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INCENTIVE MEASURES

Further analysis of the design and implementation of incentive measures

Note by the Executive Secretary

INTRODUCTION

1. In paragraph 5 of its decision IV/10 A, the Conference of the Parties requested the Executive Secretary:

> "To prepare in collaboration with the Organisation for Economic Co-operation and Development (OECD), the World Conservation Union (IUCN) and other relevant organizations, a background paper containing further analysis of the design and implementation of incentive measures for the conservation and sustainable use of biodiversity, as it is related to the thematic focus of the fifth meeting of the Conference of the Parties, with the aim of developing guidance to Parties;
>
> "To describe, in this document, ways and means to identify perverse incentives and possibilities to remove or mitigate their negative effects on biological diversity."

2. The Conference of the Parties has also called upon Parties to provide case-studies on incentive measures at both its third and fourth meetings. In addition, OECD and IUCN have contributed to this work through the production of case-studies and conceptual development. As instructed by Conference of the Parties, the present note has been prepared in collaboration with these organizations and draws upon numerous case-studies provided by them. A synthesis of case-studies from these organizations and from Parties appears in document UNEP/CBD/COP/5/INF/14, which also identifies case-studies related to the thematic focus of the fifth meeting, as requested in paragraph 5 (a) of decision IV/10 A.

* UNEP/CBD/COP/5/1.

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3. The analysis presented in the note by the Executive Secretary on sharing of experiences on incentive measures for conservation and sustainable use prepared for the third meeting of the Conference of the Parties (UNEP/CBD/COP/3/24) and the note on design and implementation of incentive measures prepared for the fourth meeting (UNEP/CBD/COP/4/18) provides the basis for the analysis herein. The note for the third meeting outlined a conceptual framework guiding the design of incentives stressing a balanced approach of formal instruments, social measures, and compliance mechanisms. The note for the fourth meeting reviewed a number of case-studies of successful programmes on incentive measures and further developed the design concepts of the earlier document, leading to some practical guidelines.

4. The present note builds on these earlier documents and the work of OECD and IUCN to present further analysis of the design and implementation of incentive measures. Chapter I focuses on three critical aspects of a programme on incentive measures: (i) programme design; (ii) selection of instruments; and (iii) implementation steps. Chapter II discusses perverse incentives and possibilities for their removal or mitigation. Chapter III outlines possible follow-up activities for the consideration of the Conference of the Parties.

I. FURTHER ANALYSIS OF THE DESIGN AND IMPLEMENTATION OF INCENTIVE MEASURES

A. Incentive-measures programme design

5. An incentive measure is conventionally defined as an economic or legal instrument designed to encourage beneficial activities (a positive incentive) or to discourage harmful activities (a negative incentive). The Conference of the Parties has taken a broad view of incentives to include social and institutional measures, such as stakeholder participation, capacity-building, and information provision, in addition to formal policy instruments. Relevant decisions of the Conference of the Parties are outlined in the synthesis document.

6. As outlined in the above-mentioned notes by the Executive Secretary prepared for the third and fourth meetings of the Conference of the Parties, a programme on incentive measures typically includes three components: formal policy instruments, social and institutional measures, and compliance mechanisms. 1/ An incentive is created and reinforced by the interaction of these three aspects of the institutional environment governing resource use, rather than by any single measure operating alone. When a formal policy instrument receives social and institutional support, and compliance is adequate, then a programme on incentive measures is "institutionalized" and will direct decision makers consistently towards actions that support and reinforce programme objectives. 2/

1/ The note prepared for the fourth meeting of the Conference of the Parties (UNEP/CBD/COP/4/18) considered compliance and institutional measures together. The present document reverts back to the classification established in the note prepared for the third meeting (UNEP/CBD/COP/3/24), which was based on institutional economic theory (for example, D. North, Institutions, Institutional Change, and Economic Performance (Cambridge University Press, Cambridge, 1990).

2/ S. Presber-James,. "An Institutional Approach to Incentives for Conservation" (paper presented at IUCN World Conservation Congress, Montreal, 1996).

7. Formal policy measures include economic and legal instruments, regulations, and public investment. As the OECD case-studies show clearly, a programme on incentive measures usually includes a mix of formal policy measures. Market-based instruments such as taxes and subsidies, and the creation of property rights and new markets, are normally supplemented with regulations controlling resource-use levels and public (and private) investment in infrastructure and information. The role of regulation and public investment are often to ensure an adequate level of conservation when market-based incentives are used in a sustainable-use programme.

8. Social and institutional measures include information provision, capacity-building and stakeholder participation. These provide critically important social support for the formal policy instruments. Social and institutional measures are prominent in nearly all of the case-studies (UNEP/CBD/COP/5/INF/14), and sometimes feature as the centerpiece of a new programme on incentive measures. Such programmes follow a "bottom-up" strategy of increasing public awareness of biodiversity, training in conservation and sustainable use practices, and strengthening organizational capacity. Social and institutional measures may also encourage conservation entrepreneurs whose activities reinforce incentives and inspire other participants.

