



ECONOMICS AND  
BIOLOGICAL DIVERSITY:

*Executive Summary and Guidelines for  
Using Incentives*

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BIOLOGICAL DIVERSITY:  
Executive Summary and  
Guidelines for Using Incentives**

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# ECONOMICS AND BIOLOGICAL DIVERSITY

## *INTRODUCTION*

**S**ome of our planet's greatest wealth is contained in natural forests, plains, mountains, wetlands and marine habitats. These biological resources are the physical manifestation of the globe's **biological diversity**, which simply stated is **the variety and variability among living organisms and the ecological complexes in which they occur**. Effective systems of management can ensure that biological resources not only survive, but in fact increase while they are being used, thus providing the foundation for sustainable development and for stable national economies.

But instead of conserving the rich resources of forest, wetland, and sea, current processes of development are depleting many biological resources at such a rate that they are rendered essentially non-renewable. Experience has shown that too little biological diversity will be conserved by market forces alone, and that effective government intervention is required to meet the needs of society. Economic inducements are likely to prove the most effective measures for converting over-exploitation to sustainable use of biological resources.

## *ECONOMIC OBSTACLES TO CONSERVATION*

The fundamental constraint is that some people earn immediate benefits from exploiting biological

resources without paying the full social and economic costs of resource depletion; instead, these costs (to be paid either now or in the future) are transferred to society as a whole. Further, the nations with the greatest biological diversity are frequently those with the fewest economic means to implement conservation programs. They need to use their biological resources to generate income for their growing populations, but problems arise when these resources are abused through mismanagement rather than nurtured through effective management.

Other major economic obstacles to conservation include:

- biological resources are often not given appropriate prices in the marketplace;
- because the social benefits of conserving biological resources are often intangible, widely spread, and not fully reflected in market prices, the benefits of protecting species and natural areas are in practice seldom fully represented in cost-benefit analysis;
- the species, ecosystems, and ecosystem services which are most over-exploited tend to be the ones with the weakest ownership;
- the discount rates applied by current economic planning tend to encourage depletion of biological resources rather than conservation; and
- conventional measures of national income do not recognize the drawing down of the stock of natural capital, and instead consider the depletion of resources, i.e., the loss of wealth, as net income.

### *ASSESSING THE VALUE OF BIOLOGICAL DIVERSITY*

In order to compete for the attention of government decision-makers, conservation policies first need to demonstrate in economic terms the value of biological diversity to the country's social and economic development. Approaches for determining the value of biological resources include:

- assessing the value of nature's products—such as firewood, fodder, and game meat—that are consumed directly, without passing through a market;

- assessing the value of products which are commercially harvested, such as timber, fish, ivory, and medicinal plants; and
- assessing indirect values of ecosystem functions, such as watershed protection, photosynthesis, regulation of climate, and production of soil.

Some biological resources can be easily transformed into revenue through harvesting, while others provide flows of services which do not carry an obvious price-tag. However, an ecosystem which has been depleted of its economically-important species or a habitat which has been altered to another use cannot be re-built out of income. The costs of re-establishing forests or reversing the processes of desertification can far exceed any economic benefits from over-harvesting or otherwise abusing biological resources, so estimates of the environmental costs of depletion need to include costs of the time and effort required to restore resources to their former productivity.

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Assessing values and costs of protecting biological resources provides a basis for determining the total value of any protected area or other system of biological resources. Since the value of conserving biological resources can be considerable, conservation should be seen as a form of economic development. And since biological resources have economic values, investments in conservation should be judged in economic terms, requiring reliable and credible means of measuring the benefits of conservation.

## USING ECONOMIC INCENTIVES TO PROMOTE CONSERVATION

To the extent that resource exploitation is governed by the perceived self-interest of various individuals or

groups, behavior affecting maintenance of biological diversity can best be changed by providing new approaches to conservation which alter people's perceptions of what behavior is in their self-interest. Since self-interest today is defined primarily in economic terms, conservation needs to be promoted through the means of economic incentives.

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An **incentive** for conservation is any inducement which is specifically intended to incite or motivate governments, local people, and international organizations to conserve biological diversity. A **perverse incentive** is one which induces behavior which depletes biological diversity. A **disincentive** is any inducement or mechanism designed to discourage depleting of biological diversity. Together, **incentives and disincentives provide the carrot and the stick for motivating behavior that will conserve biological resources.**

**Direct incentives**—either in cash or in kind—are applied to achieve specific objectives, such as improving management of a protected area. **Indirect incentives** do not require any direct budgetary appropriation for biological resource conservation, but apply fiscal, service, social, and natural resources policies to specific conservation problems.

Incentives are used to divert land, capital, and labor towards conserving biological resources, and to promote broader participation in work which will benefit these resources. They can smooth the uneven distribution of the costs and benefits of conserving biological resources, mitigate anticipated negative impacts on local people by regulations controlling exploitation, compensate people for any extraordinary losses suffered through such controls, and reward the local people who assume externalities through which the larger public benefits. Incentives are clearly worthwhile when they stimulate

activities which conserve biological resources, at a lower economic cost than that of the economic benefits received.

To function effectively, incentives require some degree of regulation, enforcement, and monitoring. They must be used with considerable sensitivity if they are to attain their objectives, and must be able to adapt to changing conditions.

### *THE PROBLEM OF PERVERSE INCENTIVES*

Economic incentives have been far more effective in over-exploiting biological resources than conserving them. In most parts of the tropics, the opening of forest areas is supported by powerful economic incentives such as state-sponsored road-building programs which facilitate access to markets. Further, resettlement of poor people in the remote forested areas made accessible by new roads is often politically preferable to genuine land reform which involves the redistribution of existing agricultural lands. Governments have often instituted these perverse incentives for important political or social reasons, and the impact on the environment is often an external factor.

