Chapter 19. Integrating economics

CHAPTER 19

Integrating economics

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SUMMARY

Economics provides a important set of approaches and tools for biodiversity conservation, as reflected in repeated calls for its use in the Convention on Biological Diversity and its related meetings and decisions. Its tools demonstrate the high economic value of biodiversity and address the economic causes of biodiversity degradation and loss. But although economic tools include economic and financial incentives that encourage and enable people to to conserve biodiversity, they have rarely been applied to biodiversity planning in Asia.

A major reason for this omission is that little practical guidance has been provided to planners on how to use economics for biodiversity conservation. Although there are examples of the application of economics approaches to biodiversity in Asia, none have been presented in a form that can easily be adapted to biodiversity planning, especially National Biodiversity Strategies and Action Plans. A practical framework is needed outlining the requirements and steps for including economic concerns and economic measures in biodiversity planning processes, supported by policy information and real world experiences.

These are the critical issues affecting the integration of economics into Asian NBSAPs:

- The economic value of biodiversity is poorly appreciated by economic planners in Asia. As a result, biodiversity loss is rarely seen as having a cost to the economy, and the economic potential of biodiversity is often under-emphasised;
- Biodiversity planners in Asia often pay little attention to economic and financial concerns. As a result, biodiversity conservation is often economically and financially unsustainable;
- There is little practical experience in using economic tools in biodiversity conservation. This has severely limited Asian countries' attempts to meet their obligations under the Convention on Biological Diversity;

- A growing body of information on the economic aspects of biodiversity conservation and the great advances in biodiversity planning through National Biodiversity Strategies and Action Plans provide the framework for using economic tools to strengthen biodiversity planning in Asia.

An important component of biodiversity conservation

For a long time economists and conservationists found it difficult to speak the same language, let alone work together towards a common purpose. Economists, traditionally vilified by conservationists as the enemy of the environment, rarely took conservation seriously. Yet, over recent years, this situation has begun to change. Conservation planners and economists have begun to realise that there is actually a great deal of mutual benefit to be gained from cooperating with each other. In fact, they often have shared goals. Environmental equity and sustainability have come to be recognised as integral components of economic growth strategies, and economic instruments and tools are increasingly being used to support environmental conservation.

The interdependence of conservation and economics is particularly relevant to biodiversity planning, a fact that is well-recognised in the Convention on Biodiversity (CBD). There are repeated references to the use of economic tools for biodiversity conservation throughout the CBD. Article 7 calls on parties to identify and monitor components of biodiversity that are economically valuable or important. Article 11 requires the adoption of economic measures which act as incentives for biodiversity conservation and sustainable use. Articles 20 and 21 reiterate the need to generate and allocate sufficient financial resources to biodiversity. Economic measures are also central, although largely implicit, to the implementation of other parts of the CBD (Table 1).

Table 1. References to economics in the CBD

Article	6	7	8	9	10	11	12	14	15	16	20	21
Economic valuation		•										
Economic incentive	•		•		•	•		•		•	•	•
Financial resources			•	•			•		•	•	•	•

From Emerton 2000a

Since the first meetings of the Conference of the Parties and the Subsidiary Body on Technological, Technical and Scientific Advice to the CBD, economic valuation, economic incentives and financial resources have been the subject of recurrent discussion. This has resulted in a series of recommendations, decisions and calls for action on their use for biodiversity conservation (Table 2).

Table 2. COP decisions relating to economic measures

I/2	Financial resources and mechanism (finance)
II/6	Financial resources and mechanism (finance)
II/7	Consideration of Articles 6 and 8 (finance)
II/8	Preliminary consideration of components of biological diversity particularly under threat and action which could be taken under the Convention (finance)
II/11	Access to genetic resources (valuation)
III/5	Additional guidance to the financial mechanism (finance)
III/6	Additional financial resources (finance)
III/9	Implementation of Articles 6 and 8 (incentives, finance)
III/10	Identification, monitoring and assessment (finance)
III/11	Conservation and sustainable use of agricultural biological diversity (incentives, finance)
III/12	Program of work for terrestrial biological diversityforest biological diversity (finance)
III/14	Implementation of Article 8j (incentives, finance)
III/15	Access to genetic resources (finance)
III/18	Incentive measures (incentives)
IV/4	Status and trends of the biological diversity of inland water ecosystems and options for conservation and sustainable use (incentives, valuation, finance)
IV/5	Conservation and sustainable use of marine biological diversity (finance)
IV/6	Agricultural biological diversity (incentives, finance)

