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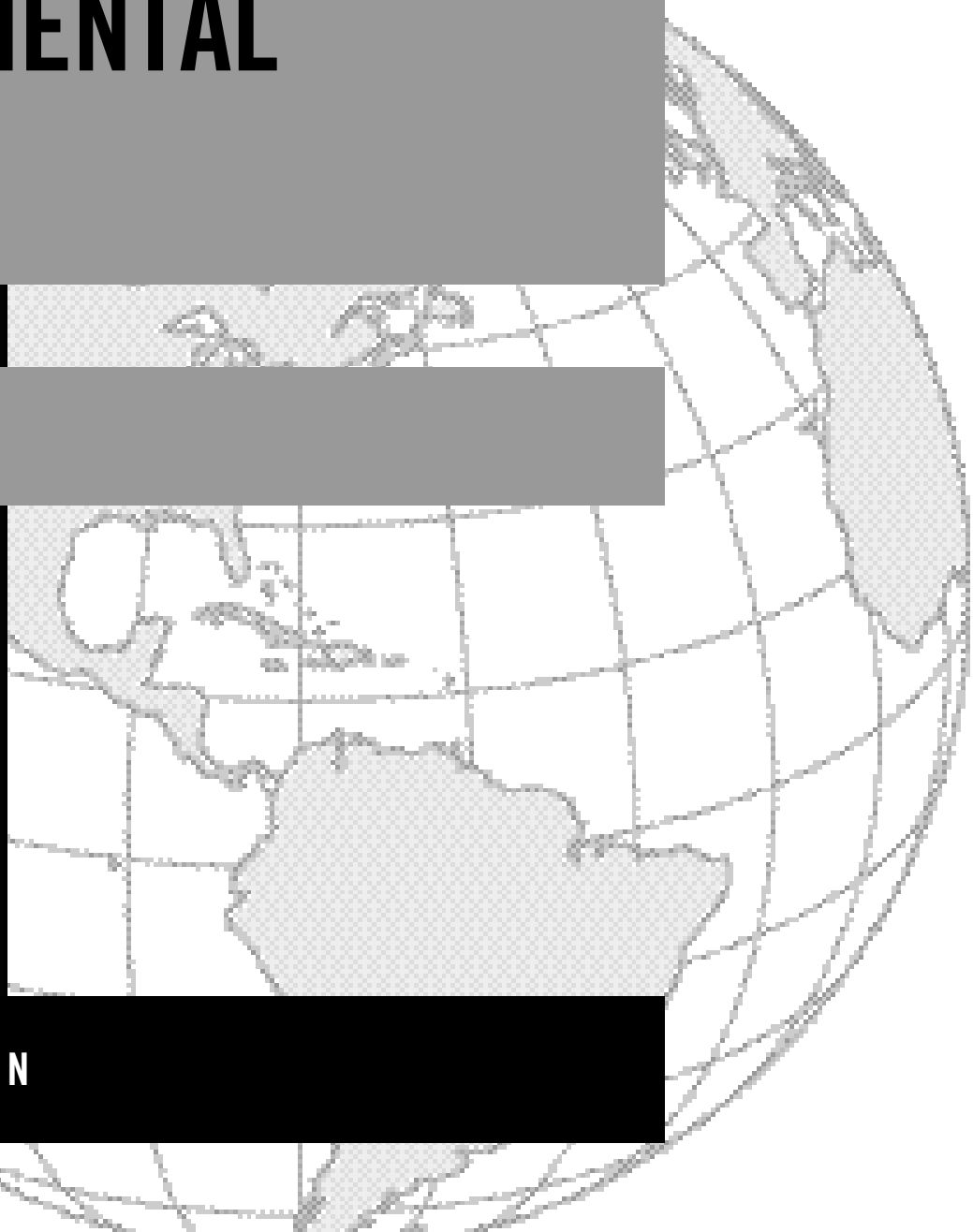
POLICY BRIEF

INNOVATING ENVIRONMENTAL FINANCE



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BY RICARDO BAYON

INNOVATING ENVIRONMENTAL FINANCE

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By Ricardo Bayon

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A FINANCIAL TOOLBOX

There are at least three types of financial tools, or more aptly put, finance and policy tools, that will permit the protection and development of environmental goods and services. They are:

1) those that help protect environmental areas as providers of "public goods or services;"

2) those that help protect environmental resources as providers of "private goods or services" (as businesses); and,

3) those aimed at correcting the incentive structure to encourage the conservation of biosystem resources.

The chart below provides a list of financial tools that might fall into each of these categories. In addition, there is a special sub-category related to creating markets for ecosystem services such as water filtration, carbon sequestration and so on. This sub-category is separated from the other three because many of these goods and services are currently treated as public goods, though with the proper mix of incentives and government regulation, they could become markets of their own.

Financing the Protection of World Heritage Sites		
As Public Good	**Changing Incentives**	**As Business**
• Taxation • Grants and Subsidies • Loans from MDBs • Debt-related Instruments • Loans from Capital Markets • Philanthropy	• Tax incentives • Removing damaging subsidies • Environmental Fines • Tradable Permits / Development Rights / Extraction quotas • Performance Bonds • Deposit-refund schemes	• Credits and loans to "Green Businesses" (Export Credit). • Venture Capital (equity) for "Green Businesses" • Investment Guarantees for "Green Businesses" • Resource Extraction Rents and/or Severance Fees • Entry fees / concessions • Securitization
New Markets: • Ecosystem services (e.g. carbon sequestration, water filtration, storm protection)		

FINANCING ENVIRONMENTAL GOODS AND SERVICES AS A PUBLIC GOOD

Tax Revenues

Public goods such as roads, law enforcement and clean air, are generally financed through tax revenues. Such revenues are the oldest, largest, and most traditional source of funding for environmental or conservation sites. When a government allocates money to its National Parks Service or Ministry of the Environment and this entity in turn channels that money to an environmental purpose, it is the taxpayer who is financing the site's conservation.

Money from taxes, however, is anything but secured. It depends on the whims of those in charge of the political system and is usually decided upon in country capitals, far away from most environmental or conservation sites. Additionally, natural resource protection is not generally an issue with strong political allies. For this reason, conservation sites are often low on the priority list and at risk of having their budgets cut when there is a need for fiscal austerity.