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While incentives to convert forests and other wilderness to agricultural uses may have been appropriate when biological resources were plentiful, the process is reaching its productive limits (and indeed has exceeded them in many places). A major step in moving from exploitation to sustainable use is for governments to review the impacts of all relevant policies on the status and trends of biological resources. Based on the policy review, governments should eliminate or at least reduce policy distortions that favor environmentally unsound practices, discriminate against the rural poor, reduce

economic efficiency, and waste budgetary resources. Overcoming the damage caused by perverse incentives will require new incentives to promote conservation, applied at a series of levels and in a number of sectors.

### INCENTIVES WHICH DEplete BIOLOGICAL DIVERSITY

Numerous examples can be quoted of government-designed incentives which have perversely led to the destruction of biological resources. Outstanding examples:

- A recent study by the World Bank has shown that a series of policies, tax incentives, and legal rules enacted by the government of Brazil in order to accelerate the pace of settlement in the Amazon basin has led to massive deforestation which is causing severe environmental problems and the depletion of biological diversity.
- A combination of incentives has made the overstocking of grazing land in Botswana a response that is privately rational, and socially expensive. Along with numerous other incentives, artificially elevated prices for beef offered by the EEC has led to an increase in the national cattle herd to levels that exceed the carrying capacity of the range, leading to reduced populations of wildlife and accelerated soil erosion.
- In Indonesia, overly generous logging agreements that leave most of the rents from logging virgin forests to concessionaires, and excessive incentives to forest-product industries that encourage inefficient investment in wood-processing capacity, combine to increase deforestation far beyond what it would be without these policies. Poorly drafted and enforced forestry stipulations are inadequate to ensure sustainable forestry practices in the face of these powerful incentives.

*APPLYING INCENTIVES AT THE COMMUNITY LEVEL*

The specific package of available biological resources varies considerably from place to place, depending on such factors as soil, rainfall, and history of human use. For the people living in or near the forests, plants and animals provide food, medicine, hides, building materials, income, and the source of inspiration; rivers provide transportation, fish, water, and soils; and coral reefs and coastal mangroves provide a permanent source of sustenance and building materials.

Depending on these resources, rural people have typically developed their own means of managing a sustainable yield of benefits. Biological resources are often under threat because the responsibility for their management has been removed from the people who live closest to them, and instead has been transferred to government agencies located in distant capitals. But the costs of conservation still typically fall on the relatively few rural people who otherwise might have benefitted most directly from exploiting these resources. Worse, the rural people who live closest to the areas with greatest biological diversity are often among the most economically disadvantaged—the poorest of the poor.

Under such conditions, the villager is often forced to become a poacher, or to clear national park land to grow a crop. Changing this behavior requires first examining government resource management policies to determine how they may stimulate a villager's poaching and encroachment. Economic incentives designed to reverse the effects of these policies may provide the best means of transforming an exploiter into a conservationist.

Appropriate measures may include assigning at least some management responsibility to local institutions, strengthening community-based resource management systems, designing pricing policies and tax benefits which will promote conservation of biological resources, and introducing a variety of property rights and land tenure arrangements. These measures may serve to rekindle

## COMMUNITY INCENTIVES FOR CONSERVING BIOLOGICAL RESOURCES

Changing the behavior of local people toward biological resources of national concern usually requires a package of direct and indirect incentives, in cash and in kind. Such packages have proven effective in a number of cases, including:

- At the village of Ban Sap Tai, adjacent to Thailand's Khao Yai National Park, creative rural development techniques have encouraged local cooperation in protecting park resources. Most important was the establishment of an "Environmental Protection Society," a community-based NGO which is part credit cooperative, part non-formal education center and part collective business enterprise. Realizing that benefits are now flowing to them from the national park, over 70 percent of the villagers have joined the Society.
- In Nepal's Mt. Everest National Park, a series of incentives aimed at bringing the benefits of the protected area to the Sherpa people living within the park—including employment, land tenure rights, responsibility for forest protection, restoration and protection of religious structures, and community development—have helped restore nearby forests and revive important elements of Sherpa culture.
- Several communities in the Yucatan Peninsula of Mexico have been given exclusive use rights for areas of coastal waters important for an economically important resource, the spiny lobster; nearby areas without such use rights have been seriously overharvested. International support in the form of recognition of the area as part of a Biosphere Reserve has helped ensure that the new management system is sustained.
- In Sichuan Province, China, a food-for-work program in the Wolong Nature Reserve (an important area for giant panda) involved new housing for

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**Box: Continued**

families resettled from the fragile uplands of the reserve, a school for 400 pupils, constructing some 100 km of footpaths, planting some 1000 ha of previously cultivated and abandoned land with bamboo varieties favored by the panda, and patrolling the reserve to locate starving pandas and to provide emergency panda food in strategic areas.

- La Tigra National Park provides over 40 percent of the water supply for Tegucigalpa, the capital of Honduras. To develop more effective ways of protecting the watershed and its biological resources while bringing enhanced benefits to local people, several pilot rural development projects have been designed to maximize self-help, confidence-building and control over resources by the villagers themselves.
- Coastal villages in the Philippines have long been dependent on the productivity of coral reefs, but as traditional management systems break down, overexploitation has increased. A project carried out by Silliman University, USAID and the Asia Foundation has enhanced fisheries resources through building new systems of responsibility for resource management in three island villages.

traditional ways of managing biological resources which have been weakened in recent years.

Which members of a population have their access to biological resources enhanced and which members have it restricted by government policies is of profound importance in determining whether the resources will make a sustainable contribution to society. People living in and around the forests, wetlands, and coastal zones, often exercise more power than governments over the use of the biological resources, so they should be given incentives to manage these resources sustainably at their own cost and for their own benefit.