IV/7	Forest biological diversity (valuation, finance)
IV/8	Access and benefit sharing (valuation, finance)
I/9	Implementation of Article 8j and related provisions (finance)
IV/10	Measures for implementing the CBD (incentives, valuation, finance)
IV/12	Additional financial resources (finance)
V/4	Progress report on the implementation of the program of work for forest biological diversity (valuation)
V/6	Ecosystem approach (incentives, valuation, finance)
V/8	Alien species that threaten ecosystems, habitats or species (finance)
V/9	Global Taxonomy Initiative (finance)
V/11	Additional financial resources (finance)
V/15	Incentive measures (incentives)
V/16	Article 8j and related provisions (finance)
V/24	Sustainable use as a cross-cutting issue (finance)
V/25	Biological diversity and tourism (incentives, finance)

This recognition of economics as a cross-sector theme in the CBD is based on a sound and very pragmatic rationale. Unless it makes demonstrable economic and financial sense to conserve biodiversity, it is unlikely that anyone will do so — be they governments, industries, firms, households or individuals. People will continue to degrade and deplete biodiversity in the course of their production and consumption activities because they feel that it is more profitable and economically desirable to do so (and, often, because they are simply unable to afford to do otherwise).

Such economic concerns in biodiversity planning are of particular relevance to Asia. Throughout the region, economic conditions and economic activities threaten biodiversity: pollution arising from rapid and unplanned industrialisation and urbanisation; for example, and infrastructure developments that alter habitats and ecosystems. Weak or inappropriate national economic policies promote biodiversity-depleting activities and fail to encourage conservation. Subsidies manipulate prices and markets to the detriment of biodiversity. Biodiversity resources are undermined because of limited and

insecure rural livelihoods and unsustainable trade in wild animals, indigenous timber and tropical fish. At the same time, pressing demands on government budgets, widespread economic decline and stagnation, and pervasive poverty all mean that few countries or communities are in an economic position to conserve biodiversity unless it can be demonstrated to generate tangible and substantial benefits for them.

Most countries in Asia have ratified the CBD and have now started to implement policies and plans for biodiversity conservation. It has become clear that economic measures are vital both for overcoming the causes of biodiversity loss and for ensuring that biodiversity conservation is an attractive and attainable option.

Economic measures in biodiversity planning

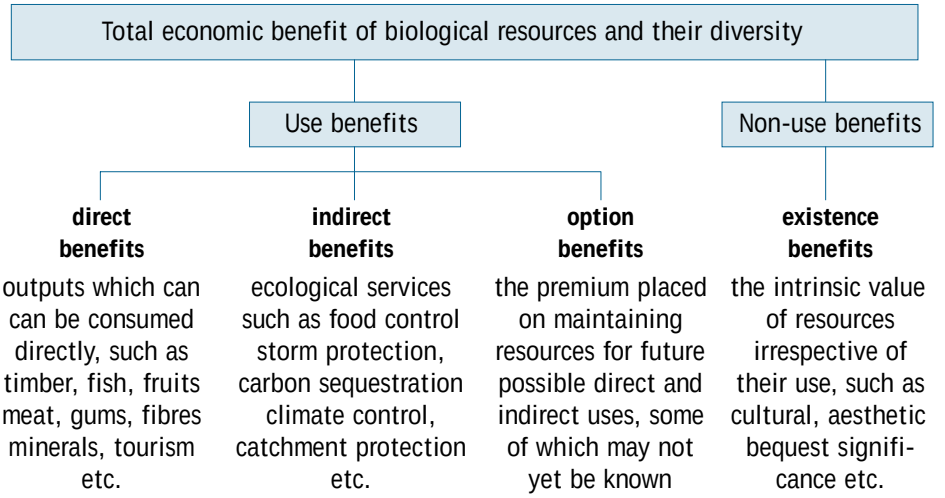
Three sets of economic tools and measures have relevance to biodiversity planning: economic valuation, economic instruments and financing mechanisms. They have been mentioned repeatedly in the CBD and at its associated meetings, and can be used to strengthen conservation.

Economic valuation

Economic valuation 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 they provide for human production and consumption (for example the timber value of natural forests or the fisheries value of coastal and marine ecosystems). Demonstrating the total economic value of biodiversity illustrates the benefits associated with its conservation and highlights the wide range of individuals and groups they accrue to, both on- and off-site (Figure 1).

Valuation also shows the high and wide-ranging economic costs associated with the loss or degradation of biodiversity and its components, including on and off-site subsistence losses and decreases in employment, income and foreign exchange earnings as well as the expenditures necessary to replace or mitigate lost biodiversity goods and functions. Calculating economic values also 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.

