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**ECONOMIC INCENTIVE MEASURES FOR THE CONSERVATION AND SUSTAINABLE USE
OF BIOLOGICAL DIVERSITY:
CONCEPTUAL FRAMEWORK AND GUIDELINES FOR CASE STUDIES**

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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In 1993 the OECD Group on Economic and Environmental Policy Integration (GEEPI) formed an Expert Group on Economic Aspects of Biodiversity to undertake a two-year project on the use of economic incentive measures for the conservation and sustainable use of biological diversity.

At the first meeting of the Expert Group in October 1993, it was agreed that the development of country case studies would be an appropriate and practical approach to acquiring a better understanding of the use of economic incentive measures for biodiversity conservation in support of the Convention on Biological Diversity. This document provides the conceptual framework and guidelines to facilitate the case study process. The conceptual framework places the use of economic incentives into a larger perspective linking, for example, economic incentive measures with the main causes of the loss of biodiversity, and the objectives of the Convention on Biological Diversity. The guidelines indicate specific issues and questions that the case studies should address.

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ECONOMIC INCENTIVE MEASURES FOR THE CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY:

CONCEPTUAL FRAMEWORK AND GUIDELINES FOR CASE STUDIES

I. Introduction

The purpose of this paper is to develop a conceptual framework within which it is possible to begin to analyze the role of economic incentive measures for meeting biodiversity conservation objectives, including those expressed in the Convention on Biological Diversity. The framework is presented to provide a basis for undertaking country case studies on the use of economic incentive measures for the conservation and sustainable use of biological resources in OECD Member countries. To help guide the country case studies and to ensure that they address the same sets of issues, the paper also presents case study guidelines.

A goal of the case study process and other elements of the work supervised by the Expert Group on Economic Aspects of Biodiversity is to support the Convention on Biological Diversity. The Convention on Biological Diversity is of the nature of a so-called "framework convention": it provides a starting point for developing solutions to biodiversity problems rather than a recipe for success. Therefore, at this juncture, the implementation of the Convention requires a clear understanding of the biodiversity problem and the objectives expressed in the Convention on Biological Diversity. Then, potential solutions to the biodiversity problems that reflect the Convention's goals can be discussed. This paper focuses attention on the role of economic incentive measures as an approach to address some of the pressures on biodiversity, and as a means of addressing the objectives of the Convention on Biological Diversity. Economic incentive measures are defined in this paper as those measures that rely on the price system and market forces to achieve their environmental objectives.

II. Definition of Biological Diversity

Scientists generally use the term *biological diversity* to refer to the range of variation or differences in living organisms and their environments. Biological diversity can be distinguished by the three main levels of biological hierarchy: *genes*, *species*, and *ecosystems*. This distinction illustrates the different levels of scientific concern over the biodiversity problem, as well as the difficulty of developing a consensus definition of biological diversity that can be operationalised for conservation policy. For example, on one level, conservation of biodiversity has been characterized as ensuring sufficient variation in the genetic make-up of species. Alternatively, conservation of biological diversity has also focused on reducing threats to species extinction and richness. Finally, at the broadest level, it is concerned with the conservation of natural ecosystems in the face of conversion and modification from human activities.

Biodiversity conservation is typically translated in terms of conserving species richness. However, it is widely recognised that declines in species and genetic diversity are interrelated. Continuing loss of species diversity (and certainly species extinction) implies a reduction in the overall pool of global genetic

material with profound significance for both natural evolutionary change and artificial selective breeding. It is further recognised that the loss of both genetic and species diversity is mainly due to human activities, where conversion and alteration of habitats and ecosystems are by far the most important factors. Consequently, conservationists usually call for the preservation of "species rich" habitats and ecosystems as the basic strategy for biodiversity conservation (McNeely *et al.*, 1990).

The Convention on Biological Diversity has stimulated further debate on the meaning of biodiversity and assessment of its ecological and economic significance. It is clear that the concerns over biodiversity loss as expressed in the Convention go much further than a preoccupation with species extinction, and include the conservation of natural habitats, ecosystems, and genetic material. In Article 2 of the Convention it is stated that "Biological diversity means the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." This definition reflects the different needs and priorities (in terms of genetic, species, and ecosystem conservation) of different countries with respect to biological diversity. As a point of departure, this paper adopts the Convention's definition of biological diversity, as well as the definitions of other relevant terms found in Article 2 of the Convention.

III. The Proximate Causes of Biodiversity Loss

The variety of living organisms on Earth is not static, it has been slowly and naturally evolving since the beginning of life. Human activities also shape the variety of living organisms. In the past, when the Earth's natural abundance seemed boundless, there was little concern over the effects of human activities on the world's stock of biological diversity. It is only recently that we have come to recognise the relative "smallness" of the planet and the tremendous effect of human activities on species extinction. The renowned biologist E.O. Wilson observes that "current reduction of diversity seems destined to approach that of the great natural catastrophes at the end of the Palaeozoic and Mesozoic eras -- in other words, the most extreme in the past 65 million years" (Wilson, 1988, pp. 11-12).

Many biologists and conservationists have identified the anthropomorphic factors that are the most *direct causes* of natural, or wild biodiversity depletion. These are listed under three general categories as (World Conservation Monitoring Centre, 1992):

- habitat alteration and destruction that results from the expansion of human populations and human activities. Habitat change by humans is caused directly through land use changes, pastoral development, cultivation, urbanisation, infrastructure development and industrialisation, and indirectly through environmental effects caused by the use and extraction of resources from the environment, and the discharge of various wastes to air, soil, and water;
- over-exploitation for commercial or subsistence reasons in order to generate various goods and services (or for the purpose of the elimination of the species), including meat, fur, and collection of live specimens for domestication and trade; and
- introduction of exotic (nonindigenous) species, which may compete with, prey upon, or hybridise the native species (or whose diseases may prey upon the native species).

In order to give a general idea of the relative ordering of these various causes, biologists find that habitat loss and land conversion affects 76 per cent of all endangered mammals, while over-exploitation affects 54 per cent, and "introductions" affect 18 per cent (World Conservation Monitoring Centre, 1992). These factors vary in importance between the different parts of the world and the various species, but there is general agreement that these three factors are the primary contributing agents to the vast majority of endangerments and extinctions occurring in the immediate past (few hundreds of years) and in the foreseeable future.