9. The compliance component of a programme on incentive measures may include measures to encourage both socially enforced compliance and legal enforcement. Legal enforcement usually requires investment in institutional capacity, but can be assisted through measures designed to create social support for incentives. Socially enforced or voluntary compliance can be encouraged through activities such as stakeholder participation and information provision. When social investments are adequate and programme design is sound, socially enforced or voluntary compliance, together with adequate formal enforcement, underpin a new programme on incentive measures.

10. Experience has shown that the design of programmes on economically, socially, and ecologically sound incentive measures may be guided by consideration of the following conceptual guidelines: 3/

(a) Internalization;

(b) Efficiency;

(c) The precautionary principle.

1. These three guidelines are meant to inform thinking about how to structure programmes on incentive measures, rather than as strict rules of design and implementation. Internalization refers to incorporating external costs and benefits into the decisions of producers and consumers. External costs and benefits are essentially environmental "side-effects" of economic activities; the goal of a programme on incentive measures is to internalize a greater proportion of these effects into the calculus of individual decision makers. The efficiency principle holds that programmes should be designed to ensure that expected social benefits are greater than or equal to the cost of implementation, administration, and enforcement. The social and institutional

3/ M. Chakraborty, "Economic incentives for biodiversity: will they work in developing countries?", Economic and Political Weekly, May 17-24 1997, pp. 1071-1073.

context of a country can impact these costs considerably, and thus influence programme design. For example, where property rights and other institutions are not well developed, administrative controls may be more cost effective than sophisticated market-based instruments. The precautionary principle, combined with the ecosystem approach, requires that programmes on incentive measures err on the side of caution when scientific knowledge is uncertain or where ecological consequences might be irreversible.

2. A range of measures for policy makers to draw upon in programme design has been identified by, inter alia, OECD. 4/ The following section reviews these measures and suggests some guidance to Parties on where and when specific instruments could be used. Below, guidance is provided on each of the three components of a programme on incentive measures: economic and legal instruments, social and institutional measures, and compliance mechanisms. Examples of successful use of each of these instruments appear in the synthesis document (UNEP/CBD/COP/5/INF/14).

B. Selection of instruments for programmes on incentive measures

1. Economic and legal instruments

(a) Taxes and subsidies

3. In the context of biological diversity, taxes are fiscal instruments designed to increase the cost (or reduce the benefits) of unsustainable use of components of biological diversity. Charges and fees are related measures that serve the same function. In contrast, a subsidy is a fiscal measure designed to reduce the cost (or increase the benefits) of conservation or sustainable use of biodiversity and its components.

4. In principle, a tax or subsidy could be designed to internalize the full external cost of an activity. However, the high degree of uncertainty of the social, economic and ecological value of biodiversity makes this difficult to achieve in practice. Instead, taxes and subsidies are often implemented simply to reduce biodiversity use or to increase conservation, by raising or lowering the associated costs and benefits. In these cases, the level of taxation or subsidy may be determined by the gap between the profitability of the preferred activity and the competing unsustainable activity, rather than by any measurement of social value of the benefits achieved. In other cases, the level of the incentive is set with other goals in mind, such as revenue generation to accomplish related conservation objectives.

5. Taxes and subsidies are most relevant to situations where implementation of property rights cannot efficiently capture external costs and benefits, or where there is a policy preference not to assign private property rights to an environmental asset. An example of the former is a levy on the use of an underground aquifer; an example of the latter is charging visitor fees in a national park. Constraints on the use of taxes and subsidies include difficulties in setting the optimal level of the incentive, their vulnerability to political manipulation, and a potential loss of competitiveness when other countries are not taxing or subsidizing the same activities.

4/ OECD, Handbook on Incentive Measures for Biodiversity: Design and implementation. (OECD, Paris, 1999) and OECD, Saving Biological Diversity: Economic Incentives (OECD, Paris, 1996).

(b) Property rights and creation of markets

6. Property rights refer to a set of entitlements defining the owner's rights, privileges, and limitations for use of the resource. There are a number of ways of assigning property rights, including individual, state, and community ownership, among others. 5/ Property rights may include a claim on a benefit stream or potential benefit stream ranging from the ownership of land or capital assets. One may also use property rights in the design of market-based incentives to conserve biodiversity as in the case of tradable development rights and conservation easement. In this case, programmes often require investment in market infrastructure, legal and administrative institutions, and public awareness. Property rights also include intellectual property rights on genetic resources, though these are not directly addressed here. 6/ In addition, new property-rights systems require accompanying regulations to provide a framework of rules or limits governing resource use.

7. Clear examples of property rights applicable to aspects of biodiversity are goods that can be privately owned and marketed, such as commercial fish stocks, wildlife products (furs, horns, skins, etc.), timber and other forest products, and tourism and sport hunting facilities. In fact, problems arise when there is a general lack of property rights, like in the case of open-access resources. Advances in information technology, communications, and legal recognition of property rights, continue to expand the possibilities of using market-creating mechanisms to address an original absence of property rights and the environmental problems associated with it. Examples include individual transferable fishing quotas (ITQs), tradable development rights, effluent discharge and air pollution trading rights, biodiversity prospecting, joint implementation and the clean development mechanism. Labelling and certification schemes are a growing application of property rights that allow designated producers to profit from the demand for "green" products.