Figure 1. The total economic value of biodiversity



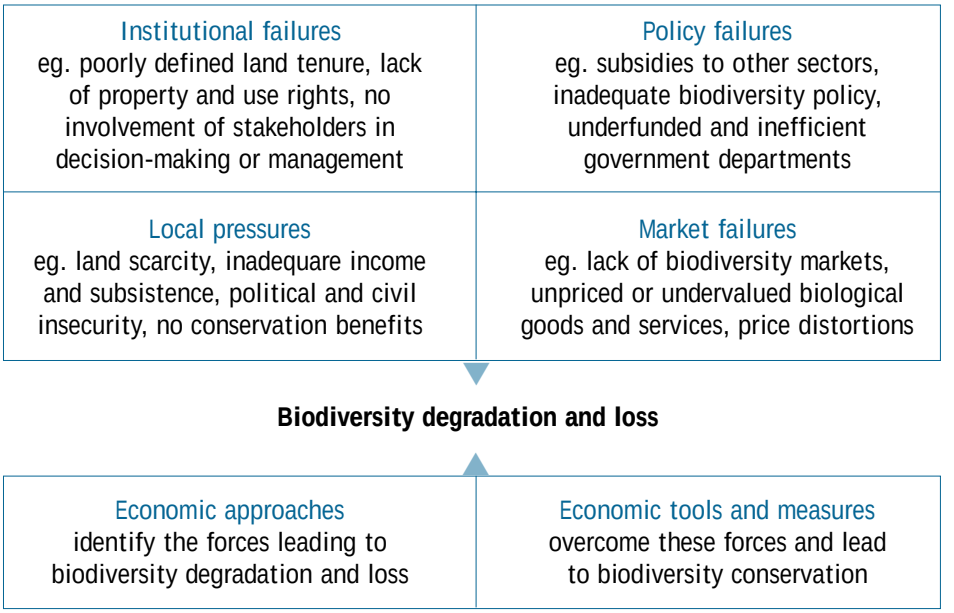
From Emerton 1998

Economic instruments

Many of the goods and services associated with biological resources, ecosystems and their diversity are undervalued by the market, or ignored in macroeconomic and sectoral economic policies. These policy and market distortions and failures result in biodiversity being underpriced, over-consumed and under-conserved. It is treated as a free good which can be mined, converted, depleted or otherwise degraded at no cost (Figure 2).

Economic instruments attempt to overcome the causes of biodiversity loss, and include property rights, taxes, subsidies, charges, fees, market establishment, trust funds, loans, performance bonds and deposit systems. They are already widely used in other sectors of the economy to achieve development goals, and have a broad range of potential applications to biodiversity conservation. Economic instruments can encourage people to conserve biodiversity in the course of their economic activities. They aim to change behaviour by making sure that people take into account the real value of biodiversity and broad costs associated with its loss when they make decisions.

Figure 2. Economic causes of biodiversity loss



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Financing mechanisms

Biodiversity conservation is not without cost — it imposes a wide range of direct and indirect costs on different economic groups. Ways must be found to offset, compensate for and fund these costs. Various mechanisms can be used to finance biodiversity and compensate the people who bear the costs associated with its conservation. Financing mechanisms operate at many levels: between and within countries, between governments, and within the private sector and local communities.

Because traditional sources of funding — central government subventions, donor funds and royalties and other charges — are so limited, and are under competition from so many other sectors of the economy, they are rarely sufficient to finance biodiversity conservation. Yet there are many other, more innovative, ways of raising and allocating financial resources to biodiversity.

Funds can be raised directly from biodiversity resources and services. Sustainable use or trade in biodiversity includes goods such as timber and non-timber forest products and the pharmaceutical, agricultural and industrial applications of biological resources. Services include water provision, climatic regulation, tourism and scientific research. Funds can also be obtained from charges

levied on economic activities which contribute to biodiversity degradation and loss; these charges include pollution taxes, land reclamation bonds and waste disposal charges. Other financing mechanisms include the transfer or redistribution of funds between individuals, groups or countries through measures such as investment promotion, trust funds, loans, debt for nature swaps and offsets.

What guidance is available on using economics?

Despite the important role accorded to economics in the CBD and the repeated calls for its application and use, little guidance has been provided on using economic tools for biodiversity planning. One reason for this is that the economics of biodiversity is a relatively new and untested discipline. As yet there are very few examples of economics having been integrated into biodiversity planning processes.