Multilaterals

A less direct mechanism for financing environmental sites or services involves channeling funds through multilateral organizations. For instance, when the world's governments put money into the Global Environmental Facility (GEF), they are routing tax money to a multilateral institution that can channel the resources to projects or agencies that help protect environmental resources. Multilateral money can take the form of grants or even low-interest or concessionary loans.

The GEF is perhaps the most obvious example. The GEF was established in the early 1990s as an experimental facility for financing work in biodiversity, climate change, international waters, and ozone depletion. Following the Rio Earth Summit, it was restructured to serve as the main financing facility for the Convention on Biological Diversity and the Framework Convention on Climate Change. Recently, it has also undertaken to finance some projects called for in the Convention to Combat Desertification. Between 1991 and 1999, the GEF had allocated more than $991 million in grants for biodiversity, $884 million for climate change, $360 million for international waters, and $155 million for ozone depletion. In terms of World Heritage sites, GEF projects have helped finance the conservation of sites such as Galapagos and the Barrier Reef Complex in Belize. The Box below describes the GEF's program in Belize.

Box 2.1

GEF Project: "Conservation and Sustainable Use of Barrier Reef Complex"

In 1998 the GEF council approved a grant of $5.355 million to finance the implementation of a Coastal Zone Management Act in Belize. This project follows on from a previous project funded during the GEF's pilot phase to conserve coastal and marine resources in Belize. The project will be completed in 2003 and it is expected that the project will be co-financed by government and private sector donors to the tune of $2 million. Total project costs are estimated at $7.37 million. The Barrier Reef complex in Belize is the longest such reef in the Western Hemisphere and five of the marine protected areas targeted through this program are World Heritage sites.

Source: GEF Project Status report, 1998.

In terms of loans from multilaterals, the governments of Colombia and Brazil have taken out loans from the Inter-American Development Bank (IDB) to help finance environmental funds (see information on environmental funds below and example of FNMA in box below) aimed at natural resource conservation.

Debt-related Mechanisms

Recent developments permit other, more creative mechanisms for channeling tax money to protected areas. A prime example is the conversion of a country's national debt into money for conservation. This mechanism, sometimes referred to as a "debt-for-nature swap," can take one of two forms:

- **Debt conversion:** In a debt conversion (or swap), a third party (often an environmental NGO) buys a country's debt at a discount from a creditor on the secondary markets. The creditor is willing to sell because it does not think the developing country will repay the debt. (Some debts are sold for as little as ten cents on the dollar so that $1 million of debt can be bought for $100,000). After buying the debt, the third party sells it to the debtor government (also at a discount, though not as great as it obtained from the creditor) for local currency to be used for conservation. As an example, let's say that a conservation organization buys $1 million of Peruvian debt from a creditor for $300,000. It then sells the debt to the Peruvian government for $500,000 in local currency, which the organization uses to finance conservation activities in Peru. In this way, the government pays $500,000 in local currency for a debt worth $1 million (at the same time that it encourages conservation in the country), and the conservation organization pays $300,000 for $500,000 worth of conservation activities. The creditor gets $300,000 for a debt it didn't think was ever going to be paid back. When done correctly, these transactions can be real "win-win" situations. This sort of third-party debt conversion is usually used to convert a country's private, commercial debt (the debt it owes to private creditors such as banks).
- **Debt forgiveness or debt buy-back:** In a debt forgiveness, the creditor of a country's national debt (usually another government) agrees to forgive the debt in return for conservation activities in the creditor country. Often, this takes the form of a buy-back, where the debtor government agrees to purchase its debt for a fraction of its face value in local currency and to invest that local currency in conservation activities in its own country. As a general rule, debt forgiveness transactions are done for a country's bi-lateral debt.

In both these cases, the money to finance the debt conversion comes from the debtor country's tax revenues, so debt conversions are really only fancy ways of leveraging tax money for conservation.

Over the past 10 years there have been more than 100 debt-for-environment transactions worldwide, generating more than $1 billion in finance for conservation (some used to finance parks and protected areas) and reducing the debt of developing countries by more than $7 billion (see list of debt-for-environment transactions in Annex 1). However, this trend has recently slowed since most private commercial debt is no longer being sold at a discount in secondary markets.

Borrowing on Future Taxes

In addition to negotiating debt-for-environment swaps, some countries (notably the U.S.) have experimented with borrowing on future tax revenues to finance conservation. One way this can be done is by issuing state or municipal bonds at low rates of interest to pay for conservation activities. Ultimately, these loans are paid back using tax revenues that are collected at some future date, or via alternative sources of tax revenue (license plate

taxes, taxes on cigarettes, etc.), so this too is just a way of earmarking future tax revenues for conservation. As a concrete example of this tool, The Nature Conservancy (TNC) has worked with several state governments in the U.S. to issue bonds that have raised more than $14 billion for the conservation of open lands. Examples of states in which these bonds were issued include California, Florida, New Jersey, and New York.

Using a similar principle, some developing countries (notably Brazil and Colombia) have borrowed money from multilateral development banks (the IDB in the cases below) for conservation, projecting to pay back the loans from future tax revenues or via environmental fines. The box below (taken from Bayon, Lovink and Veening, forthcoming) provides detailed information on how Brazil has borrowed on future tax revenues to finance conservation.

Box 2.2

Brazil: National Environmental Fund (FNMA)

The Brazilian National Environment Fund (FNMA) was established by Brazilian law in 1989 to develop projects promoting the rational and sustainable use of natural resources, improving the quality of the environment, and raising the overall quality of life for the population of Brazil. The Law establishing the FNMA specified seven priority areas for projects: conservation of land, research and technology development, environmental education, forestry extension, institutional strengthening, environmental control, and rational use of flora and fauna.

In 1992, FNMA was supported by an IDB loan of $22 million in local currency at concessionary rates. A second loan was approved in 1998 to provide an additional $24 million to the FNMA, at similar concessionary rates. This makes the FNMA one of the few environmental funds that is capitalized via a multilateral development bank loan taken out by a government. The rationale behind this is that by strengthening civil society, the FNMA will help "create a demand" for environmental goods and help provide some of the public goods (e.g. clean air, clean water, access to open spaces) that markets tend to undersupply. It is expected that the loan from the Bank will be paid back by: (i) using future tax revenues, (ii) leveraging external grants (such as from the GEF, etc.), as well as (iii) through the collection of environmental fines and penalties. By late 1997, FNMA had financed over 500 small environmental projects.