8. For market-creating mechanisms to work, the allocation of property rights is usually accompanied by quantitative restrictions on production or consumption. This is most often the case when a certain standard of conservation is required, such as in fisheries management, freshwater use, air pollution, and development rights. In these cases, government regulations provide limits on use levels, and rights are allocated among market participants who are allowed to trade among themselves. The outcome of trading is an allocation of use rights to the most efficient market participants (as the least efficient producers will have to purchase rights, raising their costs). Such schemes create an incentive to use resources efficiently within limits set by the Government.

9. Some aspects of biodiversity that have substantial public goods benefits, such as ecosystem resilience, ecosystem services, existence values, and the value of future options also bear the negative consequences of unclear property rights. However, biodiversity and its components tend to be characterized by a mixture of public and private goods, in which case bundling them may be effective, particularly in concert with subsidies to support the provision of the public-good benefits. The case-studies provide examples of

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5/ T. Tietenberg, Environmental and Natural Resource Economics (HarperCollins Publishers Inc.,1992).

6/ See the report of the Panel of Experts on Access and Benefit-sharing (UNEP/CBD/COP/5/8).

subsidies for sustainable forestry practices, or for the conservation of agro-biodiversity, in order to provide benefits that may not otherwise occur in the free market.

2. Regulations and investments

(a) Regulations

10. Regulations include legal limitations on the use of a resource, such as access to a reserve area, limitations on quantity of species harvested, or protection of an environmental commons (such as air or water quantity or quality). A regulation provides a public good that normally would not be provided through the free market, such as a system of national parks, the protection of endangered species, or the provision of an ecosystem service such as water quality or flow.

11. Regulations are usually used in conjunction with market-based instruments. An objective of regulations is to protect against irreversible losses when market-based instruments are the central mechanism controlling resource use. In fact, most, if not all, of the market-based programmes on incentive measures presented in the case-studies also included a set of associated regulations designed to prevent overexploitation by market forces. Conversely, none of the case-studies relied on regulations alone to accomplish conservation objectives.

12. Weaknesses of the regulatory approach include their relatively high administrative and enforcement cost (compared to market-based instruments), and a lack of flexibility. The higher costs stem in part from the cost of obtaining information on the status of biodiversity, its users, and their level of off-take or access. Another problem in the regulatory approach arises in the complex nature of biodiversity. Regulations need to be broad enough to cover all of the sources of impact on a targeted resource. Despite these costs, regulations are often a critically important component of a market-based programme on incentive measures, as the case-studies show.

(b) Public and private investment

13. Public investment refers to the use of government funds to provide public goods, in full or in partnership with investment from the private sector or other organizations. It differs from a subsidy in that public investment involves the purchase of a property right to a resource by the Government (for the benefit of the public), whereas a subsidy is a payment or tax concession to an owner who retains the property right to the resource. Public investment is used to purchase land and other resources for conservation purposes, to pay compensation for lost rights to resources, or to provide infrastructure and information.

14. Attracting private investments in support of a programme on incentive measures can be encouraged through public investment for the provision of public good or other incentives. An example is the Terra Capital Fund, a private equity biodiversity fund for Latin America. It has been set up by the International Finance Corporation with support from the Global Environment Facility (GEF) for its incremental costs.

15. The success of a programme on incentive measures often depends upon complementary public or private financing. For example, the establishment of

a national park may require compensation to be paid to resource users in buffer zones to reduce the impact of their activities. Or market infrastructure may be required for the successful implementation of a new system of property rights. Private investment can often be attracted to provide goods that can earn a financial return such as sustainable use of resources, tourism development, and so forth.

16. A common vehicle for public investment is an environmental fund. Endowment may come from a grant from government budgets, foreign assistance, the sale of state assets, dedicated charges or fees, debt for nature swaps, and private and non-governmental-organization contributions. Environmental funds provide a focal point for contributors interested in biodiversity conservation and may be attached to a specific park, system of parks, or country. Environmental funds typically make investments in public goods, such as reserve area purchase and management, public awareness and education, and other activities that otherwise would require government financing.

3. Social and institutional measures

(a) Information

1. Information provision refers to raising awareness of a programme on incentive measures and its benefits among stakeholders, policy makers, and the general public. Often, the costs of a new programme on incentive measures are perceived as greater and more immediate than potential benefits. Future benefits of conservation investment are often obscured by the complex nature of biodiversity, variation in rates of response or recovery, and significant intangible values. By comparison, lost access to a resource is quantifiable and short term. The challenge in a public-awareness programme is to raise the value of the perceived long-term benefits of a biodiversity programme. This challenge is made more difficult in developing countries where discount rates tend to be higher (as an increase in the discount rate reduces the future value of a benefit stream) and where the immediate needs of local communities are high. In developing countries, lack of information on the potential benefits of conservation is often the biggest obstacle to a programme on incentive measures.

2. Strategies to provide information and raise public awareness include environmental education, funding and dissemination of valuation studies, community development, and training programmes aimed at conservation stakeholders. Non-governmental agencies are often effective in raising public awareness of conservation objectives at the community level, within parks and reserves, and in wider society through advertisement and fund-raising activities. For example, IUCN has developed an economics of biodiversity website that provides policy makers and the wider public with up to date information on issues such as incentive measures, impact assessment, valuation and other related topics (http://economics.iucn.org).