Several guidelines for biodiversity planning through National Biodiversity Assessments and National Biodiversity Strategies and Action Plans (NBSAPs), (as required by Article 6a of the CBD) have been developed. They highlight the central role of economic valuation in biodiversity assessments (UNEP 1993), the need to include economic criteria, incentives and financing mechanisms in biodiversity strategies and action plans (Miller and Lanou 1995), and the importance of integrating sustainable development goals into biodiversity planning (Prescott, Gauthier and Sodi 2000). They do not, however, provide methods of integrating economic tools and concerns into these NBSAPs.

A number of official working papers have been prepared in support of CBD processes and meetings which outline the need for sharing experiences on the use of economic incentives for biodiversity (UNEP 1996). Others present a framework for undertaking such case studies (OECD 1994, UNEP 1997), analyse case studies (UNEP 1998), and provide further guidance on the design and implementation of incentive measures (UNEP 2000). These papers give detailed guidance on documenting examples of the use of economic incentive measures for biodiversity conservation. They pay less attention to how to set in place such measures as part of national biodiversity planning processes.

Other independent efforts have been made to present global overviews of methods and examples of the application of economic valuation tools to biodiversity[1], the use of economic incentive measures for biodiversity conservation[2], and the development of innovative financing mechanisms for biodiversity[3]. At least two annotated bibliographies dealing with the application of economic tools to biodiversity conservation have also been produced[4].

However useful these methods and examples might be, though, few economic and biodiversity planners (within governments at least) are aware of them. More importantly, none of these materials present coherent or integrated guidance on how such experiences and methodologies can be adapted to the requirements of NBSAPs; in other words how economic tools and measures can be identified, developed, used or applied within the context of national biodiversity policies, strategies and plans.

The use of economic tools in Asia

The inclusion of economic analysis and specification of economic measures in NBSAPs has been extremely weak in Asia, although several countries accord some recognition to the economic importance of biodiversity in their National Biodiversity Assessments and Country Studies. China's Biodiversity Country Study is a good example; it contains a detailed quantification of biodiversity economic values (some expressed in monetary terms) as well as a comprehensive analysis of the economic causes of biodiversity degradation and loss.

Fewer NBSAPs refer in detail to economic incentive measures or financing mechanisms, or to how these will be translated into concrete actions in support of biodiversity conservation. In most cases, the inclusion of economic considerations in biodiversity planning has extended little beyond broad statements that valuation, incentives and financing mechanisms can and should be used. Notable exceptions include the Philippines, Vietnam and Pakistan. The Pakistan NBAP sets out a detailed series of actions that deal exclusively with the use of economic measures for biodiversity conservation.

Despite the limited attention given to economic tools and measures in NBSAPs, there is a range of useful specific experiences with economic valuation techniques, economic incentive measures and innovative financial mechanisms in Asia. These individual cases capture many of the major issues in using economic tools and measures for biodiversity conservation.

Asian cases include many examples of the application of economic valuation techniques to biodiversity. They present estimates of the contribution of biological resources to local livelihoods[5], urban quality of life[6], private sector earnings[7], and national and international economies[8]. Some work has also been carried out on the economic value of ecosystem services[9], and on the economic costs of biodiversity degradation and loss[10]. Covering a wide range of different countries, sectors and groups, a common theme of these studies is the extremely high economic value of biodiversity in Asia.

Analysis has also been applied to the links between economic conditions and biodiversity loss. Analysis of the destructive impacts of economic activity on biodiversity[11], and the ways in which broader economic policies and markets encourage this destruction[12], make it clear that both historical and current economic forces have had devastating impacts on the status of biodiversity in Asia.

Studies and other literature also present recommendations and examples of ways to use economic measures to encourage biodiversity conservation. There is a large number of interesting ways in which economic incentives have been used within the context of biodiversity conservation projects and programs in Asia[13], and ways that economic and fiscal instruments have been implemented by government to control sectors of the economy that have a negative impact on biodiversity[14]. Several innovative financing mechanisms have also been developed and tested in Asia to generate and allocate funds for biodiversity conservation, targeting different groups, sectors and countries[15].

