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ROLE OF ECONOMIC INSTRUMENTS IN BIODIVERSITY CONSERVATION

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Abstract

This paper deals with application of economic instruments in bio diversity conservation with reference to demand side and supply side economic instruments, need for economic instruments for biodiversity conservation, economic causes of biodiversity loss, direct payments to conserve biodiversity and potential investments for biodiversity conservation. It outlines the implications of bilateral financing biodiversity, debt-related measures, private financing biodiversity, prospecting rights and biological royalties, NGOS financing biodiversity, debt-for-nature" swaps, public fund for biodiversity conservation, environmental fund, multilateral assistance in biodiversity conservation and foundations and other private sources towards bio diversity conservation. This paper concludes with some interesting findings along with policy suggestions.

Introduction

Biodiversity has many values of importance to humans. Groom et al. (2006) classify them into instrumental and intrinsic values. The instrumental values include their use as goods such as food, fuel, fiber and medicine; for ecosystem services such as nutrient recycling, air and water purification, climate regulation, and the generation of moisture and oxygen; information values such as genetic storehouse for biotechnology, genetic engineering and other life sciences research; and psycho-spiritual uses such as aesthetic beauty, religious awe and cultural identity. The intrinsic value could be in existence, and that satisfies some humans. Further, biodiversity also has future potential uses, which may be difficult to foresee. All these values can be assigned economic values, but with limitations. Many attempts to put monetary values on the present and future potential values of biodiversity have been inadequate but still resulted in values which are many times the world's total Gross National Product, which humans cannot afford to substitute. From the different values that humans generate from biodiversity, it can be said that we need it for both our economic survival and existence.

Examples of these economic instruments include measures such as property rights, taxes, conservation easements, subsidies, charges, fees, market establishment, funds, loans, performance bonds, deposit systems, payment for ecosystem services, and livelihood support systems. In this connection, Emerton (2000) notes that aim to change people's behavior by making sure that they take into account the real value of biodiversity and the broad costs associated with its loss when they make decisions. In many parts of the world, they are used to supplement and not replace other conservation strategies such as existing regulations and land acquisition programs designed to conserve habitats and species.

A Demand and Supply of Economic Instruments

Biodiversity is viewed in economics as the source of biological resources which can be allocated by providing choices to improve human welfare. Therefore, the relationship between demand and supply underlies the forces that drive the allocation of natural resources from

biodiversity. An evaluation of the success or failure of economic instruments for biodiversity would be to figure out whether they have addressed the demand and supply of resources they were aimed to address. Hence it can be classified the economic instruments by the demand and supply. This is an attempt to use the basics of economics to classify economic instruments for biodiversity conservation. Though the instruments affect both demand and supply of biological resources, the criteria is based which of these two factors are directly affected by the economic instrument. The specific determining criteria are that demand instruments directly decrease or increase demand for biological resources and the supply instruments directly increase or decrease supply of biological resources. For example, ecotourism is a demand instrument. Ecotourism in a forested area will reduce how the nearby communities which benefit from the tourism proceeds may demand biological resources such as timber and bushmeat from the forests. Eco-labeling and certification also increases demand for products from sustainably managed resource bases.

On the other hand, when there are tax incentives for landowners to keep biological resources on their land that directly reduces the supply of resources such as timber to the markets. Also, debt conversion mechanisms such as debt-for-nature swaps encourage poorer countries to protect their natural resources and this directly reduces the supply of biological resources from their natural areas.

A demand and supply classification of economic instruments:

Demand instruments

Ecotourism
Markets for recreation
Eco-labeling and certification
User fees
Markets for carbon sequestration
Markets for watershed services
Compensation programs for opportunity cost and damages

Supply instruments

Biodiversity offsets and mitigation
Conservation banking
Conservation easements
Covenants and deed restrictions
Stewardship exchange agreements
Mitigation banking
Transferable development rights
Tax cuts
Insurance
Cost-share incentives
Conservation stewardship incentives
Land and water rental leases
Conservation contracts
Property and estate tax incentives
Capital gains tax

Debt conversion mechanisms

Need for Economic Instruments for Biodiversity Conservation

Many experiences of the use of economic instruments for biodiversity conservation focus on their economic effectiveness and efficiency. Parker (2004) states that from an economic perspective study of 1,250 land trusts in the USA, conservation easements have been one of the most cost effective incentives for conserving land. IUCN (2008) explains that though the voluntary carbon markets are not doing much because of the increasing emissions, all countries stand to potentially gain from such trade. But the economic impacts on poor people in developing countries depend on whether aforestation activities engage local communities, and whether they lead to loss of access to forest resources and fast-growing plantations that deplete groundwater supply. Also, there is little evidence that mechanisms exist for and little reason to be confident that the benefits from credits will be transferred to communities and especially the poor.

Almost all forms of human production and consumption have the potential to impact on biodiversity. Economic activities directly cause biodiversity loss when they deplete, convert, pollute or otherwise degrade biological resources and ecosystems. For example overgrazing, over-fishing, conversion of forests and wetlands to agriculture, and the unsustainable exploitation of plants and animal products all lead to biodiversity loss because they use up renewable biological resources at a rate greater than that at which they can naturally regenerate, or because they replace natural ecosystems with other land uses which do not support a diverse base of natural species. Other activities such as the use of destructive fishing or timber harvesting techniques, slash and burn agriculture, open pit mining or the disposal of untreated agricultural, industrial and domestic wastes into land and water degrade biodiversity as a secondary effect of the technologies and methods they employ – they affect environmental quality, and thereby impact on biodiversity.