The FNMA is housed in the Brazilian Ministry of the Environment (Ministerio do Meio Ambiente, Recursos Hidricos, e da Amazonia Legal) and controlled by a board of 14. In 1997, nine were from government and five were from civil society. The Board meets several times a year to decide on administrative and operational procedures and to select projects for final approval.

In a recently passed Environmental Crimes Law for Brazil, the FNMA is mentioned as one of the main recipients of the proceeds collected via the environmental fines proposed by this new law. This could ensure a substantial contribution to the capital of the fund.

Source: Adapted from *IDB 1997.*

Private Philanthropy

In addition to taxes, the other source of money available to finance the protection of "public goods" is private philanthropy. In the U.S., Europe, and a number of other countries there is a long history of channeling money from philanthropy to the protection of natural areas. This money comes from individuals, organizations, or families who feel strongly about conservation and who are willing to donate money to ensure the protection of certain areas.

One example of the use of philanthropy to support the conservation of protected areas comes from the U.S., where the National Park Service has created a semi-autonomous National Parks Foundation whose role is to stimulate philanthropy and finance for the protection of parks. This Foundation has been instrumental in the creation of "Friends of the National Park" societies around the country who voluntarily help raise money for the protection of specific areas. The Foundation has been successful at raising money for conservation in part because it maintains a Board of prominent, and often wealthy, individuals who help make contacts and raise funds.

Like most areas of human endeavor, the process of philanthropy and fundraising is being thoroughly revised by the advent of the Internet. Recent years have seen the development of web sites involved in "click-through" or Internet philanthropy. These sites channel "internet surfers" to retailers in return for a percentage of the sales they help generate. Internet users are willing to go through these sites because (i) it doesn't cost them anything, and (ii) they are interested in helping out a particular cause. Three such outfits are GreaterGood.com, 4Charity.com, and iGive.com. All of these involve surfers going to a specially-designed web site, choosing their favorite philanthropic institution (whether it is the National Wildlife Federation, The Nature Conservancy, or the Red Cross) and then going through that site to shop at Amazon.com or any one of a long list of participating retailers. In return for this business, the retailers pay a percentage of the profits from each sale to the selected charity/philanthropy.

In 1999 the research agency of Craver, Matthews, Smith and Company issued a report detailing the prospects for online philanthropy and concluded that the potential was vast and mostly untapped. In addition, they found that the Internet could bring a whole new generation of users and donors to the traditional non-profit groups. Some of these findings have already been borne out. iGive.com, for instance, has apparently written checks totaling nearly $750,000 to more than 10,000 charities since going online in late 1997. And in 2000, a group called VentureFrogs pledged to donate up to $1 million to the American Red Cross ($1 for every unique visitor to their web-site). So far, they have collected more than $770,000 for the American Red Cross.

One of the first to use this form of "click-through" philanthropy was the World Hunger Program of the UN Food and Agriculture Organization. Several years ago FAO started a World Hunger site backed by a donor willing to give a small amount of money for every person clicking on the site. This site raised several million dollars for the World Food Program's activities and has since been integrated into the web site of GreaterGood.com.

FINANCING WORLD HERITAGE AS A PRIVATE GOOD

In addition to taxes, philanthropy, and other such "public" sources of finance, there are a number of potential "private" sources of finance for environmental conservation. These include sources that provide money to businesses that help protect an environmental site,

sources that take a percentage of the profits made by companies that rely on environmental sites or resources for their business (e.g. tourism operators), or sources that raise money by charging for the use of the environmental resources.

In terms of finance for businesses that protect conservation sites, money can be channeled using a variety of traditional business finance mechanisms such as loans, equity investments, investment guarantees, and export credits. Some of these are discussed below.

Equity Investments in "Green Businesses" (Environmental Venture Capital)

Perhaps the best examples of a mechanism for channeling money to "green businesses" are the recent experiences with the use of venture capital tools to support environmental enterprises. The last five years have seen the creation of several "Environmental Equity Investment Funds," such as:

- **Terra Capital Fund:** Established by the International Finance Corporation (IFC) of the World Bank, the GEF, Banco Axial (Brazil), and an outfit called the Environmental Enterprises Assistance Fund (EEAF), the aim of the Terra Capital Fund is to help finance businesses in Latin America that are profitable and help protect biological diversity (see box below).
- **Eco-Enterprises Fund:** Established by The Nature Conservancy (TNC) and the Inter-American Development Bank (IDB), the Eco-Enterprises fund will finance businesses in Latin America set up by non-profit organizations working together with private companies and whose work is somehow related to environmental protection;
- **IFC Solar Energy Fund:** Financed, in part, by the IFC, this fund seeks to provide venture capital to businesses that promote the use of solar energy.

All of these are capitalized using money provided by multilateral development banks such as the IFC or the IDB, but they also include investments from private venture capitalists. Similar funds have been established or are being planned in Africa and Asia.

Box 2.3

The Terra Capital Fund

In late 1998, a consortium made up of the Environmental Enterprises Assistance Fund (EEAF), a Brazilian bank (Banco Axial) and Sustainable Development Inc. (SDI), working with the World Bank's International Finance Corporation (IFC), announced that they had secured the capital necessary to establish a private, for-profit, environmental venture capital fund for Latin America called the "Terra Capital Fund." The fund obtained money from a variety of sources, private and multilateral (including the IDB, the Swiss government and private investors), in order to invest in small, private businesses that meet a set of environmental criteria. In addition to money for its capitalization, Terra Capital received grant money from the GEF ($5 million) to:

- establish the technical and managerial capacity needed to operate such a fund,
- monitor and evaluate the environmental impact of investments, and
- cover any additional costs that will be incurred by the fund when screening projects for their biodiversity/environmental value.

Initially capitalized at $15 million, the fund will make investments of between $500,000 and $3 million (with an average investment of $2 million) in projects related to sustainable forestry, agriculture, ecotourism, and other biodiversity-based businesses.