*SUPPORT FROM THE NATIONAL LEVEL FOR  
COMMUNITY-BASED INCENTIVES*

The biological resources which support the community are also of considerable interest to the nation and the world. Further, incentives at the local community level are likely to require considerable support from compatible policies at the national level. Biological resources do not occur only in wilderness, and economic incentives may also be used more generally throughout the country to encourage settlement patterns and production systems that are directed at the sustainable use of the resources of forest, savanna, wetland, and sea. The specific policies required at the national level will derive from what is required at the community level to conserve biological resources.

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*Many conservation problems are due to divided responsibility among sectoral units, leading to fragmentation, poor coordination, conflicting directives, and waste of human and financial resources.*

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Sustainable development requires coordination among a number of policies and levels. This is not as easy as it sounds. Many conservation problems are due to divided responsibility among sectoral units, leading to fragmentation, poor coordination, conflicting directives, and waste of human and financial resources. This can only be overcome by examining the impact of decisions in one sector on the ability of another sector to depend on the same resources. In most cases, the optimal balance point where the benefit of considering secondary impacts is overtaken by the cost of doing so lies well beyond the current practice of taking decisions based on a very narrow range of sectoral considerations.

*INTERNATIONAL SUPPORT FOR INCENTIVES  
PACKAGES*

Biological diversity is a public good, and species and ecosystems in one part of the world can provide signifi-

cant benefits to people in distant nations. Indeed, some experts believe that far greater benefits from conserving native gene pools, especially in the wilds of the tropics, will be gained by wealthy temperate nations than the often poverty-stricken nations doing the conservation. Further, much of the depletion of biological diversity over the past 400 years or so has been caused by powerful global forces, driven primarily by markets in colonial, and then industrial, countries. Because the international community as a whole benefits from conservation, it should contribute to the costs of conserving biological resources.

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An important means for doing so is through the provision of economic incentives from the temperate nations to the tropical ones. These can include direct incentives such as grants, loans, subsidies, debt swaps, and food; and indirect incentives such as commodities agreements, technical assistance, equipment, and information. Development assistance often contains a package of such incentives, including both direct on-the-ground projects and very abstract incentives such as peer pressure and public image.

### *FUNDING FOR CONSERVATION INCENTIVES*

Governments seldom have sufficient capital or labor to manage their nation's biological resources in an optimum way, even though investments in conservation can be very cost-effective. Conservation programs are usually implemented through resource management agencies who need sufficient and reliable sources of support to implement an effective incentives scheme. Support from government budgets might include national bank loans, initial contribution to revolving funds, the government portion of shared costs, and education and training.

Some incentives involve little more than an administrative decision or regulation, such as the enactment of a law or monetary policy action, while others involve bilateral agreements or cooperation with international agencies, as in food for work programs. In many developing countries, large externally-supported development projects can often include elements which support incentives for conserving biological resources. Community development activities may already be in progress in communities located near areas important for conserving biological resources, in which case linkages with changed behavior toward conservation can be incorporated with little additional cost.

Additional innovative funding mechanisms for supporting incentives include: tax deductability for donations of cash, land, or services; charging entry fees to protected areas; returning profits from exploiting biological resources to the people living in the region; implementing water use charges for the water produced by a protected area; building conditionality into extractive concession agreements; seeking support from international conservation organizations; and considering "conservation concessions," similar to those for forestry or mining.

The threats to biological resources have such profound implications for humanity that governments must take decisive action, and accept that some additional investments will be required. But sustainable development of biological resources will likely be far less expensive than rehabilitation programs, and most conservation efforts have proven cost-effective on traditional economic grounds.

Action is required at the strategic level, where governments establish national and international objectives for addressing on a broad front the fundamental problems of degradation of biological resources, and at the tactical level, with specific actions designed to address specific problems.

## PAYING FOR ECONOMIC INCENTIVES TO CONSERVE BIOLOGICAL RESOURCES

Incentives packages require funds if they are to be effective. Some are able to generate their own funds from harvesting of resources at sustainable yields; others require more innovative sources of funding. Examples:

- Costa Rica has implemented a wide range of innovative funding mechanisms. A large percentage of land acquisition costs for Costa Rican parks has come from the Agrarian Development Institute, which has issued special national parks bonds to expropriate many land holdings. Many other government agencies have provided manpower, equipment, and occasionally monetary support to park management. Special proprietary funds are used for operating expenditures of the conservation authorities, drawing on donations, transfers from other agencies, fees and charges for visitor services and concessions, and a series of fiscal stamps.
- The Luangwa Valley of Zambia is one of the richest wildlife areas in the country. Based on the premise that at least part of the revenues earned from wildlife should be returned to managing the wildlife resource, a Wildlife Conservation Revolving Fund was established in 1983. Income to the Fund comes from the harvest of hippos, and from auctions among safari hunting companies for the rights to hunt in the Lower Lupande Game Management Area. Forty percent of the proceeds are handed over to the local Chiefs for community projects of their choosing and 60 percent is devoted to wildlife management costs. Once economic benefits started to flow to the local villages, the reduced poaching of elephants has led to an increase of their populations to the level where sustainable harvests would far exceed the total costs of effective management programs.