The unsustainable utilisation of biological resources and the consequent decline in their availability or diversity is a serious problem. This includes activities which are unsustainable overall, or in terms of the areas and species they harvest. Any activity which harvests resources at a quantity or rate greater than that at which they naturally regenerate or are replaced, and leads to a decline in their quantity, quality or diversity over time, can be said to be unsustainable; the conversion, modification and fragmentation of natural ecosystems to other uses which do not maintain a diverse pool of natural species or which undermine the provision of vital ecological functions. This includes land uses which lead to permanent changes in habitats by destroying and replacing natural ecosystems and their component species. Examples include the conversion of natural ecosystems to agriculture, mariculture, settlement or mining;

The use of destructive harvesting or production techniques which impact negatively on biodiversity and it could be viewed seriously. This includes land and resource uses which waste or destroy non-target species in the course of their activities. It could be noted that the use of destructive fishing or timber harvesting techniques, slash and burn agriculture or the unselective exploitation of wild species; the alteration of environmental quality and functions that are required to maintain biodiversity and ecosystems. This includes production and consumption activities which generate wastes or by-products which harm the natural resource base. In this context, examples include untreated domestic waste, the use of hazardous or toxic chemicals or the disposal of industrial effluents or by-products into land, air and water.

Economic Causes of Biodiversity Loss

People do not degrade biodiversity for no reason. They do so because their situation and circumstances provoke and sometimes even force them to do so. Economic activities that lead to biodiversity degradation are permitted, or even encouraged, to take place because of failures and distortions in the markets, laws, policies and institutions that govern production, consumption and biological resource use. These failures and distortions make it seem more profitable, or economically attractive, to degrade biodiversity in the course of economic activities. They comprise the underlying economic causes of biodiversity degradation and loss they are perverse incentives that encourage people to degrade biodiversity, or they provide disincentives that discourage biodiversity conservation. In general, it is possible to identify four major categories of perverse incentives or disincentives that comprise the underlying economic causes of biodiversity loss.

Policy and Legal Failures

Governments set in place policies to stimulate economic activity and to meet particular national or sectoral goals. Laws aim to regulate people's behaviour so as to achieve these economic goals or to conform to particular social or moral norms. Policies and laws are usually accompanied by a range of supportive instruments such as subsidies, taxes, fines, education, research and extension. Such policy instruments often encourage people to degrade biodiversity in the course of their economic activities, either because they directly stimulate activities that lead to biodiversity loss, because they fail to contain or enforce checks against biodiversity degradation, or because they omit consideration of biodiversity. In this context, examples include agricultural policies which encourage high-input arable production as the only legitimate use of land, industrial and urban policies which encourage development and settlement in ecologically sensitive areas or contain inadequate consideration of waste management and pollution control, and environmental sector policies which fail to consider issues of resource management, use and tenure.

Market Failures

Markets, through the price mechanism, allocate resources and coordinate people's decisions about the quantity of goods that they produce and consume. People's economic activities respond to the markets and prices that they face, because these influence the relative profitability and desirability of different production and consumption options. Prices and markets are however frequently imperfect, and send the wrong signals about the value of biodiversity-based goods and services. Often the price of unsustainably-exploited biological resources, or of products or technologies that degrade biodiversity, are more attractive than those of sustainably-harvested or biodiversity-conserving technologies and products. Sometimes there is no market at all for biodiversity goods and services, or people are unable to access these markets. This in turn encourages people to under-value, over-consume and under-conserve biodiversity. In this context, examples include the setting of natural resource utilisation fees and royalties at zero or low prices, the monopolisation of local resource markets by parastatals or middlemen, artificially low prices for industrial and agricultural chemicals, low fines and penalties for environmental degradation or the complete absence of prices and markets for many environmental services and biodiversity-conserving goods

Institutional Failures

Institutions set and control the terms and conditions under which economic activities, biodiversity and other resources and factors of production are managed, allocated and

used. Local, national and international institutions often encourage biodiversity loss, or fail to provide incentives for biodiversity conservation. Institutions are frequently geared towards other goals such as agricultural expansion, export or employment promotion, or industrial development, and omit consideration of biodiversity. They can also discourage biodiversity conservation because they represent only the interests of a particular group or sector such as government, industry or foreign companies, or do not work well in practice it is not uncommon even for the institutions mandated with biodiversity management to exclude key biodiversity users, managers or stakeholders such as local communities or the private sector, or to be ineffective in implementing on-the-ground conservation activities. In this context, examples include the lack of consideration of biodiversity in sectoral institutional mandates, the monopoly control of government over protected areas and exclusion of local residents, poor land and resource tenure arrangements, the establishment of natural resource management institutions which exclude key users or sectors of the population;

Livelihood Failures

Bio-physical and demographic conditions and local pressures which are also often linked intimately to the nature of economic policies, markets and institutions all determine people's livelihood activities and their needs, constraints and opportunities. These circumstances sometimes mean that people have no option but to degrade biodiversity in the course of their economic activities. When livelihood circumstances and economic opportunities are insecure or limited, and when there are few available sources of income and employment at local or national levels people often have little choice or alternative but to over-exploit, convert or otherwise destroy biodiversity in order to survive. In this context, examples include over-dependence on biological resource harvesting for income or subsistence, land and population pressure, war and civil insecurity, seasonal stress and drought, poor infrastructure and markets, and widespread poverty.