IV. The Underlying Causes of Biodiversity's Decline

The *underlying causes* of the loss of biodiversity can be found in market, government intervention, and information failures, and in the structure of property rights.

A. Market failure

Market failure occurs when markets fail to properly value and allocate scarce resources because the right market signals are not being sent to resource users and decision-makers. Typically, markets are missing for goods and services that have *public goods characteristics*. Many of the services of biological diversity have such characteristics. Public goods cannot be "owned" by anyone, nor can anyone be excluded from using the public good. This leads to socially perverse natural resource management decisions by producers and those who use the services of natural resources. The existence of public goods characteristics gives rise to the so-called *free rider problem* in which individuals gain the benefits of the public good without paying for them. The free-rider problem extends beyond the national to the international level. For example, one country's contribution toward the preservation of biological diversity does not provide that country with exclusive control of the resulting benefits since the genetic resources and many of the values of the preserved diversity can be enjoyed by all.

The public goods nature of biodiversity means that resource-using activities may generate *environmental externalities*. Externalities occur when all the social costs of resource use and degradation are not included in the prices of the goods and services emanating from the resource. They are not included because there is an absence of markets or payment mechanisms for these goods and services (biodiversity services). For example, the private costs of converting forestland do not include all external costs that are imposed on society. They include, for example, the global warming effects of reduced carbon sequestration by trees and other biomass, the breakdown of ecological processes, lost recreational values and, potentially, lost genetic information.

When markets do not capture the value of the environmental services of biological diversity there is little incentive for individuals to protect and preserve these services. The environmental goods are treated as free goods in consumption and productive activities and consequently they are "over-used." There is, therefore, an immediate tilting of the "playing field" between conservation and the developmental forces that sacrifice conservation. The playing field is further biased by economic distortions that have adverse side effects on the environment and biodiversity. If, therefore, a proper comparison was made between the social values of biodiversity and depleting activities, it would show that the social value of biodiversity is higher than its private value, and the social value of depleting activity is less than its private value. Either one of these distortions would indicate that biodiversity depletion has already gone too far.

A specific form of the public goods problem associated with the harvesting of wild species is *open-access resource management regimes*. Such a regime installs a system of incentives based solely upon first appropriation, and this implies that no individual harvester has an incentive to discontinue harvesting the resource, because any of the resource that one harvester leaves behind will simply be captured by another.

The open-access nature of marine resources and other aquatic ecosystems and its effect on over-exploitation are well known. In fact, early economic analysis of extinction was developed in regard to marine resources. But terrestrial species and biological resources and the services they render possess open-access characteristics as well. Biological resources in buffer zones, national forests, and communal properties are often open access goods. Sedjo (1992) observes that natural genetic resources have traditionally been viewed as the "the common heritage of mankind" that should be available without restriction. The Convention on Biological Diversity addresses open-access problems related to genetic resources by recognizing on several occasions in the text the sovereign rights of States over their natural resources, and the authority of national governments to determine access to national genetic resources.

1. Assessing the value of biological diversity

The public goods characteristics of biodiversity mean that many of the values associated with biodiversity are not normally expressed in the marketplace. The values of biodiversity, or the benefits of biodiversity conservation, can be identified in four categories: direct use value, indirect use value, option value, and existence value.

Direct use value refers to economic value derived from extracting and using biodiversity in any way. There are at least five types of use value of biodiversity. First, wild species can be a direct source of natural chemicals and compounds used in the production of natural drugs and other natural products (e.g. taxol, an anti-cancer compound, found in the Pacific yew tree of western North America).

Second, genetic resources represent a stock of potentially useful information and provide the base for the development of better or new pharmaceutical products and improved crop and livestock varieties. In this sense, conserving biodiversity is like maintaining an immense library of potentially useful information for insuring our crops, health, and lifestyles. While it is clear that maintaining diversity of biological resources is extremely valuable for the information that it provides, the market is unable to channel much of this value to the owners of the lands or the discoverers of the diverse resources generating it. This is attributable to the "fundamental paradox of information". The paradox is that information is valueless until revealed, and the value is inappropriable once revealed. It is very difficult to market information in its purest form. For this reason, the willingness to pay for these services of diverse resources is not effectively returned to the landholders or private innovators.

Third, wild species can be the source of a gene or set of genes with desired genetic traits that can be used in breeding or in biotechnology. Fourth, the uniqueness and beauty of diverse ecological systems has value for recreational activities such as fishing, hunting, camping, and hiking, and for those who enjoy visiting and photographing natural systems. Some rare animals in particular (such as whales, pink flamingos, or the giant panda) have been recognised as possessing great beauty and other aesthetic qualities. Fifth, diverse wild species and diversity of agricultural crops and other farm products have value for direct consumption.

Indirect use value refers to the primary ecological "functions" that diverse biological resources provide (such as management of watershed flows of surface and groundwater, protection and enrichment of soils, pollination, germination, and dispersal of plants, pest control, and regulation of surface temperatures and local and regional climate through evaporation). Primary ecological functions concern the capacity of an ecosystem to develop and maintain itself, and the resilience of an ecosystem in terms of its capacity to respond to both shocks and stresses imposed on it (Perrings and Opschoor, 1994). A resilient and well-functioning ecosystem can maintain ecological goods and services needed for economic activity. Primary ecological values, though critical, tend not to be represented in economic decisions.

A third category of value associated with biodiversity that is also not normally internalized in the marketplace, is termed *option value* and comes from the uncertainty surrounding the demand and supply for ecosystem services. The amount people would be willing to pay to avoid risk and uncertainty can be thought of as the risk premium. There are two types of risks associated with less diverse environmental systems. First, the less diverse environmental systems are, the less likely it is that gene pools and reservoirs, indeed genetic variability of all kinds, will be available to substitute for others that are depleted. There is therefore an insurance argument for *keeping options alive*. Uncertainty about the current values of biodiversity and biodiversity functions, and the irreversible nature of losses to biodiversity imply that the risk premium is potentially large.

Second, diverse environmental systems may be essential to the resilience of ecosystems to stress and shock. Less diverse systems are likely to be less resilient. The risk of breakdown of systems involved in ecological processes (e.g. climate regulation) particularly needs to be avoided. If society is averse to risks, it will attach a premium to biodiversity as protection against such risks.