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- Ecuador has extraordinary levels of biological diversity, containing nearly twice as many species of plants and animals as all of North America. To protect this diversity, 15 protected areas have been established, covering about 11 percent of the land area. As with many Latin American countries, Ecuador is suffering from significant external debt (\$9.4 billion in 1987). After examining the situation, a small group of Ecuadorian professionals organized a private foundation to use the debt crisis as an opportunity to attract financial resources to be invested in conservation of biological resources. Through donations in hard currency, a fraction of the Ecuadorean external debt will be purchased at discount value on the secondary financial market. Funds in local currency to pay for the debt will be used to support conservation activities.
- The World Heritage Convention has encouraged the Federal Government of Australia to provide subsidies to states having World Heritage Properties, to compensate for income which might be lost through cessation of extractive uses. In the case of the tropical rainforests of Queensland, the Federal Government has offered a package to the state worth some \$71.6 million.

# GUIDELINES FOR USING INCENTIVES TO CONSERVE BIOLOGICAL DIVERSITY

## *INTRODUCTION*

**W**hile packages of incentives can work to conserve biological resources at community, national, and international levels, they are not always easy to apply. The major constraints faced by an incentives package can include:

- the long period of time between investment in conservation and return on the investment;
- short-term hardships caused to subsistence resource users who lack alternative livelihoods;
- lack of information on the economic benefits of conservation;
- lack of sufficient financial resources for conservation, especially in developing countries;
- the problem of benefits from conservation accruing to other countries (international externalities);
- low political payoffs from investments in conservation; and
- weakness of government institutions at local level, with resulting inability to implement effective management.

The problems are so serious that governments must take decisive action, and accept that some additional investments will be required; but sustainable development of biological resources will likely be cheaper than rehabilitation programs, and many—even most—conservation efforts have proven cost-effective on the basis of

traditional economic criteria, when all costs and benefits are considered.

Action is required at two general levels: The regional or national plan; and the specific project. The first is strategic, establishing national objectives for addressing on a broad front the fundamental problems of degradation of biological resources. The second is more tactical, attacking specific parts of the problem with action tailored to the needs of the situation. The procedure for developing and implementing incentives is quite different in the two cases, but each is dependent on the other for its success.

The following guidelines are intended to stimulate the greatest possible government commitment to conserving the entire spectrum of biological resources, in an economically optimal way; and to assist development agencies—both national and international—in improving the design of projects that affect biological resources. They provide practical advice for the formulation of policies for the sustainable development of biological resources, and for the conversion of policy into practice through specific project interventions. They include details on how incentives-packages can be designed and implemented by resource management agencies, and how specific project interventions can be most effective.

# GUIDELINES FOR CENTRAL GOVERNMENT PLANNERS

## *INTRODUCTION*

**W**hile the natural wealth of forest, wetland, and sea has great potential for supporting sustainable development, problems have arisen as governments and local populations have increased their demands on the biological resources. Since future consumption of goods useful to humanity depends to a considerable extent on the stock of natural capital, conservation is a precondition for sustainable development. Many of these resources have considerable market value, and if managed appropriately their sustained productivity can help support rural and urban communities far into the future. Significant political benefits can ensue.

It is apparent that conserving biological resources requires appropriate government policies in many sectors, and that using economic incentives will not bring about miraculous cures to society's conservation ills. However, economic approaches can help clarify issues and indicate costs and benefits of alternative courses of action, providing an important tool to governments that are concerned about managing biological resources more effectively.

Since governments establish the policy framework within which individuals and institutions operate, they should ensure that the resource management agencies have the policy support which will enable them to carry

out their assigned responsibilities. And since human decision-making is usually based on economic thinking, the benefits of linking economics more explicitly with the conservation of biological resources are manifest.

***GUIDELINE 1:***

***MAKE RAPID INITIAL ASSESSMENT OF AVAILABLE BIOLOGICAL RESOURCES***

In order to develop informed policies on depletion rates, rates of sustainable yield, national accounting systems, and land use planning, all governments should build the capacity to assess the status, trends, and utility of their biological resources. This capacity should include:

- national compilations of the flora and fauna (at least higher plants and vertebrates) contained within the nation, in addition to the more usual assessment of stocks of timber, fish, and minerals; where these compilations do not yet exist, development projects might require that rapid appraisal methods be employed—perhaps through the use of indicator species which can provide the optimal return on investment of field time—to ensure that biological resources are being given an appropriate level of priority;
- institutionalized biological surveys, perhaps carried out by university departments of biology or similar local institutions, to determine what species occur where and in what numbers, and how these parameters change over time;
- a national program for monitoring the status and trends of biological resources, linked to international systems such as UNEP's Global Environmental Monitoring System and the World Conservation Monitoring Centre (operated by IUCN, in collaboration with UNEP and WWF); and
- regular publication of the available information on status and trends of biological resources, and the various forces which are affecting these trends.

These efforts will help governments to recognize the consequences of their development activities on the

biological resources of the nation, and help identify external effects of development projects on biological resources. However, in-depth assessments are time-consuming, and action should not be delayed until “all the information” is available; instead, some rapid initial assessments need to be done. Development assistance agencies may be willing to help support such efforts.

**GUIDELINE 2:**

***ESTIMATE THE CONTRIBUTION OF BIOLOGICAL RESOURCES TO THE NATIONAL ECONOMY***

As a basis for applying economic incentives and calculating marginal opportunity costs, governments need to estimate the economic contribution that biological resources make to the national economy. This requires:

- ensuring that national accounting systems make explicit the tradeoffs and value judgements regarding impacts on biological resources that may not be measured in monetary terms;
- conducting research on methodologies for assessing the cross-sectoral impacts—positive and negative—of resource utilization;
- collecting information on the physical properties of resources in specific environments and for specific uses;
- developing methodologies for assigning values to non-marketed biological resources, appropriate to the needs of the country; and
- estimating the economic productivity of various ecosystems, with various types of inputs.

The sustainable levels of production of economic benefits from biological resources, including fish, timber, wildlife, medicinal plants, and other goods and services, should be estimated and demands upon benefits planned within those limits. Governments should develop means to assess the true costs of allowing the depletion of biological resources to continue and seek alternative paths toward sustainable development. These factors should be reflected in the prices of forest products and other biological resources.