(b) Stakeholder involvement

3. Stakeholder involvement refers to the participation of interested parties in the design and implementation of new incentive measures. Its purpose is twofold: to ensure that policies are socially appropriate, and to create a sense of ownership in them. When the full range of stakeholders are incorporated in policy design and implementation, policies become indigenous and have a greater chance of success. Participation in policy design creates

a sense of "policy ownership" among stakeholders, creating an incentive to assist in implementation, monitoring and enforcement.

4. Promoting stakeholder involvement requires institutions to organize and structure the participation of individuals and organizations, who in the past may not have had a role in the policy-making and implementation process. Such institutions may consist of civic bodies that include land-owners, tourism operators, indigenous and local community representatives, non-governmental organizations, and government agency staff, among others. Stakeholder participation is a "bottom-up" process aimed at including all relevant groups.

5. An obstacle to stakeholder participation may arise where traditions of civic involvement in government processes are limited. This problem can be addressed through capacity-building and information provision, which must be socially appropriate and specific to local requirements. Such programmes are expensive and time consuming, but necessary to ensure social support for a new incentive.

(c) Capacity-building

6. Capacity-building refers to investment in conservation organizations and stakeholders aimed at increasing their ability to respond positively to incentives. Stakeholders often do not have the training, knowledge, or resources required to take advantage of a programme on incentive measures. Capacity-building involves training, equipping, and adequately funding stakeholders in a programme on incentive measures, particularly administrators within government conservation agencies. Capacity-building also includes investment in physical infrastructure and providing adequate resources for administrative functions. Legal institution development, such as the administration of property rights claims, judicial capacity, and enforcement agency support, are other aspects of capacity-building.

7. Many countries, in particular developing countries, tend to have significant capacity-building needs. Capacity can be low because of traditions of administrative control over resources, confusion over property rights where customary practice is not recognized in law, or distrust of government and foreign initiatives that reduce access to resources. Investing in training, combined with information provision and participation in programme implementation, are the appropriate methods for building capacity in these situations. A well trained population can understand and better enforce market-based policy instruments and regulations, and is more familiar with long-term planning and management of natural resources, traditions of accountability that emphasize group responsibility.

8. Experience shows that it can take several years to build institutional capacity and change the capabilities and orientation of a large group of people, such as agency staff, local communities, or landowners. The expense of capacity-building programmes can be reduced if incentive measures are socially appropriate.

3. Compliance mechanisms

9. In many countries, past enforcement of conservation laws and policies was widely perceived as unjust or socially inappropriate. This has been the case particularly in developing countries where conservation policies were imported from a foreign context. As a result, enforcement has taken on a

negative connotation and is now not widely promoted as a conservation tool. However, when conservation laws and policies are indigenous, and have the support of stakeholders, enforcement can play an important role in incentive programmes. Enforcement increases the likelihood that programmes on incentive measures will meet their socially agreed objectives.

10. The role of enforcement is to ensure compliance with a programme on incentive measures, so that benefits and costs are properly internalized. When stakeholders make conservation investments or reduce resource use, lawbreakers or "free riders" can dissipate benefits. Free riders are those who do not participate in programmes on incentive measures, yet still benefit from the programme and the activities of others. When benefits are dissipated (or remain external to the participants), incentives to participate are reduced.

11. Enforcement takes place through both formal and social means. Formal enforcement refers to impartial, third party, legal mechanisms. This includes the activities of law enforcement agencies, park staff, regulatory bodies, and the court system. Social enforcement refers to informal mechanisms of enforcement related to social pressure and individual choice; though informal, social enforcement can be a more appropriate, and more effective, mechanism to ensure compliance with conservation programmes. The required level of formal enforcement is directly related to the degree of social support for a programme on incentive measures. A well designed and socially acceptable programme on incentive measures will be less costly to legally enforce because of reduced friction with social expectations and spontaneous social enforcement.

C. Possible steps in the implementation of a programme on incentive measures

1. Identification

1. The first step in a programme on incentive measures is to identify the target resource, including its geographical area, range of user and beneficiary groups, and values, based on the ecosystem approach to the extent possible. Identification includes an assessment of whether or not a programme on incentive measures is justified, given other priorities and the scarcity of conservation resources. A preliminary assessment of costs and benefits of a programme may be warranted, though data may be lacking. Another approach is to consider the allocation of resources against national biodiversity conservation priorities.

2. Valuation studies may be undertaken in the identification stage to provide information on the potential scope of benefits in a new programme on incentive measures. Valuation studies may attempt to determine the full value of biodiversity, including its tangible and intangible benefits (including social, ethical, religious and other values in addition to economic values). Valuation may assist policy makers in the design of instruments and dissemination of valuation studies can also be used to encourage broader public support for conservation objectives, as part of awareness-raising.