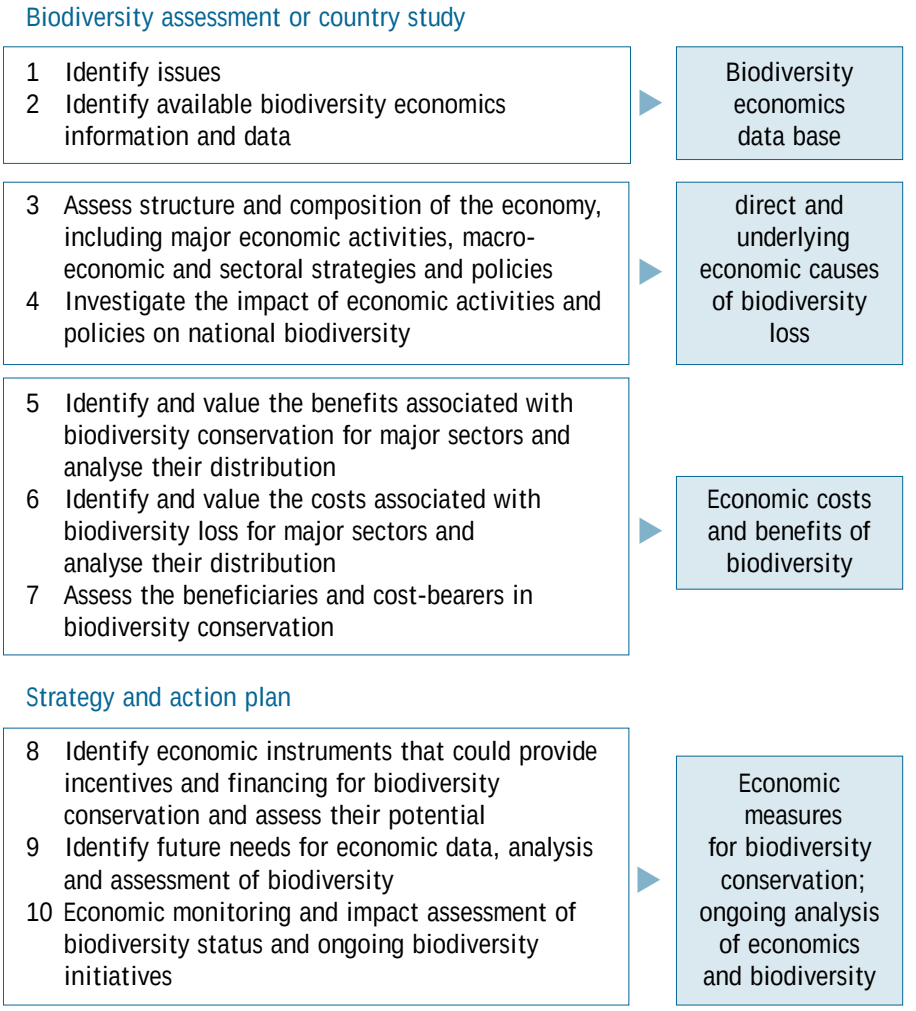
But, as is the case elsewhere, these Asian experiences and information sources remain scattered and isolated. They have not been carried out in the context of national biodiversity planning, strategies and plans or in explicit pursuit of the goals of the CBD. In addition, economic and biodiversity planners do not have access to much of this valuable information.

Although examples of the use of economic measures for biodiversity conservation do exist in Asia, they have yet to be integrated into any coordinated strategy for biodiversity conservation.

A framework for integrating economics

it is important to develop some kind of systematic framework for the use of economics in biodiversity planning. A first step is integrating economic measures into the two components of ongoing NBSAPs: National Biodiversity Assessments or Country Studies; and Biodiversity Strategies and Action Plans. This is relatively straightforward, and involves ten basic steps that can be used to analyse, identify, develop and implement economic aspects of biodiversity conservation (Figure 3).

Figure 3. Ten economic steps



From Emerton 2000a

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 a country's biodiversity. 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.

Identifying data requirements for biodiversity economics assessment

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 obtained.

Step 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 will vary for different countries. Before starting to collect and analyse information on biodiversity economics it is necessary to identify possible areas of focus, including the following:

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

Step 2. Identify sources of biodiversity economics information and data. Information on economic aspects of biodiversity is typically difficult to find, and scattered in a large number of documents. Identifying sources of such information involves the following:

- 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 which kinds of project reports and unpublished research papers have been produced by donors, NGOs, universities and research institutes on the economics of biodiversity; and
- obtaining country, sector, development, statistical and environmental reports produced by multilateral agencies such as the World Bank and UN agencies.

Analysing direct and underlying economic causes of biodiversity loss

The most important activities in a Biodiversity Strategy and Action Plan will be those which aim to overcome the direct and underlying economic causes of biodiversity loss. The next steps provide the information necessary to identify which economic policies and activities are leading to biodiversity degradation.

Step 3. Assess the structure and composition of the economy. A country's basic economic attributes — 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 the following:

- how is the human population distributed — where do they live, within which ecosystems?
- how do they earn their livelihoods — which 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, 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, 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, structural adjustment programs) have been used to stimulate particular economic sectors or activities?