The fourth category of value associated with biodiversity and not normally internalized in the marketplace is referred to as *existence value* and is the value enjoyed from just knowing that something exists, even though the individual may never experience the good directly. Even without coming in direct contact, all species have actual or potential value for advancing human knowledge and understanding of the natural world. Cultural, symbolic, and historic value of wild species fall under this category of value. Certain rare species (e.g. grizzly bear, bald eagle) because of their anthropomorphic and historic significance, are the recipients of strong personal and symbolic meanings. Randall (1986) observes that existence values must be derived from some form of altruism since they are independent of current use, expected future use, and the avoidance of risks related to future use. Randall (1986) suggests three forms of altruism. Bequest value refers to the value of knowing that something will be available for future generations to enjoy. Philanthropic altruism refers to the value of knowing that one's contemporaries may want to use the resource. Intrinsic altruism refers to the ethical concern of the individual for the well-being of nonhuman living beings and components of the ecosystem.

B. Government intervention failure

Government intervention failure represents a second underlying source of pressure on the conservation of biological diversity and the sustainable use of its components. Intervention failures include weak institutions to implement and enforce biodiversity conservation measures, inconsistent and poorly coordinated public policies across sectors and agencies, and economic distortions that have unintended impacts on the conservation and sustainable use of biological diversity.

1. Weak institutions and incomplete policy integration

Inadequate organisational structures and institutional arrangements can be an important impediment to the implementation and enforcement of biodiversity conservation measures and to the sustainable use of the components of biological diversity. Biological diversity is a cross-sectoral issue and cuts across traditional agency structures. As a result, there will typically be a split of biodiversity management responsibilities among different agencies and offices at the local, regional, and national levels. These agencies and offices will have different objectives, target groups, and interests, making co-ordination of planning and management across the competing departments difficult. To successfully implement national strategies, programmes and policies on biological diversity may require the restructuring of existing institutions or the creation of new ones. One possible organisational approach suggested by an ad hoc UNEP expert panel is to establish a "focal point" co-ordinating group to develop cross-sectoral biodiversity strategies, and to facilitate the integration of conservation and sustainable use of biological diversity into the decision-making of relevant authorities (UNEP, 1993).

Biodiversity provides a multitude of beneficial services to society -- for example, as a source of ecological services, genetic information, recreation, or as a symbol of national heritage. It follows that different individuals will have different ideas about the proper management of resources that provide many different outputs and uses. Overlapping uses complicate the conservation and management of biological diversity and mean that policy co-operation and co-ordination from all levels of government, industry, and community groups are critical to ensure that sustainable biodiversity management reflects in a balanced way the multiple uses to which these resources can be applied.

The Preamble of the Convention on Biological Diversity [and Article 10(e)] stress the need for co-operation, including that between governmental authorities and the private sector. Similarly, the involvement of indigenous and local communities is provided for in Articles 8(j) and 10(d). The knowledge and experience of indigenous and local communities must be drawn upon and fully utilised, and public awareness raised to develop a sense of community involvement and action. Mechanisms to improve policy co-ordination include the encouragement of public participation and community involvement in the decision-making process in the relevant sectors, and the use of different types of inter-ministerial or inter-agency consultative arrangements to stimulate collaboration in the development and implementation of policy.

National biodiversity strategies, plans and programmes should be developed in an open and transparent process, involving public participation to the greatest extent possible. Public opinion should be taken into account to counterbalance sectoral interests in society. It is often the case that vested interests and pressure groups influence government policy formation with potential negative ramifications for the conservation and sustainable use of biological diversity. For example, in agriculture, the leverage of farming lobbies relative to environmental groups has an important effect on policy choices with relevance to natural resource use and the environment.

2. Economic distortions

In some instances government policies can create market distortions that have unintended and unexpected impacts on the conservation and sustainable use of biological diversity. Ensuring that the environmental effects of public policies are fully integrated in the policy formation and implementation process can often help avoid unintentional and undesirable side effects on biological diversity. Articles 6(b)

and 10(a) of the Convention on Biological Diversity highlight the importance of the integration of conservation and sustainable use of biological diversity into national decision-making, and sectoral or cross-sectoral programmes and policies.

Of particular importance is the identification of existing *subsidies* in natural-resource based sectors and publically *administered resource prices* (such as for water and timber) that do not embody the full social costs of resource use (OECD, 1991).

Subsidies. Subsidies should be evaluated with respect to how they contribute or detract from environmental policy objectives, and the means and implications of eliminating those judged to be counter-productive. For example, agricultural assistance schemes designed to secure self-sufficiency, promote food exports, and to increase farm incomes are common in most OECD Member countries. But, such assistance can exacerbate the negative effects of agricultural production on biodiversity by encouraging reduced crop diversity, the over production of crops that are highly erosive, the cultivation of marginal lands that tend to be more subject to soil erosion and moisture deficiencies, and the conversion of wetlands and forestland to agricultural production. High and stable prices for agricultural commodities also influence tillage, practices, the use of fertilizers and pesticides, the amount of excess manure, and the intensity and use of soil resources (OECD, 1993).

Resource pricing. Natural resources are frequently priced at less than their marginal cost to society. Indeed, they may be priced below the marginal cost of production, as in below-cost timber sales. This is because they are often distributed through public agencies which may have little incentive to break even or maximise net financial returns. Water resources are a case in point. Excessively low government administered prices for water resources continue to be the rule in a large number of OECD Member countries (OECD, 1991). Often these subsidies are very large. The effect is to distort the real price of water by undervaluing the resource. Inefficiency in water allocation results as use of the resource is expanded beyond that which would be optimal under full marginal social cost pricing (OECD, 1989).

C. Information failure and uncertainty

Poor information and uncertainty are a third underlying cause of biodiversity loss. For example, the effects of habitat alteration and introduction of exotic species on biodiversity in the long-run are often not fully considered due to lack of foresight and information.

Uncertainty of ecosystem effects from biological diversity loss, in particular, make decision-making on conservation issues problematic. For example, the significance of biological diversity in ecosystems has not been linked with studies of the resilience of those same systems in a systematic way. There is thought to be a "threshold" of diversity below which ecosystems lose their self-organisation and ability to provide ecological services, but there exists fundamental uncertainty about the dynamics of ecological systems (as well as the dynamics of the jointly determined system comprising ecological and economic systems) and where the threshold lies.

Ecological complexity, fragmentary knowledge, and fundamental ecological uncertainty with high potential risks, suggest the use of the *precautionary principle*. The precautionary principle, as expressed in the Preamble of the Convention on Biological Diversity, states that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat.