Source: Adapted from *Bayon, Lovink, and Veening, Forthcoming.*

Box 2.4

The Eco-Enterprises Fund

Also in 1998, The Nature Conservancy (TNC) and the Multilateral Investment Fund (MIF) of the InterAmerican Development Bank (IDB) created an environmental venture capital fund known as the EcoEnterprises Fund (or Fondo EcoEmpresas). When fully capitalized, the fund will be a $10 million dollar operation designed to provide venture capital and technical support to environmentally responsible business projects in Latin America and the Caribbean. In its own words, the fund will help "spur the growth of small and medium-sized companies, which is key to the economic future of Latin America and the Caribbean, and promote the conservation of one of Earth's most biologically important regions."

In addition, the EcoEnterprises Fund aims to foster the development of socially and environmentally responsible enterprises, generate revenue for biodiversity conservation, and enhance the long-term sustainability of non-profit environmental organizations in Latin American and the Caribbean.

Target sectors include alternative agriculture (including organic agriculture, apiculture and aquaculture), sustainable forestry, non-timber forest products, and nature tourism.

The fund has two components: a $6.5 million venture fund to invest in enterprises at all stages of development and a $3.5 million technical assistance fund to provide business advisory services to help new ventures succeed. TNC serves as Fund Manager. Over a 10-year period, the fund will provide between $50,000 and $800,000 (with an average of $150,000) to as many as 25 ventures. Revenues generated by the ventures will contribute to the long-term financial sustainability of the participating environmental organizations, demonstrating ways to integrate economic growth and environmental protection.

A key difference between the Terra Capital Fund and the Eco-Enterprises Fund is that the latter requires the ventures it finances to be a collaboration between private enterprises and non-profit organizations. This criteria was included to help build capacity within the NGO community in Latin America.

Source: Adapted from *Bayon, Lovink, and Veening, Forthcoming.*

Loans to "Green Businesses"

In addition to equity investments in green businesses, it is also possible to stimulate the creation of these businesses by providing them with concessionary or low interest loans. The best example of the use of this mechanism is the Small and Medium Enterprise (SME) program of the IFC and the GEF. The idea behind this program is that it makes loans to intermediary organizations (around $1 million at low rates of interest), who then

on-lend to small and medium enterprises that help protect the environment (in smaller amounts and at higher rates of interest). So far, organizations like the World Wildlife Fund (WWF)-U.S. and Conservation International (CI) have participated in the program as intermediaries, but the success of the program has been mixed. Recently, some of the intermediaries have said that they have found it exceedingly difficult to channel funds to "bankable" businesses that also help protect the environment. At least one intermediary, WWF, has indicated that it might actually return unspent money to the IFC because of difficulties in finding suitable investments.

Export Credit and Investment Guarantees

Other mechanisms that might help stimulate "environmental businesses" include investment guarantees and export credit. The principle behind these mechanisms is simple: since many private investors shy away from investment in green businesses because they are perceived as being "excessively risky," why not set up a mechanism that will help diminish these risks and thereby encourage "environmental" investment? Some of the mechanisms that have traditionally been used to provide this form of incentive to investment include export credits and investment guarantees. In the U.S., Europe, Japan, and at the global level, these kinds of investment guarantees and export promotion tools have been used by organizations such as the Export-Import Bank of the U.S. (Ex-Im), the Overseas Private Investment Corporation of the U.S. (OPIC), the Japanese Export-Import Bank (Jexim), and the Multilateral Investment Guarantee Agency (MIGA) of the World Bank. Guarantees generally come in two forms:

- Guarantees against commercial risk that cover businesses against risks such as non-fulfillment of contracts, non-payment of loans, fluctuations in the exchange rate, among other things; and
- Guarantees against political risks, which cover businesses against events like wars, civil disturbances, inconvertibility of currency, and the expropriation of goods.

An example of the use of investment insurance to finance a project with environmental components is found in the box below.

Box 2.5

MIGA and the Rainforest Tram

An example of the use of guarantee instruments to encourage environmental activities is the case of two guarantees provided by the Multilateral Investment Guarantee Agency (MIGA) of the World Bank. In 1995, MIGA supported the construction and operation of 1.3 km. aerial tram, a restaurant, and a visitor research center located on a 338 hectares site of rainforest bordering Braulio Carrillo National Park in Costa Rica (50 km. north of San José). MIGA issued guarantee contracts covering foreign investment in Dosel S.A., a special purpose company set up to run the Rain Forest Aerial Tram (RFAT). One contract guarantees the equity invested by Conservation Tourism, Ltd., of the United States against currency transfer risk; the other guarantee contract covers the Bank of Nova Scotia's (Canada) non-shareholder loan to Dosel against Transfer Restriction, Expropriation, War, and Civil Disturbance. The idea behind the Rainforest Tram is that it will help educate visitors about the importance of the rainforest, as well as serve as an example of how Costa Rica can make the best use of its rainforests in a non-destructive

way. Finally, the company concerned, Dosel, hopes to work closely with the Costa Rican government to reduce illegal hunting activities in the area.

Source: Adapted from *Bayon, Lovink, and Veening, forthcoming*

Another interesting possible use of guarantees as a way of stimulating conservation has been proposed by the U.S.-EPA (1997), which recommended the establishment of guarantee mechanisms that enhance the availability of credit for environmental activities to municipalities in the U.S. Generally, the guarantees discussed by the EPA are used to finance environmental infrastructure (i.e. wastewater treatment plants and solid waste facilities) and not to support activities directly related to biodiversity conservation, but there is no reason why these mechanisms could not be applied to biodiversity-based businesses. The EPA refers to these guarantees as "tools for enhancing credit" and defines them as "assurances to lenders or bondholders that credit is available and that they will be repaid if the debtor government or private party should default or delay payment." What is interesting in the EPA's approach to guarantees is that they are used to help environmental projects obtain money through capital markets via the issuance of bonds (Bayon, Lovink, and Veening, forthcoming).

Although guarantees can serve as promising tools for stimulating biodiversity-based businesses, it is important to note that they can also carry considerable financial risk. An institution providing guarantees needs to ensure that it has enough capital to cover the guarantee should it be called upon to do so. Existing investment guarantee agencies have considerable expertise in this regard, (in fact, OPIC has found that if done correctly, providing investment guarantees can be an extremely profitable business), so this is an obstacle that can be surmounted.