Where broader policy, legal, market and institutional circumstances provide perverse incentives for biodiversity degradation, or disincentives to biodiversity conservation, there is a need to identify and overcome them, and to instead set in place a system of incentives that encourage biodiversity conservation.

Direct Payments to Conserve Biodiversity

The international community has invested billions of dollars to stem the loss of biodiversity in developing nations. Despite these investments, the

loss continues. Biodiversity is a public good and thus is not supplied in sufficient quantities by individuals acting in their own self-interest. Conservation practitioners try to provide individuals who destroy ecosystems and species with incentives to preserve them. These incentives lie on a spectrum from indirect to direct with respect to their link with conservation objectives. Conservation initiatives in the United States, Australia, and most of Europe increasingly emphasize more direct incentives: land purchases, leases, and easements, as well as financial incentives such as performance payments and tax relief. For example, the U.S. government spends over $1.7 billion per year to induce farmers to protect land, and The Nature Conservancy, with an annual budget of more than $700 million, operates almost exclusively through land purchases and easements.

These payment approaches are based on a willing buyer–willing seller model. Sellers deliver conservation outcomes in exchange for a negotiated payment in cash or in kind. Payments are conditional on conservation outcomes. Conservation in developing nations has emphasized the

more indirect end of the spectrum. Indirect approaches include initiatives like Integrated Conservation and Development Projects (ICDP) and Community- Based Natural Resource Management. Such projects encourage rural communities to maintain biodiversity by helping them to use it sustainably. They may also provide alternative sources of products, income, or social benefits schools, wells, clinics, etc. as a means of encouraging communities to cooperate. These kinds of efforts have been referred to as "conservation by distraction". After decades of global efforts to conserve biodiversity through indirect approaches, there is a growing recognition that such initiatives rarely work. N. Salafsky et al., (1999) have pointed to basic conceptual flaws; for example, people are more likely to incorporate new sources of income as complements to existing activities rather than as substitutes for them. Others have noted that the technical, economic, social, and political conditions needed for an indirect approach to succeed are difficult to find in the real world.

Indirect Versus Direct Approaches

Potential obstacles to implementing a direct payment approach in developing nations include uncertain or inequitable land tenure, limited experience with and enforcement of legal contracts, and limited local opportunities for nonagricultural investment or employment. Direct payments may displace biodiversity loss to other areas, may be misappropriated or misused, and may create social conflict. However, these problems generally apply equally to indirect interventions. Direct payments might be seen as a form of bribery or an imposition of Western values on developing nations. However, investments that encourage eco-tourism or create markets for tagua nuts are equally aimed at inducing rural communities to change their land use and livelihoods in response to Western values.

Recent debates have highlighted four issues that need be examined in relation to direct and indirect approaches. 1) Institutional complexity. Indirect and direct approaches require institutions that can monitor ecosystem health, resolve conflict, coordinate individual behavior, and allocate and enforce rights and responsibilities. A system of conservation payments, however, allows practitioners to focus their energies on designing the requisite institutions. Existing direct payment initiatives have estimated administrative costs from 5% to 25% of the operating budget. A developing nation may not have the institutional capacity to make contractual agreements and to manage money in a direct payment initiative. If, however, it lacks such capacity, it would not likely have the institutional capacity to implement a more complex indirect intervention. 2) Costs. In general, a direct payment approach will be more cost-efficient than any indirect approach. For example, an analysis of a conservation intervention in south eastern Madagascar by J. C. Conrad, P. J. Ferraro (2001) indicates that, were the nearly $4 million of available conservation funds invested in annual payments conditional on the protection of forest, about 80% of the original forest could have been protected into perpetuity, whereas only 12% could have been protected through support of indirect incentives. Furthermore, rural residents receiving conservation payments would have received incomes two times those that could be generated through an indirect intervention.

Potential Investments for Biodiversity Conservation

(Least

Investment	Examples
Support for the use/marketing of extracted biological products	Logging, nontimber forest product extraction, and hunting
Subsidies for reduced-impact land and resource use	Sustainable agriculture on already cultivated lands, "alternative income generation"
Support for the use and or marketing of biodiversity within relatively intact	Eco-tourism, sport hunting, bioprospecting, wild honey production
Payment for other environmental services (generating biodiversity conservation as a side benefits)	Watershed protection, carbon sequestration
Payment for conservation land "retirement" of biodiversity use rights	Easement, "nonlogging" concessions
Performance-based payment for biodiversity conservation	Paying for bird breeding success, paying for occupied wolf dens

(Most direct)

The basic principle is that the cheapest way to get something, we want is to pay for what we want such as protected rain forest rather than pay for something indirectly related to it on capital for improving eco-tourism or more simply "we get what we pay for." Paying people to protect habitat and wildlife can be surprisingly affordable. Many of the regions in which conservation practitioners work are at the margins of the economy where other land uses do not generate substantial net returns. E. Ortiz (2000) reported that the middle-income nation of Costa Rica pays rural residents about $35 annually per hectare of forest protected, and excess demand for conservation contracts suggests that these payments are higher than necessary. Even cheaper, Conservation International is protecting 81,000 hectares of rain forest in Guyana through a conservation concession that costs $1.25 per hectare per year and The Wildlife Foundation in Kenya is securing migration corridors on private land through conservation leases at $4 per acre per year.