Information failure and uncertainty are closely linked with the types of government intervention failure discussed above. Incomplete information can lead to government policy measures that provide the wrong signals and incentives to guide the use of biological resources, and distorted demand for the goods and services stemming from diverse biological resources. The Convention on Biological Diversity stresses in a number of its Articles (such as 12, 13, 17 and 18) that the successful implementation of actions for the conservation and sustainable use of biodiversity will depend on the enhancement and exchange of knowledge through research, strengthening technical and scientific capacity, and public awareness.

D. The structure of property rights

The rights and duties of individuals, groups, and nations with respect to the protection of biological diversity are bound by the structure of property rights. If damage to biological diversity is -- by virtue of the legal arrangements -- of no consequence to the responsible party, then there is no incentive to encourage greater care in preventing such damages. For example, existing private property rights arrangements embodied in legislation in most OECD Member countries do not generally allow extensive interference in landowners' uses of privately-owned land, including uses that would be damaging to biological diversity. But property rights are not immutable. A wide range of economic and social forces influence political attitudes towards the rights and duties associated with biological diversity, and this can lead to modifications of existing property rights systems, or the creation of new property rights systems, that are more favourable to the conservation and sustainable use of biological diversity.

In some cases the clarification and enforcement of property rights to use land and biological resources (irrespective of private or public ownership) can facilitate improved resource management. Improved land tenure systems, or the creation of land tenure institutions where they currently do not exist, can result in resource investments that are more consistent with the conservation and sustainable use of diverse biological resources.

Intellectual property rights are particularly relevant to Article 16 of the Convention on Biological Diversity. Intellectual property rights are private legal rights which apply to the intangible human contribution that goes into producing a particular technology, such as biotechnology. There are many forms of intellectual property rights but patents, trade secrets, and plant breeders' rights are especially relevant to technology transfer and Article 16 of the Convention.

V. Priorities for Action for the Conservation and Sustainable Use of Biological Diversity

To meet national objectives in the conservation and sustainable use of biological diversity, and to address the proximate and underlying sources of pressure on biological diversity, criteria for determining priorities for action must be developed. Priorities within national strategies and action plans on biological diversity should be developed using all available information, and should make use of economic criteria (cost-benefit analysis, cost-effectiveness analysis, the precautionary principle) and scientific criteria (indicators, geographic information systems), as well as take into account political, legal, and institutional aspects. In setting priorities, the views of all relevant sectors within a country at both local and national levels should be considered.

The Convention on Biological Diversity highlights the need for countries to set their own priorities. The Convention's structure provides an approach by which national priorities could be

determined. Article 7 indicates that the components of biodiversity important for its conservation and sustainable use (with attention being given to the indicative list of categories found in the Annex) should be identified and monitored to support (*ex-situ* and *in-situ*) conservation measures and sustainable use. Article 7 also requires the identification and monitoring of processes and categories of activities which have, or are likely to have, significant adverse impacts on biodiversity.

VI. The Potential Role of Economic Incentive Measures in Strategies for the Conservation and Sustainable Use of Biological Diversity

The Convention on Biological Diversity calls for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources" (Article 1). To achieve this objective, signatory states are to develop measures for the conservation and sustainable use of biological diversity (Article 6).

The conservation and sustainable use of biological diversity will best be achieved through an approach that uses the widest available range of appropriate measures and strategies, and which ensures consistency and co-ordination among the various measures undertaken. Combined policy packages should be developed that address *in-situ* and *ex-situ* conservation of biological diversity at the ecosystem, species and genetic levels; that enhance activities that have a positive impact and minimise those that have an adverse impact; and; that enhance knowledge through research, strengthening technical and scientific capabilities and public awareness. As an example of complementary measures, the protection of protected areas might be combined with measures to promote ecologically sustainable development in adjacent areas. This particular combined approach is expressed in Article 8(e) of the Convention on Biological Diversity. Similarly, while *in situ* conservation is the most effective means of conserving biological diversity, situations arise where *ex-situ* measures may be of great importance, and there is a need to ensure that *in-situ* and *ex-situ* measures are co-ordinated as elements of an integrated package of policies to achieve conservation and sustainable use of biological diversity.

The use of economic incentive measures represents one policy approach that can be used in combination with other measures to achieve biodiversity conservation and sustainability goals. Economic incentive measures are highlighted in Article 11 of the Convention which states that "Each contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity."

The incentive-based approach to the conservation and sustainable use of biodiversity attempts to improve decision-making affecting biological resources by improving markets for these resources. This approach recognises that the conservation of biodiversity will be effective only to the extent that resource users are confronted with the true cost of their actions, and to the extent that the global and domestic values of biological diversity are appropriable by the individuals and societies who actually make the decisions concerning resource allocation.

There is a substantial body of literature that explores the relative merits of economic incentive measures compared with "command and control" environmental policy measures. Because economic incentives take advantage of market forces they will often be the least-cost means of achieving environmental objectives. Economic incentive measures can also provide continuing incentives for innovation, and in some cases can provide a source of government revenues. This is not to say, of course,

that market processes are in all cases preferred, or that they can resolve all our biodiversity problems. A balance should be sought between regulatory measures, economic incentive measures, and other policy measures.

A. The range and variety of economic incentive measures

There exists a wide array of economic incentive measures that are, or could be, used for the conservation and sustainable use of biological diversity. In all cases, these economic incentive measures seek to improve markets for biological diversity, or create them where they did not previously exist. In some cases, this is achieved by giving value to biological diversity through compensation, penalties, and improved resource pricing. In other cases, this is achieved by the removal of market distortions, improved market information, the introduction of systems of trading, and improved systems of property rights. The list of economic incentive measures below is not necessarily exhaustive, but is intended to serve as a starting point for analysis.

1. Systems of trading and market creation

Agreements for the use of genetic resources. Plant genetic resources are of considerable importance in the development of new pharmaceutical products. Recently there has been a movement to develop mechanisms for compensating for the use of plant genetic resources. It has been based on the idea of making payments for prospecting rights. The idea of a biodiversity prospecting agreement is to make an exclusive arrangement for plant screening concerning a certain geographical area on terms agreed between two or more parties.