The review and formulation of all national policies which have a direct or indirect bearing upon biological resources must therefore:

- estimate the relevant benefits which biological resources can produce;
- treat biological resources as capital resources and invest accordingly in preventing their depletion;
- ensure that the objectives of sustainable utilization are met; and
- address the basic needs of the local people who depend on biological resources for their continued prosperity.

***GUIDELINE 3:***

***ESTABLISH NATIONAL POLICIES FOR MANAGING BIOLOGICAL RESOURCES***

The incentives which are required to conserve biological resources at the community level<sup>1</sup> usually require commensurate policies at the national level. A national or regional conservation strategy can be an effective means of reviewing such policies, and determining what shifts are required to achieve national objectives for conserving biological resources. Major policy components of the required integrated action might include the following considerations:

- The many economic and financial benefits of integrated rural development linked with conservation of biological resources need to be quantified and brought to the attention of policy makers.
- Both conflicts and potential for cooperation between the various activities of agriculture, fisheries, forestry, conservation and rehabilitation need to be identified in integrated plans and programs.
- Institutional reform and improvement is often a prerequisite to good design and implementation of integrated sectoral development plans and programs.
- Legislation consonant with the socio-economic patterns of the target group and the natural resources being utilized needs to be formulated, both to institute disincentives and to ensure that incentives carry the power of law.

- Policies and legislation in other sectors need to be reviewed for possible application to conservation of biological resources and community involvement in such work.
- Effective incentives need to be devised to accelerate integrated development to close any gap between what the individual sees as an investment benefit and what the government considers to be in the national interest.
- The rural population needs to be involved in the design and follow-up of plans and projects, not simply their implementation.

Systems of incentives can be designed in a large number of ways, and numerous options exist for coordinating these incentives with other national policy objectives. In designing packages of incentives, governments should compare several options, with estimated costs and benefits, for each of the various national objectives being addressed. Systems of incentives need to be supported by suitable machinery for implementing the system, including regulation, enforcement, monitoring, and feedback.

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All government sectors which depend on biological resources should design policies to encourage the sustainable use of these resources, possibly as part of the process of preparing a national conservation strategy. In addition, other sectors which have major impacts on biological resources, such as agriculture, commerce, transport, and the military, should ensure that their policies are consistent with conserving biological diversity, or at least do not unnecessarily deplete biological resources.

Coordinating and controlling natural resource use in order to deal with external effects may require the creation of new agencies with wide-ranging authority over certain aspects of the operations of implementing ministries within a particular region. This is particularly

important when systems of incentives which involve several sectors need to be designed and implemented.

Drawing on the latest advances in genetics, population dynamics, and conservation biology, governments need to state, as a matter of public record, what proportion of the current land and water area is intended to be legally protected for conserving biological resources. Such policy objectives can often be incorporated as part of a national protected area system plan or a national conservation strategy; on the basis of such national objectives, governments can measure the costs and benefits of implementing conservation programs effectively.

**GUIDELINE 4:**

**REMOVE OR REDUCE PERVERSE INCENTIVES**

A major step in moving from exploitation to sustainable use is for governments to analyze the impacts of all relevant policies on the status and trends of biological resources. Such an analysis would involve detailed determination of costs and benefits of direct and indirect values.

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*A major step in moving from exploitation to sustainable use is for governments to analyze the impacts of all relevant policies on the status and trends of biological resources.*

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Based on the policy analysis, governments should eliminate or at least reduce policy distortions such as subsidies that favor environmentally unsound practices, and at the same time discriminate against the rural poor, reduce economic efficiency, and waste budgetary resources.

An analysis should be made of incentives provided to promote activities which affect lands important for conserving biological resources, including such measures as tax concessions, credit, grants or indirect incentives such as provision of infrastructure. Future incentives should be designed to ensure a more optimal, sustain-

able production of a range of benefits as well as an equitable distribution of such benefits.

**GUIDELINE 5:**

***ESTABLISH A STRUCTURE OF RESPONSIBILITY FOR THE BIOLOGICAL RESOURCES IN THE REGION***

While those resources contained within strictly protected areas are usually a government monopoly, biological resources in buffer zones, game reserves, national forests, and communal properties are often “open access goods” and need to be brought into some form of resource-use control. Granting usage rights can often be an effective incentive to control the consumption of a biological resource of considerable national importance. Such products as firewood, medicinal plants, and meat can often be made available to local communities more effectively through direct harvesting than through middle-men, and usage rights can often provide economically disadvantaged communities with highly valued resources.

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*Granting usage rights can often be an effective incentive to control the consumption of a biological resource of considerable national importance.*

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Incentives can be used to create an institutional setting in which the property rights to specific populations of species of plants or animals are held by a single decision-making unit. Communities, lineages within a community, or other forms of informal cooperatives, have often provided the basis for community-based resource management systems. Such systems have proven their relevance over time, but are now being overwhelmed by modern incentives for exploitation. To counteract this trend, governments should consider ways and means of implementing incentives which would enable these systems to become effective once again. In addition, community-based resource management systems which are functioning well—such as protection of sacred

forests, water-use cooperatives, and equitable sharing of access to fisheries and grazing lands—should be strengthened through being incorporated into the incentives package.

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*The intention of all packages of incentives and disincentives aimed at the local community should be to ensure that the local people steadily enhance their capacity to utilize biological resources in an optimal and sustainable manner.*

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The intention of all packages of incentives and disincentives aimed at the local community should be to ensure that the local people steadily enhance their capacity to utilize biological resources in an optimal and sustainable manner. This will often involve self-reliance built on sustainable uses of the biological resources available in the local ecosystems, and will effectively reduce the dependence of rural communities on external inputs.