There is no argument against short-term assistance for profitable, eco-friendly activities that can protect biodiversity. Conservation practitioners and donors, however, must ask themselves why external assistance is necessary if these activities are so profitable. Rural residents may face credit constraints, misunderstand the benefits conservation would afford them, or be unable to organize to realize the benefits, but we suspect that such conditions are rarely the main

constraints. 3) Development benefits. The indirect approach is attractive to many stakeholders, because it seems to achieve conservation and development objectives simultaneously despite evidence suggesting it achieves neither in most cases. However, direct payments benefit poor farmers by improving cash flows, providing a fungible store of wealth, and diversifying sources of household income. Furthermore, under a payment approach, the land holders/resource users decide how best to meet their own goals and aspirations, rather than being subsidized to carry out predetermined activities as is the case under the indirect approach.

Paying an individual or community for "not doing something" might be seen as a form of social welfare rather than development. However, the idea that conservation payments are a form of welfare belies what conservationists have been arguing for decades: Biodiversity is a valuable commodity and biodiversity protection is an alternative land use. 4) Sustainability. The Holy Grail for the international conservation community is the self-financing conservation activity. Direct payments are seen as undesirable because they require an ongoing financial commitment to maintain the link between the investment and the conservation objectives.

Financing Biodiversity

Article 20 of the Convention on Biological Diversity recognizes that each government needs to provide financial support and incentives to implement the objectives of the CBD, within the capacity of each government. All governments face large demands on the available financial resources, and will need to ensure that expenditures in support of the CBD are able to compete successfully with other demands for the limited funds available. There is a need to discuss several new approaches to generating funds that will serve to support the objectives of the CBD. It is clear that many governments can use policy instruments to change the ways that funds are being raised and spent in order to make them more consistent with the CBD. Many of these "green funding mechanisms" can both generate funds and change behaviour of individuals and institutions to make them more "biodiversity-friendly".

Environmental Taxes and Charges

It is evident from the reports of Broadway and Flatters (1993) Bruce and Ellis (1993), OECD (1996) and Barde and Owens (1993), that the potential for environmental or "green" taxes is great in many countries. A carbon tax already has been collected on the use of fossil fuels in Denmark, Finland, the Netherlands, Norway, and Sweden. Other uses of tax policy could also contribute. It is learnt from the work of McNeely (1993),that the governments could decide to provide tax deductions to private landowners trying to preserve biodiversity on their own lands, as is already being done in Australia, Canada, and several African countries. Such a tax deduction would help mitigate costs of habitat conservation, including opportunity costs. Clark and Downes (1995) viewed that it might also be possible to reduce or eliminate taxation on ecologically important land where the owner commits to conserving it in its natural state. On the other hand, taxes could be increased on activities that lead to the loss of biodiversity, thus helping to ensure that the costs of environmental damage are internalized. Thus taxes can both raise funds for biodiversity and affect the way people treat biological resources.

Business is predictably unenthusiastic about proposals to tax the sales of pharmaceuticals, timber, or seeds, contending that as taxes are unhypothecated, there is no guarantee that the revenues will achieve efficient conservation results, and additional revenues would more appropriately be levied from society as a whole. According to Ten Kate (1995), the

political reality is that the introduction of such taxes is unlikely under current conditions in most countries.

Simpson (1995) offers several arguments against taxing profits arising from biodiversity prospecting. First, at least some of the benefits of biodiversity accrue to society as a whole rather than to new-product researchers, so it is only fair that society as a whole should pay for conservation. Second, it is widely accepted that public goods -- of which biodiversity is certainly one should be financed from broad-based taxes based on the principle of minimal allocative distortion; supporting biodiversity conservation with revenues from biodiversity prospecting would appear not to meet this criterion. And third, if the intention is to provide incentives to local people, it may be that direct payment schemes for implementing conservation would be more efficient than establishing biodiversity prospecting operations.

Tradeable Permits

Swanson (1995) suggests an approach to contracts for biodiversity which would entail the acquisition of the rights to particular land uses that are especially detrimental to the supply of biodiversity. For example, Schneider (1992) suggests that the supply of biodiversity from the Amazon could be ensured only if the "burning rights" were acquired from local users, suggesting that a contract for the transfer of rights to clear and burn the lands in the Amazon Basin would ensure the supply of biodiversity demanded from that region. Land owners, according to this approach, could be induced through contractual agreements to transfer such rights, and if these rights were freely transferable, then economic theory suggests that the optimal distribution of land uses would result. According to Pearce (1991), so long as all of the uses of a given area are valued, the property rights approach allows for the allocation of land uses between the various competing users.

As per the views of Swanson (1995), property rights efficiently allocate the various rights of land use between the interested parties. If the various services flowing from the ownership of a parcel of land could be identified, then the people who wanted biodiversity would simply acquire the rights from those who are able to supply it. However, he points out, the practice of transferring development rights differs quite considerably from the theory.

An efficient financial mechanism for biodiversity conservation would allocate land uses between land owners and the global community by enabling the transfer of the rights to develop particular land uses from owners to the global community, at least in those circumstances when the relative valuations induced such an exchange. However, problems arise when property rights are translated or transferred to the international level because property rights institutions do not exist across national boundaries. Hence, Swanson (1995) defines the problem of biodiversity as one of the non-transferability of real property rights for biodiversity purposes beyond national boundaries.