A closely related issue concerns the conservation and sustainable use of agricultural plant genetic resources. Although 18 International Agricultural Research Centres are the primary source of the world's agricultural plant genetic resources, the problems and deficiencies of exclusive reliance upon ex situ conservation are widely recognised. In part on account of this, the Food and Agricultural Organisation has developed the International Undertaking on Plant Genetic Resources, which provides for a mechanism for compensating the providers of the raw material in plant breeding operations. This mechanism is described as an "international fund" but remains to be implemented.

By recognising an important factor of production that is otherwise going uncompensated, and thus unconserved, biodiversity prospecting agreements and compensation for the provision of agricultural plant genetic resources help to strengthen incentives for the conservation and sustainable use of diverse biological resources.

Commercialisation of wild species. By creating clear and enforceable property rights to wild species with commercial value landowners may have an incentive to protect the species and their habitat. In some cases, this can contribute to the conservation of the species. For example, in some countries controlled commercialisation of the products of seabirds (eggs, feathers, and meat) has improved seabird conservation (Goldstein, 1991).

Eco-labelling. Labelling of goods/services produced in a manner consistent with conservation and sustainable use of biological diversity can improve the flow of information available to consumers on the various characteristics of commodities, and improve consumers' ability to make sound decisions. For example, differentiating tropical timber products by providing information on their nature (e.g. harvested

from plantation forest, harvested from legal virgin forest) may alter the market for tropical timber products and the structure of international demand for tropical timber products, leading to changes in the composition of tropical timber products harvested and marketed, with potentially positive effects on tropical forest conservation.

Environmental performance bonds. Performance bonds are another economic incentive measure that can directly and indirectly contribute to the conservation and sustainable use of biological diversity. Performance bonds can be introduced in a number of alternative ways including assurance bonds, which are lump-sum payments proportional to expected damage from the resource-using activity. Assurance bonds have been proposed in settings where there is one source (or a very small number of sources) conducting relatively well-defined, one-time activities that may be environmentally damaging.

Tradeable permits. Under a system of *tradeable development permits* a restriction on the total amount of development in a preservation zone is introduced by the government through the issuance of a limited amount of development rights. The development rights are tradeable so that individuals that place the highest value on development are able to purchase additional development rights from willing sellers.

Wetland mitigation "banking" is a similar idea that has been considered in some OECD Member countries where environmental regulations do not permit the private or public conversion of wetland. The total amount of wetland area is maintained, but some flexibility is introduced to avoid unduly restricting development. Mitigation banking involves establishing a "reserve" of restored or artificially created wetland. Private or public entities could purchase shares of the reserve to offset unavoidable wetland losses associated with development projects.

Tradeable fishery quotas are used in some cases to manage fisheries in OECD Member countries. Quotas on fishery catch rates are tradeable allowing those who attach the highest use value to the fish stock to bid the most and to acquire additional permits. The tradeable aspect of the permits allows authorities to regulate use of the resource by buying-in or selling permits through open market operations.

2. Removing perverse incentives

Governments policy interventions are frequently economically inefficient in the sense that they have unintended and unexpected side-effects on the environment. Examples include administered resource prices and output pricing, such as subsidies to water use (including irrigation), below cost timber pricing, and agricultural support programmes. These and other government policies can lead to the overuse of natural resources and excessive loss of biodiversity. Actions that address these distortions can often improve overall economic performance and help conserve biodiversity at the same time.

3. Clarification, modification, and enforcement of property rights

The clarification, sometimes modification, and enforcement of land tenure systems and rights to use land and biological resources (irrespective of private or public ownership) can facilitate resource use that is more consistent with the conservation and sustainable use of diverse biological resources. Local land tenure systems need to be assessed for their consistency with conservation and sustainable use of biological diversity. Where the rights to land are vested in entities other than individuals, then it may be important to engage in the construction of other sorts of revenue-sharing arrangements with the local community. Thus, even if the forest remains the property of the government (as in the case with a wildlife park, for

example), it remains possible to make certain facets of the forest (wildlife, extractive products, etc) the "property" of locals. Some sort of a "share" in the proceeds, or right to harvest, is usually adequate to create incentives in local communities for conservation.

With regard to intellectual property rights, the Convention on Biological Diversity calls on Parties to ensure that such rights do not run counter to the objectives of the Convention.

4. Financial incentives and charges

Payments for the conservation and sustainable use of biological diversity. Governments of OECD Member countries make use of a number of financial incentive measures to enhance environmental values of land use. From the biodiversity perspective, such financial incentives address the problem of under investment in biodiversity. Some of the approaches being used include *grants and direct payments*, often through *environmental management agreements, soft loans and tax concessions* on investments in forestry and activities that protect the environment, *purchase of land*, and *purchase of land development rights*.

Financial incentive measures such as these may also be applied bilaterally or internationally. Because of the global nature of biodiversity benefits, international applications of financial incentive measures are important. For example, a country or group of countries might enter into an agreement with a host country to financially support biodiversity conservation activities. One form of such support that is tied with debt relief involves *debt-for-nature swaps*. Under debt-for-nature swaps a private organisation or country agrees to purchase another country's debt on the secondary debt market. The debt is then turned over to the issuing country in exchange for the agreement to undertake specific actions aimed at protecting its natural environment.

It is important to observe that international financial incentives can be "win-win" solutions to the biodiversity problem. Because biological diversity has *global* public goods characteristics, and because it may be more effective to preserve diverse biological resources in some countries and regions than in others, there exists an incentive for international payments to help finance the preservation of biological diversity in biologically rich regions. Both the host and funding countries can be better off. This is an important point because it means that funding the conservation of biological resources in biologically diverse countries can be justified on the basis of the mutual pursuit of national self-interest, and not from any moral responsibility on the part of the funding countries.

Resource taxation and user fees. For renewable resources a tax is frequently advocated for common property resources so as to reduce use or harvest rates. Resource taxes of this type have been applied in the commercial timber industry, for example. Resource taxes may be applied on the harvest or use rate, or on the level of inputs. Which tax is favoured in theoretical terms depends on the nature of the inputs, the stock of the resource, and levels of uncertainty. Such taxes may have two components: one part which adjusts for any effect which current harvesting or extraction has on future yields (called the "stock effect" in a fishery context), and the other which reflects the external costs imposed by any one user on another in a common property context (the "crowding" effect).

User fees include construction and development fees, park and recreation entrance fees, and fishing and hunting license fees. User fees create a market value, or price, for what were otherwise free services.