2. Assessment

3. Assessment refers to a diagnosis of the institutional causes (i.e. formal policies, social practices, and compliance levels) of overexploitation,

unsustainable use, or uncontrolled degradation of the targeted resource. A single measure, like a perverse subsidy or absent property rights, might be the core problem, but social conventions and associated compliance practices will have built up around it. As a result, assessment should be made of each of the three components of the institutional environment governing the use of the target resource. Policy makers should bear in mind that social practices and enforcement levels can be at least as important as formal and economic policies and laws.

4. In addition to the institutional assessment, an environmental assessment of current and proposed policies is normally required. Impact assessment is addressed in decision IV/10 C of the Conference of the Parties. Further information on impact assessment is available from IUCN (http://economics.iucn.org).

3. Design

5. The components outlined in section A above, should inform programme design.

6. Financial investment should be anticipated and budgeted for in the design phase, bearing in mind that social and institutional measures require long term funding if they are to be effective in changing social conventions and capabilities. Subsidies are sometimes used to bridge the "profitability gap" between the existing and the new incentives to help overcome the resistance of programme participants.

7. Programme design normally includes an institutional mechanism for the participation of stakeholders, though in many developed countries existing institutions are adequate. Such institutions facilitate the exchange of information between policy makers and stakeholders that will normally inform the implementation and monitoring phases.

4. Implementation

8. Implementation requires a three-pronged approach in which the formal, social, and enforcement measures are introduced together. Investment in social and institutional measures may precede the implementation of formal measures in order to build administrative and enforcement capacity for the implementation of a new policy. Public awareness and information provision are essential at the time of implementation to inform stakeholders of the new policies. Programme implementation is normally an iterative process that draws upon feedback from participants.

9. Acceptance of a new incentive package by stakeholders can be expected to take some time, even when programme design is socially and economically appropriate. A new incentive will change the distribution of costs and benefits of certain activities, which can be expected be resisted until the programme has been reinforced through use. Formal enforcement and information provision is critical in this interim period. A lack of enforcement (both legal and social) in the critical early stage of the programme may lead to a dissipation of programme benefits, a loss of confidence in the programme, and its eventual failure.

10. Governments may also wish to formalize long-term partnerships with non-governmental organizations to carry out some aspects of implementation. In

many cases, building social support, training and public awareness are particular strengths of non-governmental organizations, and Governments can improve programmes on incentive measures and reduce implementation costs by drawing on the resources and skills of these organizations. For example, assistance in monitoring and compliance can be supplied by communities working in conjunction with a non-governmental organization.

5. Monitoring

11. Monitoring pertains to the ongoing assessment of a project to determine if objectives are being met, and at what economic and social cost. Stakeholders can supply information on these issues, though outside scientific and economic evaluations may be appropriate. Monitoring provides the basis for adaptive management, or the evaluation of whether adjustments can be made to increase benefits or reduce costs of the programme. Increases in benefits may be obtained by expanding the programme to cover a broader group of resource users; in these situations an economy of scale may be realized if administrative and enforcement costs increase marginally.

II. WAYS AND MEANS TO IDENTIFY PERVERSE INCENTIVES AND POSSIBILITIES TO REMOVE OR MITIGATE THEIR NEGATIVE EFFECTS ON BIOLOGICAL DIVERSITY

A. Identification of perverse incentives

1. Introduction

12. A perverse incentive is a policy or practice that encourages, either directly or indirectly, resource uses leading to the degradation of biological diversity. Three common types of perverse incentives can be identified: environmentally perverse government subsidies; persistence of environmental externalities; and laws or customary practices governing resource use. Government subsidies that encourage biodiversity decline can be quantified financially, and represent a clear opportunity for policy reform to promote the objectives of the Convention. Notwithstanding the need to address all perverse incentives, in the first instance it is recommended to concentrate on identifying government subsidies with perverse effects on biological diversity.

2. Identification and quantification

13. Perverse subsidies relating to biological diversity are government subsidies to producers and consumers that increase the use of biological resources above sustainable levels. The identification of a sustainable level to measure the effect of a perverse subsidy is difficult, but the basic approach is to identify where resource degradation is attributable either directly or indirectly to a subsidy. In general, subsidies either lower the costs, or increase the benefits, of biological resource production and consumption, and take many forms as outlined in table 1.

Table 1

Identification of perverse subsidies 7/

Subsidy type	Examples
Direct cash transfers	Grants to cover losses, price premiums
Market price controls	Guaranteed purchases, price controls, tariffs
Reduced - cost inputs	Providing cheap electricity, water, fertilizer
Tax advantages	Tax deferrals, tax exemptions, or special rates
Reduced borrowing costs	Soft loans, loan guarantees, debt forgiveness

1. Not all subsidies are environmentally perverse, however. Where resource use is within sustainable limits despite subsidies, then environmentally perverse effects may be minimal. Moreover, important economic and social goals may be at stake, such as increased food production or equitable distribution of water. Thus, identification and removal of perverse subsidies should be based upon a thorough assessment of the full range of ecological, environmental, economic and social effects of the targeted subsidy.