Step 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. Specifically, it should be possible to identify the main economic causes of biodiversity loss. This involves asking questions such as these:

- 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) affect biodiversity

through their secondary effects on ecosystem integrity and environmental quality?

- how have past and current economic conditions led to biodiversity being degraded (for example, poverty, population migration, need for foreign exchange earnings, economic crisis or 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)?

Identifying and quantifying economic benefits and costs

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

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

- What are the major economic benefits associated with biodiversity in the country? These should include the direct, indirect, option and existence values associated with biological resources, ecosystems and their diversity, as illustrated in Figure 1;
- In what form, and to which groups and sectors, do these values accrue? For example, are they 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 precisely 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?

Step 6. Identify biodiversity economic costs and their distribution. Biodiversity conservation also involves costs. It is 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 these:

- What are the major economic costs associated with biodiversity conservation in the country? This should include 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 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 precisely 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?

Step 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 provides an explanation of the economic reasons for loss of biodiversity and points to the need for redistributive economic instruments within the NBSAP. This involves asking questions such as these:

- 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 existence of biodiversity?
- What does the distribution of biodiversity economic costs and benefits mean? Are there groups who gain large benefits from biodiversity at little

or no cost? Are there any groups who degrade biodiversity at little or no cost, and, if there are, who bears the costs associated with this biodiversity loss? Are there groups who therefore have few economic incentives to conserve biodiversity? Are there groups who lack the funds to finance the costs associated with biodiversity conservation?

Conclusions from the economic assessment of biodiversity

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

- the reason biodiversity conservation is an economically desirable use of funds, resources and land for the country — the economic justification for the NBSAP;
- the effect that the country's biodiversity has on international, national and local economies and on groups such as local communities, industries, 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;
- the ways in which 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; and
- the need to include economic and financial measures in the NBSAP, and to target particular groups, sectors, economic policies and activities.

The National Biodiversity Strategy and Action Plan

The main aim of applying economic approaches in the National Biodiversity Strategy and Action Plan is to make biodiversity economically worthwhile to the various groups upon whom its conservation depends, to 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 these stages:

Recommending economic measures for biodiversity conservation

Step 8. Defining economic measures for biodiversity conservation. The conclusions drawn from 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 will also be necessary to analyse other strategies and actions specified in the NBSAP in order to ensure that they are viable in economic terms. Recommending economic measures for biodiversity conservation involves the following:

- identifying economic instruments and financing mechanisms which 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 programs of work that are needed to improve economic and financial conditions for biodiversity conservation, and to identify and guide 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 are a broad range of economic and financial measures that can potentially be used for biodiversity conservation (Boxes 1 and 2). 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 able to be implemented 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.

Box 1: Broad categories of economic instruments for biodiversity conservation

Economic instruments are used to overcome the economic causes of biodiversity loss, and to encourage people to conserve biodiversity in the course of their economic activities. They can be grouped into five broad categories:

- ***Property rights*** **— 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. Examples of property rights include legal rights and tenure over the ownership, management and use of biological resources or biodiversity areas to particular groups or communities;**
- ***Market creation and charge systems*** **entail trading in biodiversity goods and services and giving them a price which reflects their costs, benefits and relative scarcity. Creating markets ensures that biological resources are allocated efficiently and put to their best use according to people's willingness to pay. Creating the ability to buy, sell and trade in biodiversity, or to exchange biodiversity-damaging economic activities between sites can encourage biodiversity conservation and discourage activities which result in biodiversity loss. Assigning charges or prices to biodiversity goods and services is also a means of generating revenues. Examples of market creation and charge systems include the direct creation of markets (such as instituting the purchase and sale of biodiversity goods and services and value-added products where there is a demand and willingness to pay on the part of consumers); the establishment of tradeable rights, shares and quotas in biological resources and environmental quality (such as fishing quotas, pollution permits or development rights); setting new charges or rationalising existing charges (such as park entry fees, biological resource utilisation licences, environmental pollution and waste clean-up charges); and initiating charges for biodiversity goods and services which have previously been received free (such as downstream water catchment benefits, storm protection or consumptive and non-consumptive biological resource utilisation activities);**
- ***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 to discour-**

age people from using them, and to decrease the relative price of biodiversity-conserving products in line with the benefits of conservation to encourage people to use them. Fiscal instruments can also be used to raise revenues; examples include differential tax rates (such as relatively higher taxes on biodiversity depleting land uses, equipment, inputs and products) and subsidies to biodiversity-neutral or biodiversity conserving technologies, land uses and enterprises;