Problems with "Green Business Finance"

Although there has been much recent interest in channeling money to businesses that somehow help protect the environment, certain problems with this approach require careful consideration. They include:

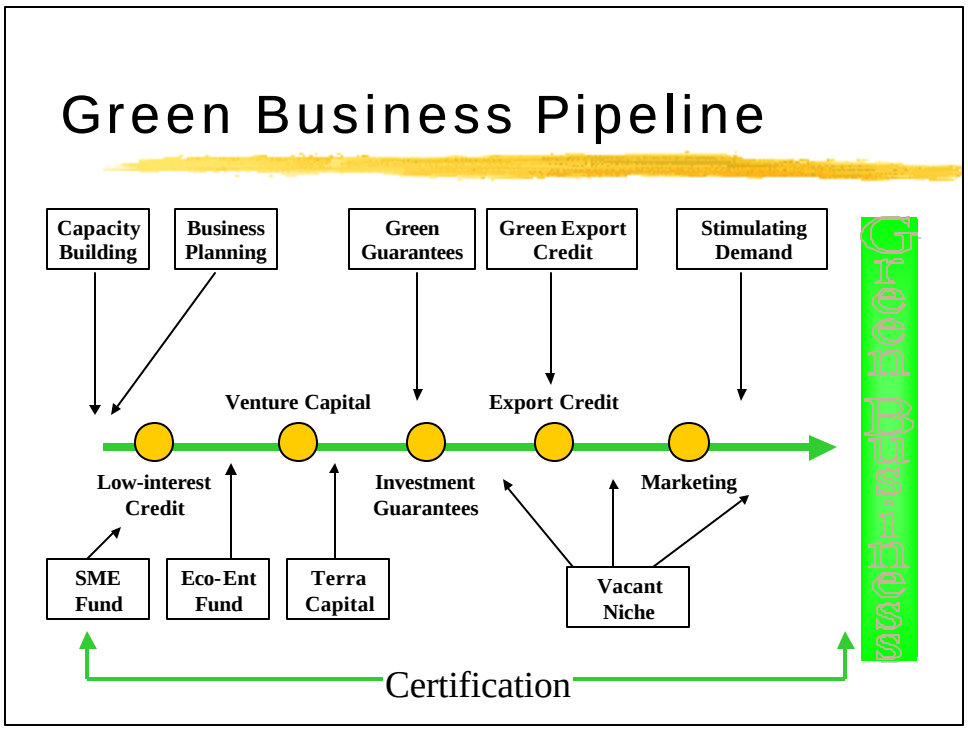
- The difficulty of determining whether the businesses concerned really do have a positive impact on the environment. Part of the problem is that not enough work has been done in monitoring the long-term impacts of these businesses on the resources they are intended to help conserve or on the communities in which they are created. To be fair, many of these businesses have not been in operation very long, but nevertheless, monitoring of "environmental businesses" would be a useful area for further research and investment.
- The difficulty of finding enough businesses that meet both the environmental and financial criteria of the funds set up to finance "green businesses." Until a broader and deeper pipeline of green businesses is developed, many of these programs will have trouble finding willing customers and investors. And, in order to build that pipeline, there is a need for training of environmental entrepreneurs, the provision of micro-credit to these businesses, and further development of the markets in which these businesses operate (e.g. eco-tourism or organic agriculture);

While protecting the environment can mean reducing pollution or decreasing the use of fertilizers and pesticides (which can be clearly demonstrated), having a positive impact

on conservation sites is a much more nebulous concept. Has it really led to decreased pressure on the site? And how can this decrease be demonstrated?

These are but a few of the hard questions that "green businesses" will need to answer before support for green businesses becomes a major form of finance for environmental conservation. This does not mean that investment should not be made in businesses that **may** have beneficial effects on such sites, but rather that it is important to have a clearer idea of what those impacts might be, and how they will be measured/demonstrated before any such investments are made.

Finally, when making investments in businesses that are expected to help protect the environment, it is important to bear in mind the entire business pipeline, and not focus too closely on one part of the business life-cycle. The "green business" life-cycle illustrated in the diagram below goes from the development of a particular market, and the development of a business idea, through the preparation of a business plan, to obtaining the first, small, low-interest loans that permit a business to develop, to obtaining the necessary equity investments that will allow a business to grow (including the provision of investment guarantees), and finally to a stage that involves export credit, marketing support, and efforts to stimulate demand for the business' products and services. At present, there is much interest in the middle part of this life-cycle (equity investment and small loans) and not enough being done on either end of the process (training of entrepreneurs, development of business plans, and marketing support/export credit). If green businesses are to succeed, however, all aspects of this life-cycle need to be adequately considered.



Resource Extraction Levies / Rents / Fees

There has been some experience around the world in the use of so called "resource extraction rents or severance fees" to finance conservation. Resource extraction levies (sometimes referred to as severance fees or resource extraction rents) involve charging the developer of resource extraction projects (mining companies or companies involved in oil exploration and development) a fee or royalty for the privilege of using a country's non-renewable resources (which, in this model, are seen as public property).

In the U.S., an example of this tool is the Land and Water Conservation Fund (LWCF), which was set up in 1964 to help fund the conservation of natural resources in the U.S. (Schmidt, 1999). Originally, the money in the LWCF came from the sale of federally-owned real estate, motorboat fuel taxes, and recreational fees. However, in 1968, concerned that the fund was not obtaining sufficient funds, the U.S. Congress mandated that the LWCF receive a portion of the money paid to the government for exploitation of the oil and minerals on the Outer Continental Shelf. Since then, the LWCF has raised more than $22 billion for conservation (more than $20 billion of which has come from the fee for exploitation of the Outer Continental Shelf). It has used this money to expand the system of protected areas in the U.S. (buying more than 3.4 million acres of new land), and to help support the conservation activities of the states. It is interesting to note, however, that of the $22 billion raised by the LWCF, only a little over $10 billion has actually been channeled to conservation activities. The rest has been appropriated by the U.S. Congress for other uses.

Similar initiatives designed to channel money from resource extraction activities to conservation have also been undertaken in various U.S. states, including New Mexico, Michigan, and Montana, among others. For more information on some of these, see box below.