# GUIDELINES FOR RESOURCE MANAGEMENT AGENCIES

## *INTRODUCTION*

**M**ost natural resource management agencies—such as departments of national parks, forestry, and fisheries—have tended to be more concerned with the resource than with the people who are affected by how the resource is managed. Fortunately, this perspective is beginning to change and agencies are becoming increasingly aware of the many benefits of working with local communities, and the costs of not doing so. In most cases, local incentives packages for conserving biological resources will need to be administered by the resource management agency, or at least with the involvement of the agency.

The following guidelines suggest how resource management agencies can enhance their capacity to design and implement incentives packages, based on the assumption that they receive the necessary policy support from central government. Where this capacity requires improvement, assistance might be sought from various international agencies. Many of the guidelines for designing and implementing development projects affecting biological resources will also be relevant to the resource management agencies.

**GUIDELINE 1:**

**DEVELOP THE INSTITUTIONAL CAPACITY FOR IMPLEMENTING ECONOMIC INCENTIVES TO CONSERVE BIOLOGICAL DIVERSITY**

Any incentives scheme must be designed within the capabilities of the relevant institutions. In seeking to develop that capacity, the management agency should ask the following questions about itself:

1. Does the agency have real coverage of the target areas, and enough staff to both promote the plan and provide the technical assistance, education, and training to carry it out? If not, can the agency gain access to the necessary staff in other ways?
2. Is the necessary inter-agency, bilateral or international cooperation within the capabilities of the executing agency staff?
3. Is the balance appropriate within the agency between headquarters managerial staff and the field staff who are actually implementing the incentives package?
4. Are the field staff sufficiently well trained to be effective workers in community development, as well as in conservation of biological resources?
5. Are the local administrative and decision-making procedures of the agency implementing the incentives package sufficiently decentralized to be effective?
6. Does the institution have solid technical and research data to support field staff?
7. Does the institution have simple, non-bureaucratic procedures with minimum red tape so that incentives can become real tools for sustainable development of biological resources?

The answers to these questions will provide the resource management agency with guidance on how it needs to develop further its capacity to implement incentives packages. The first step in this process may be to establish a "Community Development Liaison Officer," with the mandate to become familiar with the activities of all government and NGO agencies in the locality and to seek ways and means of linking those activities with local and national conservation objectives.

**GUIDELINE 2:**  
**ENSURE COMMUNITY INVOLVEMENT IN THE  
INCENTIVES PACKAGE**

The foundation of any incentives package is community support, and such support is gained only through involvement. The following elements are essential:

*Motivation.* Potential participants must be convinced that the problem being addressed by the incentives package is a high priority for the community. If farmers are shown that the proposed project can help overcome present constraints, the results are likely to be positive. This is done by making the community part of the project planning process from the earliest stages, and making them the leading actors throughout the program.

*Benefits.* Both the individual farmer and the larger community must clearly perceive the benefits they will derive from the planned conservation action, either through direct profits from the action or else from the incentives themselves.

*Information.* The community needs to be informed about the incentives package, including its costs and benefits, and any accompanying disincentives. The implementing agencies need to clear up any doubts and encourage the rural people to participate fully. The outcome of the promotion campaign should be a better informed rural population which participates actively in conservation activities.

*Viable options.* The options offered to rural people need to be accessible, and within the capacity of government or private enterprise to provide. Solid financial and logistical backing must be guaranteed and any restrictions to local participation eliminated.

*Skills.* The rural people need to have or obtain the skills required to implement the activities stimulated by the incentives package, which implies technical assistance and training as well as education in the broad sense.

Determining which incentives will be most useful in stimulating the desired behavior at the community level should begin with analysis of how current government social and economic policies are affecting the

behavior of the villagers toward biological resources. It is often useful to undertake a socio-economic survey of the communities affected by regulations controlling use of biological resources. Such surveys can also provide the necessary raw material for determining the types of incentives that are required to bring about the desired changes in behavior. Information collected might include:

- the ethnic diversity of the communities and their social structure;
- the traditional location and proximity of householder and kin groups for rituals, labor exchange and other important community activities;
- standard indicators of socio-economic well-being, including demographic parameters such as population and age structure as well as indicators of health and education;
- the pattern of economic activity, in both time and space, particularly in regard to how this affects biological resources;
- patterns of land tenure, land use, and access to resources;
- the biological resources now being used, how the resources are being harvested, the degree of awareness about controlling regulations, and possible alternative sources of income; and
- the importance of the biological resources, both economically (food, raw materials, income) and socially (role in kin and other community relationships).

This information can provide managers of biological resources with the necessary insights into the needs and desires of the local people, and can avoid misunderstandings and disruptions when implementing incentives packages.

Such surveys can also provide the necessary information for determining the appropriate level of incentives that will move individuals to respond in the socially desirable way. They can also indicate the best means of providing incentives, ensuring that they are perceived as fair, equitable, and fairly earned. Community-level institutions should be fully involved in the design, implementation, and interpretation of such surveys.

**GUIDELINE 3:**

***DESIGN REALISTIC INCENTIVES PACKAGES, AND MONITOR THEIR APPLICATION TO ENSURE THAT MODIFICATIONS ARE MADE IF NECESSARY***

Elements to bear in mind when designing and implementing incentive packages that are effective include the following:

1. The incentives should serve to catalyze initiative. They should be considered fair compensation for work done, and not as a gift.
2. The incentives must tend to emphasize the implementation of mechanisms and methodologies over simply supplying money in cash. Where cash is supplied, the tendency should be to invest more money in community development works.
3. The incentives package should be reviewed when new circumstances arise. The technology being used needs periodic review as well.
4. The incentives should be part of an integrated approach targeted at eliminating the battery of constraints to conservation due to local physical and social circumstances; they should help correct market failures.
5. Incentives which imply distribution of surpluses among contracting parties—such as the harvest of cane or meat from national parks—must be carefully and clearly regulated. No group should feel that its interests are being neglected without consultation.
6. The incentives package should produce both short-term and long-term results, the former to make them attractive to the target audience and the latter to ensure their longevity.
7. Incentives should be granted on a flexible basis. Demands with which the community is unable to comply should be eliminated beforehand.