2. Rough estimates show that the global value of environmentally perverse subsidies totals around $1 trillion per year (table 2). Three quarters of government subsidies occur in the OECD countries with $690 billion, while the non-OECD countries account for $260 billion of global subsidies. However, the share of subsidies in GNP is higher in the non-OECD countries at 4.6 percent, compared to 3.6 percent in the OECD. 7/ Not included are uncorrected environmental externalities, which are estimated at an additional $785 billion per year, of which around $600 billion may have negative environmental impacts. Some subsides are environmentally benign, but the amount is thought to be relatively small.

Table 2

Annual global perverse subsidies (US$ billions)

Sector	van Beers & de Moor 7/	Myers & Kent 8/
Agriculture	325	325
Transport	225	558
Energy	205	145

7/ Source: C.P. van Beers and A.P.G. de Moor, Addicted to Subsidies: How Governments Use Your Money to Destroy the Earth and Pamper the Rich (Institute for Research on Public Expenditure, The Hague, Netherlands, 1999).

8/ Source: N. Myers and J. Kent, Perverse Subsidies: Tax $s Undercutting our Economies and Environments Alike (International Institute for Sustainable Development, Winnipeg, Canada, 1998).

Sector	van Beers & de Moor 7/	Myers & Kent 8/
Water	60	60
Manufacturing	55	…
Forestry	35	…
Mining	25	…
Fisheries	20	22
Total	950	1,110

1. The data underpinning these estimates are of poor quality. In general, Governments do not compile and publish data on subsidies. Subsidies are hidden in a myriad of programmes and can take many forms, as outlined above. The following subsections identify the most prevalent types of perverse subsidies in major natural resource sectors, and their impacts on biological diversity. While decision IV/10 A of the Conference of the Parties invites emphasis on drylands, access and benefit-sharing, sustainable use and tourism, little research specifically examines the impact of perverse subsidies in these sectors. As a result, the following paragraphs review the current state of knowledge on perverse subsidies relevant to biological diversity generally.

3. Agricultural subsidies

2. Agricultural subsidies can be found in all five categories of perverse subsidies outlined in table 1, and represent the largest category of perverse subsidies. In OECD countries, agricultural subsidies tend to support farm incomes, employment and land use. These countries subsidize producers through guaranteed prices, direct payments, export support, and other measures. In transitional and developing countries, agricultural subsidies are aimed at raising production or ensuring adequate consumption. Typical policies include subsidized inputs (fertilizer, pesticides, crop varieties, irrigation, and research and extension) and market-price controls to reduce food prices for consumers.

3. Agriculture subsidies encourage both the intensification and extensification of production. Agricultural subsidies linked to output quantities are probably the most damaging to biodiversity, and are prevalent in the developed countries. Such subsidies may be either guaranteed prices (fixed above market levels) or direct cash transfers based on the quantity of output. Output-linked policies create an incentive to produce as much as possible, resulting in greater intensification and use of inputs, and greater extensification of farming areas. However, it should be noted that some agriculture subsidies are now targeted to biodiversity objectives, such as greenbelts and set-aside programmes (discussed in the section B below).

4. In the developing countries, government subsidization of agricultural inputs is often blamed for an overuse of fertilizers, pesticides, and irrigation, as well as a narrowing of the genetic base of crop varieties. This often accelerates the intensification of production, resulting in the loss of genetic diversity in agriculture, degradation of soil and water resources, and loss of biotic diversity within cultivated areas. In addition,

subsidies for land clearance in many developing countries lead to an extensification of agricultural areas. Expansion of agriculture into new areas is a leading cause of habitat loss, and species extinction, throughout the tropical regions.

5. Subsidies to research and development of living modified organisms, although necessary for the promotion of biotechnology in many countries may raise biosafety issues.

4. Forests subsidies

6. Principal subsidies to the forestry sector include the sale of logging rights at below market prices (low "stumpage" prices), tax advantages, and reduced borrowing costs. Transportation costs are often subsidized through the provision of infrastructure (logging roads), or directly through reduced price rail transport. Subsidies to other sectors such as agriculture, mining, and energy production (hydroelectric dams) may also accelerate forest loss and degradation.

7. The purpose of forestry subsidies is usually to promote economic development and job creation. For some countries, forest products are a source of export earnings, and government subsidies are often designed with short-term financial objectives in mind. In other countries, forest subsidies are highly politicized and benefit a small number of influential individuals.

8. Studies show that forestry subsidies increase deforestation rates by making profitable uneconomic timber production. Estimates suggest that in some tropical countries subsidies raise deforestation rates to two or three times higher than would occur under free-market conditions. As is well known, high rates of species extinction have been projected based on rates of tropical deforestation.

5. Fisheries subsidies

9. Fishery subsidies include direct payments to commercial fishers for fleet renewal and upgrading, infrastructure provision such as port and processing facilities, market price controls, export promotion, tax advantages and subsidized borrowing. In addition, many developed countries purchase access rights to foreign fishing grounds (in developing countries, particularly in Africa and South America) on behalf of their commercial fishers. Aquaculture subsidies are also significant in Europe and in some Asian countries.