Non-compliance fees and fines for damages. Non-compliance fees can be used to complement regulatory measures by creating incentives for compliance. Such enforcement incentives are sometimes considered as an economic incentive. Fines for damages to natural resource systems are also used in some OECD Member countries as an economic incentive for the conservation and sustainable use of biological diversity. Fines for damages place an "expected price" on activities that damage the environment, and exert pressure on resource users to ensure that their activities are consistent with society's biodiversity conservation and sustainable use objectives.

B. How economic incentive measures can tackle the causes of biodiversity loss

The introduction of economic incentive measures could be an important element of countries' overall policy framework for addressing the fundamental problems that lie at the core of biodiversity decline. Systems of trading and market creation, clarification and enforcement of property rights, and financial incentives and charges, address the problem of environmental externalities, open-access resource management regimes, and public goods. These economic incentive measures do so by directly or indirectly placing a price on the otherwise free environmental good, thereby improving the market signals being sent to resource users. The introduction of these measures can also alter the structure of property rights in favour of the conservation of biological diversity. The reduction or removal of perverse incentives addresses an important source of government intervention failure.

C. Economic incentive measures and the Convention on Biological Diversity

Economic incentive measures can directly and indirectly support a large number of provisions of the Convention on Biological Diversity. Table 1 takes a first step at identifying the potential linkages between economic incentive measures and the Articles of the Convention.

VII. Evaluating OECD Practical Experience with Economic Incentive Measures

The Expert Group on Economic Aspects of Biodiversity will, to the extent possible, address the following questions in assessing the OECD experience with economic incentive measures for meeting biodiversity conservation and sustainable use objectives:

- To what extent can economic incentive measures be used in combination with other policy approaches in integrated biodiversity "policy packages"?
- What are the opportunities for institutional capacity building to improve administration and implementation of economic incentive measures, and to improve policy co-ordination?
- What is the process used for prioritising actions for the conservation and sustainable use of biodiversity, and for selecting economic incentive measures to achieve desired goals?
- What mechanisms can be used to encourage the involvement of target groups and the local community in the design and implementation of economic incentive measures?

Table 1. Economic incentive measures and the Convention on Biological Diversity

Reference to article	Actions
<p>Article 5 Co-operation</p> <p>Each Contracting Party shall, as far as possible and as appropriate, co-operate with other Contracting Parties, directly or, where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity.</p> <p>Article 6 General Measures for Conservation and Sustainable Use</p> <p>(a) Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in this Convention relevant to the Contracting Party concerned; and</p> <p>(b) Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.</p> <p>Article 7 Identification and Monitoring</p> <p>(c) Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity, and monitor their effects through sampling and other techniques.</p> <p>Article 8 In-situ Conservation</p> <p>(a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;</p> <p>(b) Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity;</p> <p>(c) Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;</p>	<p>Strengthen opportunities for co-operation through the introduction of bilateral and/or multilateral economic incentive measures.</p> <p>Select and design economic incentive measures in combination with other policy measures to support integrated national strategies, plans, and programmes. Provide economic incentives to key sectors to ensure conservation and sustainable use of biodiversity.</p> <p>Make use of all information available to set priorities for action, and to help in the selection and design of economic incentive measures. Measures should be well targeted to priority problems and sectors, and applied with an appropriate level of stringency.</p> <p>Provide economic incentive measures that further conservation of protected areas, ecosystems and natural habitats; that provide incentive structures for the rehabilitation and restoration of degraded ecosystems; and, that create incentives for the protection of traditional lifestyles, knowledge, and practices in local communities.</p>

Table 1. (continued)

Reference to article	Actions
<p>Article 8 (continued)</p> <p>(d) Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;</p> <p>(e) Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.</p> <p>(f) Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, <i>inter alia</i>, through the development and implementation of plans or other management strategies;</p> <p>(i) Endeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components;</p> <p>(j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for conservation and sustainable use of biological diversity and promote their wider applications with approval and involvement of holders of such knowledge, innovations and practices and encourage equitable sharing of benefits arising from utilization of such knowledge, innovations and practices.</p> <p>(l) Where a significant adverse effect on biological diversity has been determined pursuant to Article 7, regulate or manage the relevant processes and categories of activities; and</p> <p>(m) Co-operate in providing financial and other support for in-situ conservation outlined in subparagraphs (a) to (l) above, particularly to developing countries.</p> <p>Article 9 Ex-situ Conservation</p>	<p>Introduce economic incentive measures to compensate for <i>ex-situ</i> conservation activities. Ensure that economic incentive measures for <i>ex-situ</i> conservation complement and reinforce economic incentive measures for <i>in-situ</i> conservation.</p>

Table 1. (continued)

Reference to article	Actions
<p>Article 10 Sustainable Use of Components of Biological Diversity</p> <p>(a) Integrate consideration of the conservation and sustainable use of biological resources into national decision-making;</p> <p>(b) Adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity;</p> <p>(c) Protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements;</p> <p>(d) Support local populations to develop and implement remedial action in degraded areas where biological diversity has been reduced;</p> <p>(e) Encourage co-operation between its governmental authorities and its private sector in developing methods for sustainable use of biological resources.</p> <p>Article 11 Incentive Measures</p> <p>Each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.</p> <p>Article 14 Impact Assessment and Minimizing Adverse Impacts</p> <p>1(b) Introduce appropriate arrangements to ensure that the environmental consequences of its programmes and policies that are likely to have significant adverse impacts on biological diversity are duly taken into account;</p> <p>2. The Conference of the Parties shall examine, on the basis of studies to be carried out, the issue of liability and redress, including restoration and compensation, for damage to biological diversity, except where such liability is a purely internal matter.</p>	<p>Provide incentives to encourage sustainable use of biological diversity. Undertake where possible full evaluation of all costs and benefits of resource use, and evaluate the impacts of economic disincentives on the sustainable use of biological diversity. Provide incentives to encourage local populations to undertake remedial actions. Introduce mechanisms to improve co-operation between government authorities and the private sector in the formation and implementation of economic incentive measures.</p> <p>Make use of a wide array of economic incentive measures, including those identified in this document under in the section entitled "the range and variety of economic incentive measures."</p> <p>Reduce or eliminate economic disincentives that are damaging to the conservation and sustainable use of biological diversity. Introduce non-compliance fees and fines for damages to biological diversity where appropriate.</p>

Table 1. (continued)