**GUIDELINE 4:**

***INCORPORATE ECONOMIC INCENTIVES INTO  
THE PLANNING PROCESS FOR THE AGENCY***

National protected area policies should include an economic justification for conserving the areas, provision for comprehensive planning and management to ensure the sustained profitability of the resource, and linkages between protected areas and other relevant sectors (such as agriculture, tourism, communications, community development, forestry, and water resources development). The management authority should specify what each protected area will provide to the national economy in terms of employment, construction costs, cost of food for picnics, fishing and camping equipment, transportation, watershed protection, and genetic resources.

In order for protected area authorities to benefit from the incentives potentially available from these other sectors, coordinating mechanisms should be established. A senior staff person might be appointed, with terms of reference for determining what opportunities exist for productive collaboration with other sectors, and particularly with community development initiatives (both governmental and non-governmental).

The development of each protected area should be guided by a long-term (five years is a useful planning horizon) management plan which specifies the objectives for the area, the management steps required for achieving the objectives, the means currently available for implementing management, and the additional means required to implement the plan. The latter should include potential economic incentives and disincentives, and the policies required to convert their potential into reality.

Each plan should also include mechanisms for providing incentives and disincentives to local people. This section should be prepared with the full involvement of the affected communities, include objectives for the incentives, specify what is expected from the community in return for the incentives, and outline options for implementing the incentives.

Protected area managers should ensure that all educational and interpretive materials used in and around the area also include appropriate mention of economic relationships with surrounding communities.

**GUIDELINE 5:**

***DEVELOP INNOVATIVE FUNDING OR OTHER MECHANISMS THAT WILL ENABLE THE PUBLIC TO SUPPORT CONSERVATION OF BIOLOGICAL RESOURCES***

Since few government conservation agencies have sufficient funding to carry out their mandates effectively, innovative funding mechanisms need to be sought outside the traditional government sector. Some of these may require policy support from the central government or ministries of finance, such as tax deductability for donations of cash, land, or services. Other options which might be considered include: charging entry fees; returning profits from exploiting biological resources to the people living in the region; implementing water use charges for the water produced by a protected area; establishing linkages with major development projects; building conditionality into extractive concession agreements; seeking support from international conservation organizations; and considering "conservation concessions," similar to those for forestry or mining.

Protected area management authorities, or those seeking to help support them, should consider the establishment of a Foundation or Trust which will support conservation of biological resources, either directly through the protected area authority or more broadly to cover all aspects of biological resource conservation.

Labor and other donations in kind can often be very useful means of enabling the public to express the value they place on the existence of certain biological resources. Protected area authorities should therefore give careful consideration to the mechanisms available for encouraging voluntary community service labor for conserving biological resources.

**GUIDELINE 6:**

**ENSURE THAT INCENTIVES ARE PERCEIVED AS SUCH**

Incentives and disincentives aimed at changing the behavior of individuals must clearly and explicitly indicate the linkage between rewards and behavior. This will usually require that effective information programs are provided to those receiving the benefits. When individuals or communities first receive an incentive, they should be informed in detail of how the incentive works and why they are receiving it. They should then be reminded on a regular basis that the benefits are flowing to them because they are contributing to national objectives for biological diversity, or live in or near an area which is of national importance for sustainable use of biological resources.

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It is often useful to prepare educational material on the benefits being provided to villages around protected areas or other areas of national importance for conserving biological resources; while such material is of particular use in the schools in the villages most directly concerned, it can also be used more widely to demonstrate government commitment to conserving biological resources.

More generally, public information programs should stress the importance of the entire population helping to conserve the environmental resources that local people "harvest," including clean and plentiful water, clean air, biological diversity, and attractive scenery.

**GUIDELINE 7:**  
*INCORPORATE DISINCENTIVES AS PART  
OF THE PACKAGE*

While the marketplace is usually a more powerful determinant of human behavior than regulations, experience has shown that clear regulations which are understood and supported by the local community, with penalties set at the appropriate level (that is, exceeding the benefits derived from the illegal activity), are often a necessary part of the package of incentives and disincentives for local communities. Appropriate disincentives exist in most countries, in the form of laws and regulations, supported by fines and jail sentences; but national legislation is seldom sufficiently well enforced to provide a particularly powerful disincentive. When supported with appropriate incentives and by public opinion, the local community can often be an effective enforcer of disincentives. Governments need to enact policies which enable the local communities to play this positive role in enforcing disincentives.

# GUIDELINES FOR DESIGNING AND IMPLEMENTING DEVELOPMENT PROJECTS

## *INTRODUCTION*

**I**n most countries, both governments and the private sector are already using incentives, but these incentives are not being used to support conservation. In order to demonstrate how incentives can be applied to change behavior in directions that lead to sustainable use of biological resources, field projects can be designed to address urgent problems. Demonstration projects test a full range of methodologies, and develop experience in implementation of construction works, community development, application of incentives, training, and technical assistance. Successful projects may become showcases, convincing rural people, governments, academia, and the private sector that conservation is both necessary and beneficial; they can lead to a series of replications throughout the country.