10. Subsidies to the fishing sector are designed to maintain the income and employment in the face of declining natural fisheries. Expansion of fishing capacity has overshot sustainable fishing yields in most of the world's fisheries. By one estimate, at least 70 per cent of world fisheries are fished to capacity, are overexploited and declining, or are protected and in recovery. Government subsidies to expand the capacity of commercial fishing in the face of natural decline has accelerated overexploitation, resulting in the need for more support to maintain incomes and employment. Thus, subsidies should be considered within the context of overall fisheries management, including the problems of over fishing and excessive capacity, and other subsidies directly or indirectly impacting marine and coastal biodiversity.

11. Perhaps underappreciated is the widespread damage to the physical environment, such as coral reefs and sea floors from certain fishing practices. Additionally, water pollution, the spread of water borne pathogens, and toxic contamination of water has arisen from aquaculture operations.

6. Freshwater subsidies

12. Water subsidies consist primarily of government underpricing of water supplies. Water is defined as underpriced when the full cost of provision is not recovered from charges on users. Most subsidies benefit agricultural users who consume 65 per cent of freshwater supplies globally, compared to 25 per cent for industrial users and 10 per cent for households. Underpricing of irrigation water constitutes the largest single category of subsidy, accounting for more than half of global water subsidies.

13. Overuse of water has a negative impact on freshwater-based biodiversity, particularly in areas where water supplies are becoming stressed. Biodiversity is negatively impacted by disruptions in river hydrology, siltation of water bodies, draining of wetlands and lakes, construction and filling of reservoirs, among other activities.

7. Subsidies in other sectors

14. Mining subsidies consist of exemptions from royalty payments to governments for minerals produced on state land, tax advantages, and environmental externalities. Impacts on biodiversity include increased removal of natural land cover and contamination of soil and water.

15. Energy subsidies include subsidies to producers of coal, oil and gas, and nuclear power, and subsidies to consumers to reduce the cost of energy consumption. Energy subsidies impact biodiversity primarily through increased consumption of fossil fuels, which may contribute to climate change, acid rain, and other pollution related impacts.

16. Transportation subsidies include government provision of roads and infrastructure, their maintenance, traffic control services, police and emergency services, and space for municipal parking. Transportation subsidies encourage automobile use, which impacts biodiversity through habitat loss and degradation due to road construction and pollution (as with energy subsidies).

17. Subsidies to manufacturing industries include direct grants, tax concessions, soft loans and guarantees, public procurement, tariff protection, and other instruments. Impacts on biodiversity tend to be indirect, through increased pollution or industrial waste.

B. Possibilities to remove or mitigate negative effects of perverse incentives on biological diversity

1. Conversion of perverse subsidies

18. Possibilities to remove or mitigate the negative effects of perverse subsidies on biological diversity include terminating perverse subsidies, or converting them into conservation or sustainable use subsidies. Converting perverse subsidies to conservation subsidies may be justified if the objective is to fund the remediation of damage to biodiversity caused by perverse

subsidies. Strategies to remove and to convert subsidies have worked in practice: about 5 per cent of environmentally perverse subsidies have been reformed by governments over the past decade. 8/ Moreover, reform of perverse subsidies represents perhaps the most cost-effective option available to Parties to improve economic incentives governing biodiversity.

19. Numerous case-studies submitted to the Secretariat demonstrate successful examples of both types of subsidy reform, and are described in more detail in the document UNEP/CBD/COP/5/INF/14 (the case-study numbers below refer to those in that document). For example, some agricultural subsidies in Europe have been shifted to compensate farmers for implementing agri-environmental measures, such as in Austria (case 24) and the United Kingdom (case 41). Similarly, subsidies for wetland drainage in the United States (case 42) have been converted to subsidies for wetland conservation. The OECD study (case 41) found that fishing subsidies in many countries have been converted to other programmes such as retraining.

20. Agricultural land set-aside programmes that target land of conservation value, or that require conservation practices, are another way that perverse subsidies have been converted to conservation subsidies in many developed countries. In 1995, United States farmers set aside 202,000 square kilometres (11 per cent of arable land), European Union farmers 81,000 square kilometres (11 per cent of arable land), and Japanese farmers 7,000 square kilometers (16 per cent of arable land). 8/

21. Many developing countries have begun to re-orient agricultural policies to accomplish environmental objectives. For example, annual fertilizer subsidies have been reduced from $732 to $96 million in Indonesia, from $178 to $2 million in Pakistan, from $56 million to zero in Bangladesh, and from $48 million to zero in the Philippines. Indonesia also reduced pesticide subsidies from 85 per cent to zero, and banned a number of pesticides; some of the $126 million savings in the government budget has been used to develop the country's integrated pest management programme. Subsequently, IPM programmes have been adopted in numerous other Asian countries. 8/

22. In the forestry sector, Denmark (case 27), Finland (case 28), and New Zealand (case 37) have converted perverse subsidies to conservation subsidies. In 1997, Finland passed a Financing of Sustainable Forestry Act that removed perverse incentives for forest intensification (production and export subsidies) and replaced them with new discretionary payments to landowners for the adoption of environmental practices. Denmark reformed a law to allow private forests to be used for non-productive use (i.e. for conservation), and provided payments to owners for transforming productive forests into strict reserves. New Zealand (case 37) study shows that removal of a subsidy for forest clearance for agricultural land use had particular benefits for biodiversity.