- ***Financial instruments* are a way of mobilising and channelling funds to biodiversity conservation. They include funds, loans, grants and investment activities specially earmarked for biodiversity conservation. Examples of financial instruments include green funds, trust funds and preferential loans to biodiversity-conserving activities and technologies;**
- ***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 against the possibility of this damage occurring. By charging in advance for possible biodiversity damage, bonds and deposits provide funds from the producers or consumers themselves to cover the costs of any damage and provide an incentive to avoid biodiversity damage and reclaim the deposit or bond. Examples of bonds and deposits include those levied against land restoration, disposal of dangerous or hazardous chemicals, waste clean-up and proper harvesting of biological resources.**

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Identifying future needs for economic data, analysis and assessment

Step 9. Setting up systems to assess the economic aspects of biodiversity. Very few countries have a system in place to collect and analyse biodiversity economics information. Much of the background information about biodiversity and economics that is produced as part of the National Biodiversity Assessment and Country Study is likely to be of a very preliminary nature. An important part of the NBSAP will be actions aimed at improving the knowledge of biodiversity economics costs, benefits, incentives and financing:

- collecting and analysing information about issues in the economics of biodiversity that are currently lacking, including building capacity to collect and analyse such data;
- establishing systems to assess the economic aspects of biodiversity on an ongoing basis, which can be applied within the context of monitoring the

NBSAP (Step 10), and will influence future biodiversity and economic policies, strategies and plans.

Ongoing monitoring of NBSAPs and biodiversity status

Step 10. Monitoring. The involvement of economics does not end with the production and adoption of a NBSAP, but continues after its implementation. Economic forces and conditions, as well as biodiversity status, continuously 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 ongoing basis.

Box 2. Examples of financing mechanisms for biodiversity conservation

Many mechanisms can be used to raise and allocate funds to biodiversity conservation, including the following:

- **traditional mechanisms, such as central government subventions, donor money, and existing economic instruments such as loans, grants and other funds;**
- **the Global Environment Facility (GEF), which finances actions carried out under the CBD with the aim of securing global biodiversity benefits;**
- **private sector investment, both domestic and international, including investment in biodiversity-based enterprises under a variety of arrangements such as direct ownership and management, franchises, leases and concessions, as well as through joint ventures and partnerships between private companies, communities and governments. Voluntary contributions to biodiversity from the private sector can also be encouraged via the use of endowments, foundations, tax incentives and other mechanisms. Private sector investment in biodiversity can also be solicited through deals on sponsorship, advertising and other forms of promotion;**
- **international funds, including trust funds, foundations, endowments, revolving funds, green funds and other grant or loan-making entities. These funds can be used to attract money from international sources and to channel money to biodiversity conservation;**
- **various approaches to debt relief, such as debt rescheduling, debt forgiveness, debt-for-equity and debt-for-nature swaps, can be used as a means of simultaneously generating funds, increasing private and NGO participation in biodiversity conservation and reducing national indebtedness;**

- **offsets and credits can generate flows of funds from international industries to biodiversity conservation. Under carbon offset and credit arrangements, for example, a developed country's power utilities finance the operations of a developing country's forest department in exchange for credit for the amount of carbon saved or sequestered;**
- **international compacts are voluntary agreements made by developing countries to engage in policy reforms and biodiversity conservation in exchange for the transfer of financial or technological resources from international sources to support these reforms;**
- **concessions or prospecting rights can be offered in biodiversity areas and species to companies interested in their possible future uses (for example agricultural, industrial and pharmaceutical applications of biodiversity and genetic resources);**
- **internationally transferable development rights allow units of areas set aside for biodiversity conservation to be sold to groups with an interest in biodiversity conservation, or to firms who can use them as an credit or offset.**

From Emerton 1998

Conclusions and needs for the future

The omission of any substantive economic input into biodiversity planning in most Asian countries has weakened attempts at biodiversity conservation, and hindered national attempts to meet the obligations of the CBD. Unless NBSAPs can demonstrate that they are both economically and financially viable and desirable, and take steps to overcome the economic causes of biodiversity degradation and loss, they are unlikely to succeed or be implemented.

Experiences gained to date in the application of economic measures to biodiversity in Asia, and in the ongoing development and implementation of NBSAPs, point to a number of clear lessons:

- the important role of economic tools and measures in strengthening biodiversity planning, policy and practice;
- the existence of some useful examples of the application of economics tools to biodiversity, but their isolated and scattered nature, and their limited accessibility and usefulness to biodiversity planners;
- the lack of available guidance on ways of integrating economics into biodiversity planning processes, and especially of a practical framework and set of actions with which this integration can be achieved.