It is apparent that virtually all projects which have a component which deals with biological resources will benefit from incorporating economic incentives and disincentives into the project. The following guidelines are aimed at assisting those responsible for designing and implementing development projects, either at national or international level and with governmental or non-governmental agencies, to ensure that all relevant matters have been taken into consideration.

**GUIDELINE 1:**

**DESIGN THE INCENTIVES AS A PACKAGE**

Incentives and disincentives can seldom stand alone; they need to be part of an overall strategy or plan which includes a variety of incentives and disincentives. In selecting the elements for inclusion in such a package, the following points are pertinent:

1. Consider the factors which are universally relevant and provide the foundation for almost any kind of incentives package. These include: secure land tenure; development and strengthening of local institutions; training and education; and technical assistance.
2. Based on information gained from surveys of the target communities, design the specific package of incentives to meet the highest priority needs of the villagers, with explicit objectives to be attained. When incentives are designed to enhance the management of a protected area, they should be closely linked to the management plan for the area. This requires that the protected area manager is fully involved in the design and implementation of the incentives package.
3. Assess the resources, including the biological resources and the human resources available for implementing the incentive. The biological resources may need to be surveyed, using local universities, research center staff, and other expertise that may be available.
4. Assess human motivation for both conservation and exploitation. What are the factors underlying current over-exploitation of biological resources, and what motivating factors are available for changing those factors? The needs and aspirations of the local people need to be discovered before any reasonable system of incentives can be designed.
5. Assess all development plans which might influence the incentives. What other development projects are affecting the project area?
6. Conduct a preliminary economic analysis. What is the opportunity cost for working in a particular area or region, and how does this area relate to other areas having the same biogeographic characteristics?

7. Select the types of incentives. Incentives usually must be site-specific, but certain aspects of the incentives issue can be underscored as part of land use planning policies and plans for conservation:
- Incentives need to be classified as general in nature or as targeted at specific priority regions in the country.
  - Incentives which are nation-wide or region-wide in scope (such as taxes or use rights) must be established and regulated by a legal body, to guarantee users that they are entitled to insist on State compliance where they themselves have complied with the established regulations.
  - Incentives in a national scheme must integrate land tenure and its regularization in such a way that the cultivators are guaranteed that they will reap the fruits of their labors.
  - Incentives must be designed to ensure continuity of plan activities even after the incentive is no longer applied.
  - Incentives must be well planned and realistic. Funds must be available to back them, and they must complement one another and be carefully promoted beforehand.

**GUIDELINE 2:**

***DETERMINE THE CAPACITY OF THE LOCAL COMMUNITY TO BENEFIT FROM INCENTIVES***

The capacity to benefit from incentives will vary considerably from community to community. The effectiveness of a package of incentives aimed at a specific community depends on a number of factors, including:

1. the major *objectives* of the incentives scheme (the most important issue here is to be very clear and explicit about what conservation objectives are to be achieved by the incentive);
2. the *capacity* of the community to absorb incentives (villages with well-developed institutions will usually be able to absorb incentives more effectively than poorly

- organized villages, which may first require appropriate institutions to be developed);
3. the *initial state of the biological resources* to be managed (incentives to manage existing resources are different from incentives to rehabilitate resources that have been depleted);
  4. the *level of motivation* of the community (communities which are eager to cooperate and take advantage of opportunities such as tourism are quite different from communities which need to be convinced that cooperation is in their own best interest; in the latter case, an initial promotion campaign may be required);
  5. the *constraints* which the incentives are intended to overcome (these can include: lack of title to land; unclear responsibility for biological resources to be conserved; insufficient information about available options or rights under the law; lack of access to resources, expertise, or appropriate markets; and insufficient awareness of the benefits available from conservation action);
  6. the *effect of time* on the incentives (including the time required to apply the incentive, the time over which the incentive needs to be applied, the time required for the incentive to bring about the desired change in behavior, and the time to recover any recoverable investments); and
  7. the *method of distributing* the incentive to the community (communities with strong institutions may use them to distribute the incentives, while other mechanisms may be required in other cases; this will obviously vary with the objectives and degree of motivation).

**GUIDELINE 3:**

**ENSURE THAT PROJECTS WHICH INCORPORATE INCENTIVES INCLUDE ALL NECESSARY ELEMENTS FOR THEIR SUCCESS**

When designing or assessing a project which incorporates economic incentives, the following questions need to be answered. Any negative answers should

require additional explanation; some projects may be designed to seek answers to these questions.

1. Has the project established *what are the biological resources* for which management needs to be enhanced?
2. Has the project estimated *the economic values* of the resources for which management is to be enhanced through the incentives?
3. Have clear and explicit *conservation objectives* been established for the package of incentives and disincentives?
4. Has the project identified *perverse incentives* (i.e., the national social and economic policies that have encouraged the community to over-exploit biological resources) and identified the means to overcome these perverse incentives?
5. Has the project presented sufficient *information about the community*, including determining what biological resources the community is currently using, how the resources are being managed by the community, the degree of awareness about controlling regulations, and possible alternative sources of income?
6. Does the project contain *specific packages of incentives* which are aimed at effectively meeting the highest priority needs of the villagers, and ensuring that the incentives package is linked with other development activities?
7. Does the project establish a *structure of responsibility* for the biological resources in the area? Does it build on existing village institutions, or build new ones?
8. Does the project incorporate *packages of disincentives*, through legislation, regulation, taxation, peer pressure, and appropriate levels of penalties?
9. Does the project provide appropriate *information and public education* to the target audiences on both incentives and disincentives?
10. Does the project contain a means of *monitoring and feed-back*, so that necessary changes can be instituted as the incentives package adapts to changes?
11. Will the project lead to *permanent or sustainable funding mechanisms* which will enable the incentives to continue operating after the life of the project?