available to ensure the effective monitoring and enforcement of incentive measures.</p>

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8.2. Internet resources

- ANSZEE, Australia & New Zealand Society for Ecological Economics: <http://www.cres.anu.edu.au/anzsee>
- Association of Environmental and Resource Economists: <http://www.aere.org/>
- Beijer Institute: http://www.beijer.kva.se/publications/pdf-archive/pdf_archive.html
- Biotrade Initiative: <http://www.biotrade.org/>
- CANSEE, Canadian Society for Ecological Economics: <http://socserv2.socsci.mcmaster.ca/~cansee>
- Centre for Social and Economic Research on the Global Environment (CSERGE): <http://www.uea.ac.uk/env/cserge/>
- Conservation International (CI) Economics Program: http://www.conservation.org/WEB/FIELDACT/C-C_PROG/ECON/Econ.htm
- Convention on Biological Diversity (CBD): <http://www.biodiv.org/>
- ECOECO Brasil, Brazilian Society for Ecological Economics: <http://www.eco.unicamp.br/ecoeco>
- Economy and Environment Programme for South East Asia (EEPSEA): <http://www.eepsea.org/>
- Ecosystem valuation: <http://www.ecosystemvaluation.org/>
- Envalue: <http://www2.epa.nsw.gov.au/envalue/>
- Environmental Economics Network for Eastern and Southern Africa (EENESA): http://www.ranesa.co.za/eenesa_home.htm
- Environmental Valuation Reference Inventory (EVRI): <http://www.evri.ec.gc.ca/evri/>
- ESEE, European Society for Ecological Economics: <http://www.euroecolecon.org/>
- Forum for Economics and Environment (South Africa): <http://www.econ4env.co.za/>
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International Development Research Centre (IDRC): http://www.idrc.ca/resources/index_e.html
INSEE, Indian Society for Ecological Economics: <http://indev.nic.in/insee/>
International Institute for Environment and Development (IIED):
<http://www.iied.org/infopubs/index.html>
International Society for Environmental Economics (ISEE): <http://www.ecologicaleconomics.org/>
IUCN – The World Conservation Union, Economics Unit: <http://www.biodiversityeconomics.org>
London Group on Environmental Accounting: <http://ww2.statcan.ca/citygrp/london/london.htm>
Organisation for Economic Co-operation and Development (OECD): <http://www.oecd.org/env/online.htm>
Overseas Development Institute: <http://www.odi.org.uk/publications/intro.html>
Resource Accounting Network for Eastern and Southern Africa (RANESA): <http://www.ranesa.co.za/>
Resources for the Future (RFF): <http://www.rff.org>
Russian Chapter of ISEE: <http://www.ulb.ac.be/ceese/STAFF/safonov/ISEERC.htm>
South Asian Network for Development and Environmental Economics (SANDEE):
<http://www.sandeeonline.com/>
Sustainable Economics Network (SEN): <http://www.geocities.com/wwfsen/>
United Nations Environment Programme (UNEP) Economics and Trade Unit: <http://www.unep.ch/etu/>
United Nations Environment Programme (UNEP) Financial Services Initiative:
http://www.unep.ch/etu/finserv/fin_home.htm
USSEE United States Society for Ecological Economics: <http://www.ussee.org>
ValuAsia, Benefits Transfer for Southeast Asia: <http://www.geocities.com/valuasia/>
World Bank Environmental Economics and Indicators: <http://www-esd.worldbank.org/eei/>
World Resources Institute (WRI): <http://www.wri.org/wripubs.html>
WWF Macroeconomics for Sustainable Development:
<http://www.panda.org/resources/publications/sustainability/mpo/>