Bilateral Financing Biodiversity

According to Article 20 of the CBD calls on developed country Parties to provide new and additional financial resources to enable developing country Parties to implement the Convention. But for the first time in a generation, official aid from member countries of the OECD's Development Assistance Committee has suffered a sharp decline, from US$61 billion in 1992 to US$56 billion in 1993. Inspite of renewed commitments from donors to the target of 0.7 percent of GNP agreed at the Earth Summit, 14 of the 21 donor states actually showed a decline in GNP percentage, bringing the average down from 0.33 percent in 1992 to 0.30 percent in 1993. The US (0.2%), Japan (0.3%), and the UK (0.31%) have all reported declines in their ODA- to- GNP ratios.

Debt-Related Measures

The total government foreign debt of all developing countries, taken as a group, reached US$1.8 trillion at the end of 1993, an increase of 7 percent from the previous year. The World Bank estimated that as of the end of 1994, the debt will increase by another 7 percent, reaching US$2 trillion. A number of the bilateral creditors are from North Africa and the Middle East mainly Algeria, Kuwait, Iraq, Libya, Saudi Arabia, and the United Arab Emirates or other developing countries mainly Argentina, Brazil, Mexico, and Venezuela. While these countries understandably are not keen to write off the debt entirely, they may be interested in arrangements by which at least some repayments could be made. Various approaches to debt relief, such as debt rescheduling, debt-for-equity, or debt-for-nature swaps have contributed to a reduction of the outflow of financial resources from developing countries and can continue to make contributions to external financing for those countries which are actually servicing their debts. In this regard, debt-for-policy reforms or debt-for-sustainable development may have a greater promise than the narrowly conceived debt-for-nature swaps. **Private Financing Biodiversity**

Ten Kate (1995) notes that in 1993, private financial flows to developing countries reached US$159 billion, far more than the $56 billion in development assistance. The private sector has profound influences on biodiversity through its use of resources, trading patterns, and marketing. Many private-sector investors are already deeply involved in biodiversity, holding extensive areas of land important for conservation, promoting bioprospecting carrying out biodiversity-related research, and supporting conservation efforts in the field.

This trend is most strongly seen in the industrialized countries, but many developing countries are seeking to promote rapid economic expansion, with the consequences that: 1) the local business sector will increasingly have the resources to contribute to conservation; and 2) the emerging consumer class will have the interest, influence, and resources to support national conservation efforts. This assumption leads to a focus on identifying incentives for the private sector to play a greater role in the financing of conservation. Already, many commercial, investment, and private banks have contributed to environmental initiatives in the past few years and should be considered as a source of loan funding.

Prospecting Rights and Biological Royalties

It is evident from the work of Eisner and Beiring (1994) and Mendelsohn and Balick (1995) that the untapped potential of rainforest species for yielding useful drugs as a reason for saving tropical forests. Within the last few years a number of partnerships have been formed to try to develop this potential to the point where new drugs, derived from naturally occurring compounds, are on the market. Three models can illustrate how "bioprospecting" is evolving, examine what forces are shaping this field's evolution, and suggest how significant bioprospecting may become as a source of financing for biodiversity conservation.

It is seen from the report by Sittenfeld and Gámez (1993) that the international drug company access to material from which compounds are extracted and screened using various bioassays to see if the compounds have useful properties. Those compounds with potential would then enter the long process of animal and human trials and certification before they became a profitable product.

A second model is illustrated by Shaman Pharmaceuticals, which was formed to conduct bioprospecting. Shaman has no other business than bioprospecting. By contrast, the large

drug companies are likely to continue to see the largest natural source of testable compounds to be those derived from microbes relating to penicillin, Mevacor interesting species of which may occur perhaps as frequently in habitats like the soils of parking lots and golf courses as they do in rainforests. Also, large companies can afford to write off expenses of a limited investment in bioprospecting against the public relations value of media coverage linking a giant company to rain forest preservation.

While bioprospecting may not generate significant income for conservation, it still has significant advantages for tropical countries. Involvement in bioprospecting partnerships with business can produce benefits which can contribute some incentive to conserve biodiversity; bioprospecting can help countries develop capacity to add value to their genetic resources; important skills can be developed in areas such as biotechnology and information technology; and bioprospecting can support, at least potentially, various conservation activities and lead to the development of jobs and products for local markets. Therefore, while it may be important in the long run to ensure income from a fair share of any royalties generated, the focus should be on short-term benefits such as capacity building and technology transfer, especially at the local level.

It could be noted that as more countries enter the biochemical prospecting market with unique combinations of biological and technical resources for sale, market niches will become smaller and profits and conservation incentives can reasonably be expected to decline. But at least 48 companies or institutions are currently involved in bioprospecting activities, including such giant pharmaceutical firms as American Cyanamid, Bristol-Meyers Squib, Eli-Lilly, Glaxso, Johnson and Johnson, Merck, Monsanto, Phizer, SmithKline, Beecham, and Upjohn. Those who contend that bioprospecting is not likely to yield substantial profits are belied by the giant profit making firms who clearly see the value in such biodiversity prospecting efforts.

With entry into force of the CBD, bioprospecting has become much more complicated. Today's prospector must meet requirements for prior informed consent, access on mutually agreed terms, the fair and equitable sharing of benefits, obtain appropriate visas and permits to collect, enter land, export and import materials, satisfy phytosanitary and CITES requirements, and ultimately meet regulatory requirements for product safety and standards. Thus, bioprospecting depends for its success on the shared and realistic expectations of the partners and their ability to meet each other's needs. A very real danger exists that over-regulation will lead to a reduction in new exploration at the very time when biotechnology is facilitating the utility of such discovery.