Box 2.6

Reinvesting Resource Rent in Michigan, Montana, and New Mexico

In 1984, voters in Michigan approved a constitutional amendment requiring that royalties from oil, gas, and other mineral leasing on state land be directed to a state-wide conservation and recreation trust fund. In fiscal year 1996 alone, this mechanism generated over $35.5 million in oil and gas royalties. The original legislation creating the fund called for a third of the money collected to be earmarked for annual program costs such as administration and grants for land acquisition. The other two-thirds were to be invested into the Michigan Natural Resources Trust Fund which is overseen by a five-member board and allocates money to projects on a competitive basis based on nominations put forward by the state's natural resource agency, local governments, citizens, and conservation organizations. Each year the trust fund must spend no less than 25 percent of its expenditures on land acquisition, and no more than 25 percent on developing public recreational facilities. In 1994, following another constitutional referendum, voters in the state agreed to increase the cap on money received from interest on the trust fund from $200 million to $400 million and to create a State Park Endowment Fund which receives up to $10 million annually from the oil and gas royalties, and invests it in strengthening the state's system of state parks. Over the years, the Michigan trust fund has provided more than $300 million for over 900 natural and

recreational areas.

In Montana, the state voted in 1976 to require that at least 50 percent of the state's coal severance tax revenues be deposited in a trust fund whose broad mandate is to provide for the long-term well-being of the people of Montana. Included in this, the state law established that 1.27 percent of severance tax collections be channeled to a trust fund to help finance the acquisition and management of state parks. Some of the wording in the law is interesting. It states that "coal is a limited, non-renewable resource, and for this reason a portion of our coal revenue is set aside in trust for the day when future generations of Montanans will no longer have these abundant resources at their disposal."

In the case of New Mexico, the state regularly allocates a portion of its severance taxes on oil, gas, and coal to conservation. In 1988, the state garnered more than $283 million in severance taxes. Of this, it designated $500,000 to conservation. In 1992, with receipts of over $229 million, the state allocated $200,000 to conservation. However, in the New Mexican case, the money to be allocated to conservation is decided each year, rather than being codified in the state's legislation. As a result, it is subject to the caprice of politics.

Source: Schmidt, 1999

Internationally, the use of severance fees, or natural resource rents is also taking place. Recent cases include:

- an agreement on the part of a company building a gas pipeline in Bolivia to put a specified amount of money in a trust fund to help conserve the country's natural resources; and
- the case of the highly controversial Chad-Cameroon pipeline (which is projected to pass near the Dja Faunal reserve, a World Heritage site in Cameroon), where the companies concerned agreed to put several million dollars into a trust fund to finance conservation and development in the two African countries concerned. The mechanism for operation of this trust fund has yet to be established.

With the precipitous increase in mining and oil exploration throughout Asia, Africa, and Latin America, it seems likely that resource extraction fees / levies / rents could raise millions, perhaps even billions, of dollars for conservation. It might be worthwhile to follow the example of the LWCF in the U.S., and use fees imposed on industries that benefit from the Global Commons (the high seas, Antarctica) to finance the conservation of the world's natural and cultural heritage.

Entry Fees / User Fees / Concessions

In addition to funding green businesses or imposing fees on resource extraction, the simplest way to obtain money from the "private goods and services" provided by environmental sites and services is to charge directly for their use. Charging for the use of sites usually takes the form of park entry fees, concession fees, or excursion fees.

Two good examples of this come from Nepal, where the Sagarmatha National Park has set up a system whereby 30 percent of the money collected by the park from mountaineering expeditions to Everest is re-invested into the protection of the park. Since the mountaineering fees can be substantial (it costs about $50,000 per expedition, with a

total of about 5 expeditions per year) this system has helped generate some $40-50,000 per year for activities to conserve the park. The second Nepalese example is from the Annapurna Conservation Area. Unlike most parks in Nepal, the Annapurna Conservation Area has obtained agreement from the government (by means of a special law to this effect) that the money collected from entry fees to the Conservation Area be channeled directly to the conservation of the area via a local NGO, the King Mahendra Conservation Trust. Every visitor to Annapurna Conservation Area pays an entry fee of $12 which, in 1996, generated some $400,000 for the conservation of the Annapurna, more than enough to cover the costs of maintaining the site. As a result of experiences in Sagarmatha and Annapurna, the Nepalese government is re-evaluating how it uses the entry fees collected at other parks (Mountain Institute, 1997).

Box 2.7

Entry Fees and Donations in the Galapagos

The Galapagos Islands in Ecuador are one of the most visited and recognized World Heritage sites in the world. Because of the islands' popularity as a tourist destination, the Galapagos National Park finds it relatively easy to finance a large part of its operations by charging a high entry fee and obtaining donations from visitors to the islands. The Galapagos Islands attract around 200,000 foreign tourists per year, each of whom pays a $100 park entry fee, thereby generating about $20 million per year. In addition, tourists spend around $700 to fly to the Galapagos from mainland Ecuador, and a minimum of $1,000 for a typical 5-day boat trip to visit the islands. There are very few hotels on the islands where tourists can stay, so most are forced to stay on a cruise ship or rent out sailboats, yachts, etc.

Many of the high-profile parks such as Galapagos (and several wildlife parks in Botswana, Kenya, etc.) have found that, in addition to paying high entry fees, many international tourists are willing to donate large sums of money to trust funds or other mechanisms designed to protect the park. In the case of Galapagos, each of the two main tour boat operators now **guarantees** a minimum of $100,000 in tourist donations per year from their passengers to support Galapagos conservation projects. If the tourists do not make the donations themselves, the tour companies pay the difference.

However, as Spergel (2000) and others have remarked "unless higher fees are channeled back into conserving the protected areas, visitor numbers will decline. Revenues collected from entry fees should be earmarked to support protected areas and biodiversity conservation." He goes on to explain how, in the Galapagos, the law which raised park entry fees also required that all revenue from this fee be used to pay for costs associated with operating the park. In fact, the law is very specific on the use of the funds, according to Spergel (2000): "it requires that 40 percent of the revenues collected from entry fees must be used to pay for salaries and other direct expenses of operating the park; 30 percent must go to local government authorities for construction of sewage treatment facilities; 10 percent must go to a Galapagos scientific research institute; 5 percent to the port authority for operating an inspection and quarantine system; 5 percent to the armed forces for patrolling the park; 5 percent for establishing a new Galapagos marine reserve; and 5 percent to the national parks agency for expenses of managing the national park system as a whole."