23. Converting perverse subsidies into conservation investments represents a major opportunity to Parties and Governments. A recent estimate placed the annual cost of global biodiversity conservation at $314 billion, representing less than one third of annual government expenditure on perverse subsidies. The estimate includes an ecologically representative system of protected areas (covering 15 per cent of the Earth's land area), mainstreaming biodiversity conservation into the agriculture sector, and protecting biodiversity in the wider matrix of landscapes, including forests, coastal and marine areas. Funding of a global protected areas programme could be accomplished with only

a 2 per cent reduction of perverse subsidies and reinvestment in conservation ($21.5 billion out of $1,000 billion). Thus, a relatively small redirection of funds spent on perverse subsidies could fund major global biodiversity objectives.

24. However, only a tenth of perverse subsidies occur in the developing countries, though their biodiversity conservation needs are proportionately greater. For example, protected area funding needs in the developing countries are about 40 per cent of the global total. Therefore, efforts to fund global biodiversity conservation through a reduction in perverse subsidies will be most effective if funds are redistributed from developed to developing countries. The financial mechanism of the Convention on Biological Diversity may be an appropriate vehicle for this purpose.

2. Externalities

25. Externalities such as open-access resource exploitation, pollution, or those caused by over or inappropriate use of resources are most appropriately addressed through the design and implementation of incentive measures as discussed above. The case-studies reviewed in document UNEP/CBD/COP/5/INF/14 provide examples of such programmes, including reducing open access degradation of forests, fishery, and freshwater resources.

3. Legal reform

26. An opportunity to reduce or mitigate perverse incentives arises in reforming legal or customary rules that encourage resource overexploitation. Many countries have "beneficial use" laws that require purchasers to make productive use of resources such as water or forests, as opposed to conservation use. Another type of perverse incentive is created by laws mandating species protection on private land without compensation, creating an incentive to remove the habitat of the species to preempt enforcement of the law. Opportunities for legal reform are not well quantified but anecdotal evidence suggests that they may be widespread. This is an area for further research and consideration by the Parties.

III. POSSIBLE FOLLOW-UP ACTIVITIES FOR CONSIDERATION BY THE CONFERENCE OF THE PARTIES

79. Only 12 Parties responded to the calls of the Conference of the Parties for case-studies on incentive measures. This low level of response from Parties raises concern, given the importance of deepening the analysis of current policies, design options, and best practices related to the selection of instruments in support of positive incentives.

80. In response to this gap in information, the Conference of the Parties may wish to consider ways and means to encourage the Parties to provide information in the future, possibly by including support for the compilation of case-studies within their national reporting under the Convention. It should be noted that in its decision IV/10 A, paragraph 2, the Conference of the Parties requested Parties to include information on the design and implementation of incentive measures in their second national reports. The matrix in annex I to the note by the Executive Secretary on the second national reports (UNEP/CBD/COP/5/13/Add.2) for consideration by the fifth meeting of the Conference of the Parties contains guidelines on the inclusion of information relating to incentive measures.

81. The Conference of the Parties may wish to request the Executive Secretary:

(a) To gather additional information on instruments in support of positive incentives and their performance, and to develop a matrix identifying the range of instruments available, their purpose, interaction with other policy measures and effectiveness, with a view to identifying and designing relevant instruments in support of positive measures;

(b) To continue gathering information on perverse incentive measures, and on ways and means to remove or mitigate their negative impacts on biological diversity, and assess how these corrective measures can be applied widely;

(c) To integrate actions on incentives in thematic work programmes and ensure synergy with the activities on sustainable use, noting that incentive measures are essential elements in developing effective approaches to sustainable use of biological diversity (SBSTTA recommendation V/12, paragraph 4);

(d) To coordinate action on incentives, including the optimal design and implementation of incentive measures instruments, and identification and control of perverse incentives, with other international biodiversity-related agreements and organizations, noting specifically that the joint work plan 2000-2001 of the Convention on Biological Diversity and the Convention on Wetlands (UNEP/CBD/SBSTTA/5/INF/12) includes consideration of incentive measures;

(e) With regard to perverse incentives, action could be coordinated with WTO, as this organization has specific rules disciplining certain subsidies.

83. While organizations such as WTO, OECD, IUCN, the Food and Agriculture Organization of United Nations (FAO) and the World Bank are currently pursuing programmes of work on incentive measures, work undertaken by the Conference of the Parties might focus specifically on identifying impacts on biodiversity, particularly in the context of the ecosystem approach, with the aim of integrating these issues into the activities of other organizations. In particular, the IUCN has developed an ecosystem approach to perverse incentives that might provide a useful framework for consideration by the Conference of the Parties (see http://economics.iucn.org). In addition, Parties to the Convention on Biological Diversity should ensure that implementation of the Kyoto Protocol under the United Nations Framework Convention on Climate Change is in harmony with the objectives of the Convention on Biological Diversity.

84. Parties may wish to consider, at a future meeting, a comprehensive decision in support of the increased use of instruments that support positive incentives, and on removal and mitigation of the negative impacts of perverse incentives. The decision should be taken on the basis of an information-gathering exercise, coordination with other international agreements, and further consideration in other forums.