NGOs Financing Biodiversity

Conservation finance dates its history from the work of the NGOs that have been raising money and lobbying for conservation actively for at least a hundred years. It is largely as a result of the lobbying and advocacy efforts of NGOs over the past several decades that donors and governments have increased their support for conservation. It is seen from the works of Parras, D. A., Portigo, M. F., and White, A. T., (1998) that NGOs are still in the forefront of innovation in bringing more investors and more financing to the support of conservation. The following describes tools that NGOs have been, and will likely continue to be, in the forefront of implementing, often in support of the efforts of governments and the private sector.

"Debt-for-Nature" Swaps

Debt-for-nature swaps are the best known of a family of deals that exchange debt in "hard" currency for local currency and or equity in local enterprises. It is evident from the works of

Gibson and Schrenk (1991) Hansen B., Alrře H.F. and Kristensen E.S., (1991) and Rubin et al., (1994) that debt swaps were a "win-win" deal for all involved. In a typical swap, the commercial bank holding a non-performing note of a developing country was able to get cash at a discount over face value for the note and clear its books. The Central Bank that redeemed the note for local currency got out from under a portion of its debt. The donor, often a philanthropic foundation in the early days, got more impact for its grant money through a better rate of exchange for its donation for conservation. And the international NGO, arranging the swap saw an increase not only in the local currency funding for its projects, but also in the number and amounts of donations to its programmes. Two facts that explain the sudden popularity of debt swaps i.e. First, swaps generated a great deal of publicity in the mainstream press especially the financial press where conservation programmes and activities of conservation NGOs usually do not receive much attention. Favourable press boosts fund raising in many ways not just for the NGO involved, but often for the commercial bank and debtor country. Debt-for-nature swaps generated a great deal of publicity for the international conservation NGOs, such as The Nature Conservancy, World Wildlife Fund and Conservation International, who pioneered them in the 1980s. Unfortunately, debt swaps, being no longer novel; do not generate the same press as they did five or six years ago.

Public Fund for Biodiversity Conservation

The general public also has a generous willingness to pay for conserving biodiversity, provided appropriate means are available for them to exercise this choice. As countries continue to grow economically, targeted fund raising will see a burst of growth especially in countries where television programming is also growing. Campaigns targeted at specific species or locales could generate funds from the urbanized middle class but also could lead to tension between them and indigenous peoples living in the area targeted by the fund appeal. Developing strong financial support from the emerging middle classes without also worsening this tension is the challenge targeted fund raising faces. If this challenge is met, then countries showing high rates of economic growth may soon be able to raise substantial amounts of funding for conservation. The key to success is to have representatives of both funders and local communities involved in the control of flow of such funds.

Environmental Fund

Environmental funds are regional, national or community-based instruments for financing sustainable development or the conservation of biological diversity. They are instruments for managing money and disbursing it to people or projects that help protect the environment. The best funds help build local capacity for managing financial resources while leveraging existing funds to generate additional financing. A key aspect of environmental funds is that they are locally driven and locally managed. That is, they are financial mechanisms designed to address the priorities of the region, country, province or community in which they are based. The structures of these funds vary. Some are set up to address a specific environmental issue or a specific locale. Others provide finance for a broad range of environmental activities. Still others are set up to address issues of "sustainable development" including poverty-alleviation and the well-being of children. Some devise their own strategic plans and define the issues for which they will provide money, others finance activities called for by a national or provincial conservation strategy. In short, the funds vary according to the needs, priorities and desires of their creators, but can serve as important vehicles for bringing together representatives of government and civil society, promoting participation by civil society in the formulation of policy, and building national capacity.

Utilization of Environmental Fund

One way of distinguishing between funds is by their approach to providing finance for environmental activities: Some funds act as foundations that invest their capital and use the interest on that capital in support of activities consistent with the objectives of the grant-making foundations. Funds may also function as banks or micro-credit lending facilities, providing small loans at concessionary rates to individuals or organisations carrying out environmental activities. The interest obtained from these loans is either put back into the fund or used to finance the fund's management and operation. It is also conceivable that funds could operate as venture capital firms that provide money to permit the creation of businesses that meet certain environmental criteria.

Of these, the first is by far the most common. Although it is possible for funds to provide micro-credit or act as venture capital funds, to date, most environmental funds have been set up as a mixture of draw-down funds and endowments investing a portion of the capital and using the return on that investment to support conservation programmes. In this context it is important to note that not all environmental funds need be endowments. In fact, some of the most successful funds have been draw-down funds with 10-15 year time periods for disbursing their money.

Activities of Environmental Funds

The scope of environmental funds varies widely. What is most important is that the particular funding priority of each is clearly defined. Essentially, there are two kinds of environmental funds. Single-issue funds: These are funds with very specific missions such as providing funding to cover the long-term costs of operating and maintaining a particular national park or protected area, or for financing the work of a country's system of national parks. For example, an environmental fund in Uganda finances activities relating to the operation of the Mgahinga National Park and the Bwindi Impenetrable Forest National Parks. Similarly, one of the two funds existing in Jamaica, the Jamaican National Parks Trust, provides money to finance the research and operational costs of Jamaica's newly established National Park system. Single-issue funds have the advantage of a straightforward mission, clear criteria for what projects they do finance, and a well-defined constituency.