Source: Spergel, 2000

Securitization

Finally, it is possible to channel money to environmental conservation using "securitization." Securitization is one of the newest, and perhaps most interesting, developments in world of international finance. Simply defined, securitization is the process of turning an asset, debt, obligation or aggregation of these, into a marketable security (a stock or a bond). In other words, the securitization of loans happens when creditors pool a series of loans and use the steady stream of interest payments on these loans to back the issue of a bond that can be traded in the capital markets. Securitization is what has happened with the mortgage market in the U.S., where most of the loans have been bundled and sold to the capital markets as instruments known as "Collateralized Mortgage Obligations" or CMOs.(a.k.a "mortgage-backed securities," "mortgage-backeds," "Ginnie Maes," "Fannie Maes," or "Freddie Macs" depending on the institutions that issue the securities). The rationale behind securitization is that it permits creditors to farm out their risk into the capital markets (and therefore get it off their books), at the same time that it allows the debtor to take advantage of the lower interest rates available from capital markets.

In terms of biodiversity conservation and the environment, securitization could be used in two very different ways:

1. Debt or equity belonging to a variety of biodiversity-based businesses could be aggregated and "securitized" as a way of spreading the risk and making investment in these companies more palatable to risk-averse investors (i.e. a mutual fund for biodiversity-based investments); and

2. There might be a way to "securitize" the revenues generated by the marketable goods and services provided by a national park thereby allowing the site to issue a stock or bond and borrow money at low-interest rates from the capital markets. Money borrowed in this way could be used further develop the site's income-generating potential.

The first of these "securitization," the aggregation of assets into one negotiable security, is a common transaction in financial markets. It is done regularly as a way of spreading risk, diversifying holdings, and encouraging investment in pools of companies (or debts) that would otherwise not appeal to investors. A variation of this is to strategically group high-risk and lower-risk investments and issue securities targeted at particular investors or risk-profiles, which is, in a sense, what happens through participation in mutual funds.

The second kind of securitization, where all possible revenue streams from a national park are turned into a marketable security, has no real precedent. It is therefore unclear how such as system might work, or even whether it will work at all. Nevertheless, in theory it is possible to "securitize" the revenues of a national park (entry fees together with whatever income the park is able to obtain from ecosystem services described below) and turn these into a bond sold to the global capital markets. This could have potentially important benefits:

- It could permit a national park to borrow money to strengthen its income-generating potential; and
- It would create a new group of "stakeholders" (the bondholders) interested in ensuring the success of the national park.

Changing the Incentive Structure / Correcting Distortions

As long as our economic system continues to consider the goods and services provided by nature as "externalities" that cannot, and will not, be accounted for, there will continue to be a bias against sustainable development. That is why we need to look at how to provide the necessary incentives and disincentives that will allow conservation, as well as eliminate distortions to the economic system that make conservation increasingly difficult. Such reform seeks not only to improve the efficiency of the market, but also to ensure that it is sending the right economic signals to all actors (Panayotou, 1994a). This implies that if an activity is damaging to the environment, it should be discouraged (taxed) and not encouraged (subsidized), and vice-versa – activities that are supportive of the environment should be encouraged (subsidized) and not discouraged (taxed). At the same time, maintaining the right system of incentives and disincentives can generate (although perhaps "liberate" would be a better term) financial resources that can be used for biodiversity conservation.

This section will focus on several ways that the economic system can encourage the conservation of the world's natural and cultural heritage at the same time that it discourages its destruction.

Tax incentives

One of the most effective ways for a government to encourage conservation is to provide tax incentives for activities that achieve conservation while it imposes tax "disincentives" to activities that destroy the environment. Unfortunately, the current system of taxation is set up to tax certain things that are positive to society (work, income, and value added) rather than things that are negative to society (consumption, environmental degradation, resource depletion or pollution) (McNeely, 1997). To make matter worse, the system may in some cases even be subsidizing environmentally destructive practices (see section on subsidies below). Since this system serves to encourage consumption, resource depletion, pollution and environmental degradation (and discourage conservation, work, and investment), some have proposed reducing conventional taxes and replacing them with "environmental taxes" (taxes on consumption and pollution). They argue that, if done correctly, such a reform need not change the overall tax burden (that is, it would be revenue-neutral) and would further many of the goals of biodiversity conservation and sustainable development.

There are several cases where countries have managed to change their tax system in this way, while at the same time raising substantial revenue that can be channeled to conservation. If done properly, therefore, this kind of tax switch can produce a "double-benefit" for society. Panayotou (1994) argues that the most important benefit from this sort of reform is not so much the money it generates, but rather the changed incentive system it creates.

Some examples of environmental tax reform include:

- The introduction of taxes on carbon dioxide ($0.4 per kg), sulfur ($4.55 per kg), and nitrogen oxide ($6.05 per kg) emissions in Sweden. This system raised about $2 billion in revenue, reduced the consumption of transport fuels by 2 percent, and led to a shift in fuel-use (from coal to biofuels) by power stations (Panayotou, 1997).
- Various Latin American countries (Brazil, Colombia, and Venezuela) have instituted taxes on forestry which impose a higher burden on forestry activities that do not have adequate provisions for reforestation (Seroa da Motta, Ruitenbeek, and Huber, 1997).
- A tax of five cents per liter on gasoline in Costa Rica has been used increase reforestation, forest management, and protection.