In order to set in place the conditions for integrating economics measures into biodiversity planning, a number of additional priorities and needs exist:

Raise awareness in planners. Economic and biodiversity planners in Asia know little about available economics methods, experiences and measures. There must be a greater level of awareness of the importance of economics to biodiversity conservation, and more capacity among key agencies and individuals to deal with economic aspects of biodiversity conservation.

Share experience and lessons. Available information on the use of economics for biodiversity is scattered between countries, ecosystems and sectors, and much remains inaccessible or unknown. Sharing experiences and lessons learned, between agencies, countries and sectors is a priority if existing information is to prove useful to biodiversity planning in the region.

Prepare guidelines for integrating economics in biodiversity planning. Systematic guidelines for the integration of economics into biodiversity planning are lacking. Countries need to develop, according to their own specific conditions and needs, processes and methods that can be used to introduce key economic tools and measures into ongoing NBSAPs.

Promote working links between economists and biodiversity planners. There is little discussion between economists and biodiversity planners. If the goals, strategies and actions contained in NBSAPs are to be translated into economic measures and have an impact on economic conditions and activities, this must change.

Test economic valuation, instruments and finance mechanisms. There is still little practical experience in the use of economic measures to strengthen NBSAP implementation. A major priority is for countries to identify and set in place actual economic valuation exercises, incentive measures and innovative financing mechanisms within the context of NBSAPs, to build up a critical level of experience, generate lessons and develop practical processes for the use of economics for biodiversity conservation.

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Endnotes

1. Pearce and Moran 1994; Rietbergen-McCracken and Abaza 2000b.

2. Emerton 2000b, McNeely 1988, OECD 1996, Vallejo and Hauselmann 1998.

3. McNeely 1989 and 1999, McNeely and Weatherley 1995, WRI 2000.

4. Bhattarai and Hammig 1998, Emerton 2001.

5. For example the livelihood values associated with non-timber forest products in India (Batagoda et al. 2000) and Nepal (Richards 1994), and wetland products in Malaysia (Othman and Abdullah 1991).

6. For example the contribution of coastal biodiversity to urban quality of life in the Philippines (Tejam and Ross 1997).

7. For example wildlife trade in Vietnam (Casellini et al. 1999) and aquarium fisheries in Indonesia (Cesar et al. 1997).

8. For example for forests in the Philippines (Ruitenbeek 1992) and for forests (Kumari 1995) and wetlands (Kumari 1996) in Malaysia.

9. For example those associated with mangroves in the Philippines (Gilbert and Janssen 1997, or coastal wetlands in Korea (Lee 1998).

10. For example the socio-economic effects of mangrove loss in Vietnam (Adger 1997, Tri et al. 1996), coral reef loss and reduced private sector profits in Indonesia (Cesar et al. 1997), and loss of tourism sector earnings from degradation of Sri Lanka's coral reefs (Berg et al. 1998).

11. The effects of resource over-exploitation and destructive harvesting techniques have been analysed and valued in Indonesia for fishing with dynamite and poisons (Cesar et al. 1997) and for coastal mining in Sri Lanka (Berg et al. 1998). Much attention has also been paid to identifying and quantifying the destructive impacts of infrastructure development on biodiversity; for example, in Nepal, the Philippines, Thailand and Indonesia (Dixon et al. 1986).

12. For example the impacts of trade policy on tropical deforestation in Indonesia (Barbier et al. 1993), and the relationships between economic policies, price distortions, market failures and biodiversity loss for forests in Asia (Richards 1999).

13. For example those encouraging the sustainable use of forest products in India (Vallejo and Hauselmann 1998), ecotourism in Japan and Korea (OECD 1996), and Malaysia (Vallejo and Hauselmann 1998).

14. For example pollution taxes in Malaysia and Thailand (Rietbergen-McCracken 2000a) and differential pricing of biodiversity-using and biodiversity-depleting goods and services in China and Malaysia.

15. For example mechanisms targeted at generating financial benefits for the local communities in areas of high biodiversity in India (Gupta 1996) and Pakistan (Hussein and Arif 1998). See also international financing mechanisms such as debt-for-nature swaps in the Philippines (Tan 1998) and Trust Funds in Bhutan, Indonesia, Philippines and Sri Lanka (IUCN 1994). Several studies explore the potential for encouraging private sector investment in biodiversity — for forests in Nepal (Richards 1999), for protected areas in Japan (OECD 1994), through payments for environmental services in Indonesia, and through forest-based carbon offsets (Trexler 1999).