Multi-Issue Funds

These are funds with broad missions such as "the protection of biological diversity" or the "achievement of sustainable development". One example of a multi-issue fund is the Indonesian Biodiversity Foundation

. Its overarching goal is to preserve biological diversity and support activities such as: Inventories of biological resources; the management of buffer zones outside protected areas; promoting sustainable livelihoods for those who live in or around protected areas relating to native tree nursery and reforestation initiatives; soil reclamation programs; sustainable farming practices and products; community-based environmental management education; etc.. Another example of a multi-issue fund is the Fondo Mexicano Para La Conservacion de la Naturaleza (FMCN) is another example of a multi-issue fund. It funds a broad range of environmental activities including the capacity building of Mexican NGOs.

An important issue when considering the establishment of either a single-issue fund or a multi-issue fund is the development of clear priorities. One problem that multi issue funds have encountered is that attempting to cover too many areas of activity can dilute their focus and impact. However, when multi-issue funds are closely tied to clearly established and effective mechanisms for

setting environmental priorities relating to well-developed National Conservation Strategies, National Environmental Action Plans, or a National Biodiversity Strategies their impact can be considerable. In any case, the most effective funds tend to be those where all partners are actively involved in managing the Environmental Fund and establishing the criteria by which projects are chosen for funding. Another important issue is monitoring and evaluation. Effective grant programs are those that select project activities according to a clear strategic plan and identify measurable objectives by which the performance of the grants can be evaluated.

Structure and Governance of Environmental Funds

There are a number of ways to structure the principal governing body of environmental funds. These include: **Solely government or Government-majority Funds**: These funds are either directly established within the structure of the national government, or else they are created by government, with government representatives making up the majority of the fund's board. **NGO-majority Funds**: These funds have NGOs as majority stakeholders on their governing bodies. As such, NGOs have a strong impact on decisions regarding the allocations of resources. Government representation is advisory rather than for decision-making. **Joint Government-NGO funds:** environmental funds often have a mixed board containing both NGO and government representatives.

Debt Buy-Backs

In a debt buy-back, an NGO or another suitable organisation acts as an intermediary between the debtor country and its creditors. Often, creditors have partially or wholly "written-off" bad debts such that they can be "bought" on the market at a fraction of their face value. When this is the case, the intermediary organisation can "buy-back" that debt at the reduced price say 30 cents on the dollar and "sell" it back to the debtor government for more than it paid for the debt, but less than the face value say, 50 cents on the dollar, usually in local currency. In this way, the debtor government pays for its debt in local currency and at a fraction of the real cost, while the intermediary organisation leverages its money for local conservation projects. Increasingly, environmental funds are being used to disburse the local currency derived from debt buy-backs.

Debt Forgiveness

A debt forgiveness involves the creditor essentially agreeing to "forgive" a country's debt in return for conservation actions, or an agreement to invest, in local currency, a fraction of the debt's value in conservation projects. This has fast become the most common kind of debt swap, simply because it can often involve much larger sums of money than are possible through debt buy-backs. Since debt forgiveness can often involve tens of millions of dollars, the debtors and the creditors have preferred to use environmental funds as a mechanism to disburse the funds because they allow for the money to be spent slowly and in small increments, rather than overwhelming a country's capacity to cope with the donation. Regardless of whether or not multilateral creditors ultimately agree to allow the debts they hold to be converted, they can often play a major role in convincing commercial or bilateral creditors to convert their debts in return for conservation action. If and when multilaterals agree to serve as "mediators" and "brokers", it will open up a tremendous amount of opportunities for countries and existing environmental funds to negotiate debt swaps.

Direct Bilateral Grants

Canada, Germany, Switzerland, the Netherlands, and Finland have been active supporters of environmental funds, typically, but not always, through direct grants. In the case of the

United States, which has contributed around US$ 100 million over the last six years to environmental funds, this money has come both in the form of direct grants approximately 20% of the total and debt reductions approximately 80%. However, some bilaterals are legally proscribed from capitalising endowments, although they may be able to provide additional funds to existing endowments.

One major concern of bilateral donors has been the potential loss of control over the funding priorities of environmental funds after they have contributed resources. To counter this problem, some bilateral donors have set up "funding windows" within existing environmental funds where they are guaranteed a seat on the board and a say in how their money is spent. However, many bilateral donors continue to see environmental funds as a good way to spend their aid dollars. USAID, for example, through the Enterprise for the Americas, has been particularly instrumental in setting up funds in Latin America and the Caribbean. One interesting approach is that presently being negotiated by a particular European bilateral aid agency which, rather than creating an office and staff capacity in a country to which it would like to provide aid, is investigating the possibility of using its money to capitalise an environmental fund. By so doing, it will not only help finance projects in the country, but also help create the capacities necessary for development. In short, the agency believes it will get more environmental impact per dollar spent in the country concerned by NOT establishing a staff capacity there.

Multilateral Assistance in Biodiversity Conservation

Among the multilateral organisations, the Global Environment Facility (GEF) is one of main sources of financing for environmental funds. The GEF has even gone as far as to provide all of the capital to endow certain environmental funds. One estimate is that by January 1998 it had donated approximately US$ 51 million to seven environmental funds, making it one of the single, most important sources of funds for environmental funds after debt swaps. For the Global Environment Facility, environmental funds provide an effective way to channel large grants that might otherwise overwhelm the receiving country's capacity to implement activities. By establishing a fund, the Global Environment Facility not only creates local capacity to carry out conservation action and manage money, it also ensures that the financing is sustainable and that it reaches recipients in manageable amounts. Moreover, disbursing Global Environment Facility money through national, regional, or local funds is important because it means that the priorities and activities are determined at the appropriate national, regional, or local level.