Reference to article	Actions
<p>Article 15 Access to Genetic Resources</p> <p>1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.</p> <p>2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.</p> <p>4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.</p> <p>7. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19, and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.</p>	<p>Introduce agreements for the use of biological resources and other economic incentive measures that are consistent with the Convention on Biological Diversity and, in particular, Article 15.</p>
<p>Article 16 Access to and Transfer of Technology</p> <p>5. The Contracting Parties, recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention, shall co-operate in this regard subject to national legislation and international law in order to ensure that such rights are supportive of and do not run counter to its objectives.</p>	<p>Ensure that agreements for the use of biological resources and other economic incentive measures are undertaken in a way that are consistent with the Convention on Biological Diversity and the objectives of Article 16.</p>
<p>Article 19 Handling of Biotechnology and Distribution of its Benefits</p> <p>1. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, to provide for the effective participation in biotechnological research activities by those Contracting Parties, especially developing countries, which provide the genetic resources for such research, and where feasible in such Contracting Parties.</p>	<p>Consider, where appropriate, co-operative arrangements to conduct biotechnological research as part of economic incentive measures for the conservation and sustainable use of biological resources.</p>

Table 1. (continued)

Reference to article	Actions
<p>Article 20 Financial Resources</p> <p>1. Each Contracting Party undertakes to provide, in accordance with its capabilities, financial support and incentives in respect of those national activities which are intended to achieve the objectives of this Convention, in accordance with its national plans, priorities and programmes.</p> <p>2. The developed country Parties shall provide new and additional financial resources to enable developing country Parties to meet the agreed full incremental costs to them of implementing measures ...</p> <p>3. The developed country Parties may also provide, and developing country Parties avail themselves of, financial resources related to the implementation of this Convention through bilateral, regional and other multilateral channels.</p> <p>4. The extent to which developing country Parties will effectively implement their commitments under this Convention will depend on the effective implementation by developed country Parties of their commitments under this Convention related to financial resources and transfer of technology and will take fully into account the fact that economic and social development and eradication of poverty are the first and overriding priorities of the developing country Parties.</p>	<p>Provide financial resources to support domestic economic incentive measures for the conservation and sustainable use of biological diversity. Provide new and additional financial resources through bilateral or multilateral channels to assist developing countries to meet the objectives of the Convention.</p>
<p>Article 21 Financial Mechanism</p> <p>1. There shall be a mechanism for the provision of financial resources to developing country Parties for purposes of this Convention on a grant or concessional basis ... The Conference of the Parties shall determine the policy, strategy, programme priorities and eligibility criteria relating to the access to and utilization of such resources ...</p> <p>3. The Conference of the Parties shall review the effectiveness of the mechanism ...</p> <p>4. The Contracting Parties shall consider strengthening existing financial institutions to provide financial resources for the conservation and sustainable use of biological diversity.</p>	<p>Ensure that mechanism, economic incentive measures are considered in combination with other measures the activities supported by the financial mechanism.</p>

- How can the effectiveness of economic incentive measures be evaluated, and can the effectiveness of economic incentive measures be compared with other policy instruments?
- Are there "gaps" in the use of economic incentive measures that can be identified?
- How important is the role of economic incentive measures in achieving the objectives of the Convention on Biological Diversity compared with other policy approaches?
- What are the critical information needs to guide policy and improve the application of economic incentive measures?

The case study process will provide guidance on some of these questions, and the attached "Guidelines for Country Case Studies" (Annex) have been prepared to focus the attention of the case studies on these issues.

References

- GOLDSTEIN, J. (1991). "The Prospects for Using Market Incentives to Conserve Biological Diversity," *Environmental Law*, Vol. 21, No. 995, pp. 985-1014.
- MCNEELY, J.; K. MILLER; W. REID; R. MITTERMEIER, and T. WERNER (1990). *Conserving the World's Biological Diversity*, International Union for the Conservation of Nature and Natural Resources (IUCN), Gland.
- OECD (1989). *Water Resources Management: Integrated Policies*, Paris.
- OECD (1991). *Resource Pricing*, Environment Monograph.
- OECD (1993). *Agricultural and Environmental Policy Integration*, Paris.
- PERRINGS, C. and H. OPSCHOOR (1994). "The Loss of Biological Diversity: Some Policy Implications," *Environmental and Resource Economics*, Volume 4, Number 1, pp. 1-11.
- SEDJO, R. (1992). "Property Rights, Genetic Resources, and Biotechnological Change," *Journal of Law and Economics*, Vol. 35, No. 1, April 1992.
- RANDALL, A. (1986). "Human Preferences, Economics, and the Preservation of Species," in B. Norton (ed.), *The Preservation of Species: The Value of Biological Diversity*, Princeton University Press, Princeton, pp. 79-109.
- UNEP (1993). "Report of Panel I: Priorities for Action for Conservation and Sustainable Use of Biological Diversity and Agenda for Scientific and Technological Research," Expert Panels Established to Follow-Up on the Convention on Biological Diversity, UNEP/Bio.Div./Panels/Inf. 1, United Nations Environment Programme, Nairobi, 28 April 1993.
- WILSON, E.O., (ed.) (1988). *Biodiversity*, National Academy Press, Washington, D.C.
- WORLD CONSERVATION MONITORING CENTRE (1992). *Global Biodiversity*, Chapman and Hall, London.

ANNEX

c

Guidelines for Country Case Studies

A. Introduction

This annex provides guidelines for the development of OECD case studies on the use of economic incentives for the conservation of biodiversity. The guidelines are based on the 1991 OECD Council Recommendation on the Use of Economic Instruments in Environmental Policy (reference).

B. Case study objectives

The case studies will draw on OECD Member country experience in the use of incentive measures for the conservation and sustainable use of biological diversity, and attempt to set out both practical information related to their implementation, and key lessons learned that might be transferable to other countries or regions. They should analyze in detail the issues and problems encountered before and after implementation. The ultimate aim of the case studies is to help guide policy-makers in attaining maximum net benefits from the use of economic incentive measures.

The list of issues below is provided to give guidance to case study authors. Case studies should address each of these issues, to the extent possible, and to the extent that they are relevant. The list does not pretend to be exhaustive and the authors of the case studies should feel free to explore any other issues and policies they feel relevant.

1. Background

- 1.1 What is the name of the economic incentive?
- 1.2 What is the enabling legislation?
- 1.3 When was the incentive measure introduced?