Foundations and other Private Sources

Another source of funds for some environmental funds has been private, philanthropic foundations, international NGOs and some corporations. For instance, there are two environment/sustainable development funds for the Carpathian region in Eastern Europe: a more strictly environmental fund financed by the MacArthur Foundation, and one more geared towards capacity building of NGOs financed by the C.S. Mott Foundation. The Ford Foundation and other US foundations have also played important roles in the establishment of several environmental funds. Also, C.S. Mott, MacArthur and other US foundations have provided money to the Interagency Planning Group (IPG) on Environmental Funds and to the preparation of meetings on environmental funds in Latin America, the Caribbean and Asia. Likewise, international NGOs have played important roles in the establishment of various environmental funds by donating money, serving as intermediaries and brokers, or by providing technical assistance. Private corporations, on the other hand, have historically only provided minor funds to a few funds in Latin America and the Caribbean.

However, as many corporations in developing countries begin to establish their own philanthropies, their contribution to environmental funds could dramatically increase.

User Fees

User fees and direct contributions from tax revenues are other sources of funds for environmental funds that could well grow in the future. Some environmental funds have successfully negotiated that a portion of fees for visits to national parks and reserves, or a portion of revenues raised by special taxes such as Costa Rica's tax on leaded gasoline, as well as hotel taxes, and levies for natural resource use should be dedicated to environmental funds. In Belize, for example, the Protected Areas Conservation Trust (PACT), local environmental funds, gets all its money from a "conservation tax" levied on tourists together with a portion of the country's tourism revenues. In a similar way, a new environmental fund in Ecuador is slated to receive the money collected as the result of fees on water usage in parts of the country. This money, in turn, would be used to finance the conservation of forests, watersheds and river basins that contribute to the maintenance of the local water cycle. One of the most innovative proposals for the capitalisation of environmental funds also came from Ecuador, where the government was at one time considering using the money raised by the privatisation of state-owned companies to finance an environmental fund. User fees and other such mechanisms for raising local financing are the most logical, and perhaps even the most sustainable, sources of funds for environmental funds worldwide.

The National Government

Most local governments tend to contribute in some way to the establishment of EFs in their country. In Mexico, for instance, the government has made a one-time donation of US$10 million to the Mexican Nature Conservation Fund. This has, in turn, been used to leverage US$ 20 million from USAID and US$ 16.5 million from the GEF. Finally, some funds have also received in-country bequests or grants from individuals or corporations.

Sustainable and Diverse Sources of Finance

While some Environmental Funds have a reliable, single funding source, many others have found reliance on single donors to be a significant constraint on their options. They are hostages to delays, fluctuations in donor support, as well as donor funding priorities. The success of many environmental funds derives from the efforts to diversify their funding base and focus on sustainability. In many instances, sustainability requires a stronger focus on harnessing in country resources such as user-fees, taxes and levies, and other in-country donations. Possibilities include pollution fines; higher entry fees for environment dependent recreational activities; and environmental fees on mining, petroleum, hydroelectric power shipping, fishing, forestry in terms of charging timber companies a percentage of their revenues to pay for the conservation of natural forests or tourism. Domestic fundraising often requires making the appropriate contacts with the private sector in the countries and creating partnerships with government agencies such as the Ministries of Finance. User fees can serve as useful model because they have proven successful in generating revenue even at a time of severe budgetary constraints and declining international aid. Since tourism is now the world's largest industry, charging tourists even a moderate conservation fee has the potential to generate large sums for the management of protected areas. However, some governments may be concerned about the implications of using the proceeds of a tax to finance an off-budget fund not under their direct control. Again, this requires sensitive negotiations with the relevant government officials.

Local Philanthropy

As the economies of many countries begin to develop, wealthy individuals and profitable companies may soon turn to private philanthropy. While environmental funds should be careful to avoid competition with their beneficiaries, in-country sources of funds will probably become increasingly important in places such as Brazil, Argentina, Mexico and some Asian countries. One additional benefit of environmental funds in this regard is that they can serve as a means of building the capacities of a "cadre of money managers and grant-makers" that will become increasingly useful as wealthy individuals in the countries begin to establish their own philanthropic foundations.

Conclusion

It could be seen clearly from the above discussion that the role of economic instruments in biodiversity conservation is very essential. Hence the planners and policy makers should make use of economic instruments in biodiversity conservation. The government should properly make use of demand side economic instruments such as ecotourism, markets for recreation, eco-labeling and certification, user fees, markets for carbon sequestration, markets for watershed services and compensation programs for opportunity cost and damages in its fiscal and financial planning. Moreover the government should make use of supply side economic instruments such as biodiversity offsets and mitigation, conservation banking, conservation easements, covenants and deed restrictions, stewardship exchange agreements, mitigation banking, transferable development rights, ax cuts, insurance, cost-share incentives, conservation stewardship incentives, land and water rental leases, conservation contracts
property and estate tax incentives, capital gains tax and debt conversion mechanisms in its fiscal and financial planning. In general the physical control of bio diversity conservation has been adopted by the government. The application of economic instruments in biodiversity conservation is urgent need of the hour. Hence the government should give top most priority towards economic instruments in allocation of resources for bio diversity conservation.

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