2. Selection and objectives of the incentive measure

The case studies should provide background to the adoption of the economic incentive by describing what motivated the selection of the incentive, and explaining the primary objectives of the incentive.

- 2.1 What are the pressures on biodiversity, or the sources of biodiversity loss, that the economic incentive is designed to address?
- 2.2 What role did concerns of environmental effectiveness, economic efficiency, equity consequences, administrative feasibility and cost, and, acceptability play in the selection and historical background to the incentive?

- 2.3 How did existing international agreements and domestic wildlife and resource conservation policies affect the selection of the incentive measure?
- 2.4 What are the objectives of the economic incentive (revenue raising, protected areas conservation, conservation outside protected areas, ex-situ conservation, protection of rare and endangered species, other)?
- 2.5 Was the incentive measure introduced for biodiversity conservation, or was it introduced for other objectives and later adapted to meet the biodiversity conservation challenge?
- 2.6 By what means are priorities in the conservation of biodiversity established, and how did the priority-setting process affect the selection of economic incentives?
- 2.7 From what groups and interests did the impetus of support for the economic incentive come from?
- 2.8 Was the economic incentive introduced to prevent deterioration of diverse resources, or to rehabilitate damaged environmental systems?

3. *Consideration of administrative feasibility and costs of implementation*

The case studies should consider issues in the administration of the economic incentive. This relates to the ease and cost of implementation, monitoring, and enforcement structures, which may vary with the number of target groups involved and also upon the nature of existing legal and institutional settings.

- 3.1 Is the economic incentive applied at the national level, or only regionally?
- 3.2 How extensively has the incentive been implemented (geographic area, number of programme participants, etc)?
- 3.3 Who are the responsible agencies (local, regional, or national government)?
- 3.4 How is compliance with the incentive measure monitored, and what is the name of the organisation responsible for monitoring?
- 3.5 Does the incentive make use of existing enforcement channels and invoicing systems to reduce costs?
- 3.6 To what extent does the management of the incentive measure lead to the establishment of new bureaucracies?
- 3.7 What are the policy and regulatory changes required or implemented to allow the incentive measure to be used as an instrument in conserving biodiversity?
- 3.8 What are actual or estimated administrative costs?

4. *Description of the mechanics of implementation of the economic incentive*

The case studies should provide as much detail as possible on the very practical question of how exactly the economic incentive is currently implemented.

- 4.1 What activity and/or sector is affected by the incentive?
- 4.2 What are the incentives for participation or compliance?
- 4.3 How is the incentive measure implemented (including details of the incentive measure and its key characteristics)?
- 4.4 What implementation problems have been encountered?
- 4.5 What is the charge base and how are charge rates set and collected? What are the mechanisms for changing the charge level (e.g. annual review, parliamentary review, etc)?
- 4.6 What is the value of revenues raised from charges, and how are the revenues used? Are the revenues earmarked for specific uses? What is the rationale behind the decision to earmark revenues?
- 4.7 What are the sources of funding for systems of payments for environmental services (e.g. general taxation revenues, other environmental charges, etc.)?
- 4.8 What criteria are used to set payment rates under payment measures for environmental services?
- 4.9 What are the criteria for eligibility for payments? What is the payment made for?
- 4.10 How do trading systems work in terms of administration and implementation?
- 4.11 How are violations to the incentive measure penalised?

5. *Combined policy approaches*

The case studies should examine how economic incentives are used in combination with other environmental policy instruments (regulations, voluntary agreements, public support of education, research, and technical assistance). This aspect is important because economic incentives are not the full answer to biodiversity problems: economic incentives constitute one category amongst other policy instruments which are being (and will be) used to achieve biodiversity conservation goals. Today, for example, in most cases, economic incentives are serving as complements to other policy instruments such as regulations and voluntary agreements with stakeholders. It is important, then, to consider the role of economic incentives in the context of an overall policy framework, not in isolation.

- 5.1 Was the economic incentive specifically introduced to complement other policy measures?
- 5.2 Was the economic incentive introduced as a substitute to another policy measure?

- 5.3 Which instruments or integrated packages of measures seem to work best under which conditions?
- 5.4 What is the relative effectiveness of different policy instruments in meeting their environmental, economic, and other (e.g. agricultural) objectives?

6. *Economic and environmental efficiency*

The case studies should evaluate the economic and environmental efficiency of economic incentives, taking into account the various administrative and institutional arrangements that can have a bearing on their efficiency and appropriateness. In an operational sense, economic efficiency implies that the economic cost of complying with environmental requirements is minimized. Environmental effectiveness refers to the extent that environmental objectives are achieved.

- 6.1 To what extent has the economic incentive achieved its objectives and what evaluations have been carried out?
- 6.2 How is the impact on biodiversity monitored? What are the environmental data, measurements, and models used to evaluate the environmental and economic effectiveness of economic incentives? And, how (if at all) are environmental improvements resulting from economic incentives valued?
- 6.3 What modifications have been made to the incentive measure in light of any evaluation?
- 6.4 What are seen as the main obstacles and constraints to improved environmental and economic effectiveness of the economic incentive?
- 6.5 For user fees and charges, what is their incentive effect? What is the estimated elasticity of demand for entry to national parks, and restricted natural resource areas?
- 6.6 What types of innovative approaches have been selected to improve environmental and economic efficacy -- such as whole ecosystem or watershed approaches to environmental management?

7. *Acceptability and consultation with target groups*

The case studies should describe the interaction between policy-makers and target groups at various stages in the implementation of the economic incentive.

- 7.1 Who are the target groups and who are the various players involved?
- 7.2 How were target groups consulted in the process leading to the adoption of the incentive?
- 7.3 How did the policy implementation process affect targeted groups' perception of the certainty and stability with respect to the basic elements of the incentive?

8. *Economic and distributive considerations*

The case studies should consider relevant economic and distributive consequences of the economic incentives. For example, at the micro level, specific groups may have to face considerable expenditures in a short period of time, which may threaten their continuity. On the other hand, the incentive concerned may be expected to establish efficient solutions in the longer term.

- 8.1 Was the incentive introduced gradually to ameliorate transition problems?
- 8.2 Are there any adjustment programmes foreseen for the transition period, such as temporary financial assistance measures, retraining programmes, or relocation assistance?
- 8.3 Are there any exemptions or special rules to compliance to the incentive?