The other side of tax reform is the provision of incentives (i.e. tax credits) to individuals and industries that protect the environment. Some examples of tax credits used in other contexts include:

- Tax-breaks for environmental investment in the Netherlands where the government passed a law making interest and dividends earned on money invested in officially-sanctioned environmental funds (called "Green Funds") tax exempt. To be eligible for this exemption, the "Green Fund" must be a part of an approved Dutch Financial Institution and must invest its money in "environmental projects" as defined by the government. In other words, it must invest at least 70 percent of overall capital in projects that have been approved by the Dutch government through the Ministry of Housing, Spatial Planning and Environment. Since its inception, this simple law has mobilized substantial funding for qualifying environmental projects. Between 1992-1997, this instrument mobilized a total of almost $1.4 billion for environmental projects.
- Similarly, in the U.S. the government provides various tax incentives for private landholders that engage in conservation on their lands. These range from income tax deductions, to reductions on property taxes, as well as inheritance taxes.
- Likewise, in Costa Rica, so-called "National Private Wildlife Refuges" are exempt from property taxes which encourages landholders to engage in conservation. A similar system exists in Brazil where areas designated by the government as "private reserves" are exempt from property taxes.
- An interesting variation on tax incentives comes from Costa Rica where the government has instituted a "transferable reforestation tax credit" (Panayatou, 1994). Landowners who keep their land under forest or plant native species of trees receive a tax credit. Since tax benefits tend to accrue largely on large land owners, the government has allowed these tax credits to be tradable so that small land owners can sell their credits to their wealthy counterparts with higher taxes to offset.
- Yet another variation on this mechanism comes from Germany (Panayatou, 1994) where land uses are classified in a number of categories ranging from the most environmentally beneficial (e.g. natural forest) to the most environmentally destructive (e.g. industrial site). Each change from a higher class of use to a lower class of use is taxed by the government and the greater the downgrading, the greater the charge.
- In Brazil, the government passed a law allowing property owners to declare their lands as "Private Reserves of Natural Patrimony" (*Reservas Particulares do Patrimônio Natural* - RPPN), in return for receiving certain benefits – especially

exemptions of the Rural Land Tax (*Imposto Territorial Rural* - ITR) – for all of the lands they declared as RPPNs. As a result, some 431,199,00 hectares of RPPNs are currently under protection in 23 States (IBAMA, 1999).

Environmental Fines

In addition to changing the tax structure, countries can discourage environmentally damaging activities by imposing stiff fines on those that undertake these activities. Most of the world's countries raise substantial amounts of revenue through the collection of fines on environmentally damaging activities.

In developing countries, according to Panayotou (1994a) and Lopez (1994), the bulk of the revenue for environmental investment in fact comes from fines imposed on violators of environmental laws. They further conclude that, in their current forms, these fines are still nowhere near meeting their potential as sources of revenue for conservation, nor do they yet have a marked impact on business' behavior vis-à-vis the environment. Some examples of the use of fines to discourage environmental damage, and to finance conservation include:

- Water pollution fines in Brazil and Colombia (Seroa da Motta, Ruibeek, and Huber, 1997).
- Using money collected through fines on environmentally destructive activities to finance a National Environmental Fund in Brazil (see box above). By ensuring that the revenue generated by pollution fines is used to finance projects that help conserve the environment, fines can have a "double benefit" for biodiversity conservation.

Subsidies

De Moor (1997) and Panayotou (1997) have estimated that there are anywhere from $500 billion to $1 trillion worth of "environmentally damaging and economically distortionary" subsidies worldwide. Of these, half are in developing countries and half in the developed world. The only difference between subsidies in developed and developing countries appears to be what sectors are subsidized. In the OECD countries, the majority of subsidies (approximately $330 billion) goes to agriculture and the next largest amount goes to road transport (between $85-200 billion). In developing countries, the most highly subsidized sectors are energy ($150-200 billion) and water ($42-47 billion).

Panayotou (1994, 1997) argues that "removing or phasing out costly subsidies that distort the economy and subsidize waste and environmental degradation is the single most cost-effective means of financing sustainable development." He argues that in removing these damaging distortions we contribute to sustainable development in at least four ways:

- By freeing up budgetary resources that can be spent on poverty alleviation, resource conservation and sustainable development;
- By removing distortions, improving efficiency and making economic growth possible;
- By improving income distribution ("since most taxes are regressive and subsidies disproportionately benefit the rich"); and

- By improving the environment through saving money and "realigning the incentive structure in favor of environmentally sound practices."

While removing harmful subsidies can "liberate" substantial resources that could be used for biodiversity conservation and other sustainable development priorities, it can also be extremely difficult to implement. Subsidies tend to create large vested interests that wield considerable economic and political power and that will do anything to prevent their removal (De Moor, 1997).

Despite these problems, there have, in the past five years, been an number of encouraging examples of subsidy reform in developing and developed countries (Panayotou, 1997). In fact, it has been estimated that environmentally-damaging subsidies in developing countries have been reduced from over $300 billion in the early 1990s to about $150-200 billion (a reduction of between 30 and 50 percent) in 1997. This includes a reduction of coal subsidies in China from $750 million in 1993 to $240 million in 1995, a savings of about $500 million over a two year period (Gandhi, Gray and McMorran, 1997).

Given these and other examples of success in subsidy reform, it is clear that more can and should be done to ensure that money is spent conserving nature, not paying for its destruction.

Tradable Permits / Development Rights / Extraction Quotas

The system of using tradable permits / development rights / or extraction quotas involves setting an upper limit on an environmentally destructive activity, allocating tradable rights to these activities using a pre-determined system, and letting the actors trade, buy, or sell these rights via a market system. It is different from a system of fines or a more "command and control" system in that it is designed to use the market as a mechanism for achieving the desired environmental objective in the most efficient and effective way possible.

An example of the use of tradable permits for environmental ends is the sulphur dioxide (SO_2) reduction system currently in place in the United States. Under this system, the government auctions off "permits to emit SO_2" which can be traded on the market. (In fact, these permits are currently being traded through the Chicago Board of Trade (CBOT) one of the largest commodities and futures exchanges in the U.S.) Once the permits are allocated, if a company expects to "over-pollute" it can buy the permits from a company that does not expect to use all of its permits. This system can create a strong incentive for pollution abatement, and provides a mechanism for channeling financial benefits to companies that pollute less and imposing financial costs on companies that pollute more. Besides, in auctioning off the permits, the U.S. government raises a certain amount of money (about $16 million in 2000 through the SO_2 trading system) that can be used for conservation.

Two variations on the tradable permits mechanism involve trading in permits to extract renewable natural resources (such as fish or timber), and trading in "rights to develop" a plot of land or a type of ecosystem. In examples of the former mechanism, Chile has experimented with the use of tradable permit to limit the use of water and New Zealand instituted a system of "tradable permits to fish" which allowed it to effectively get to grips with over-fishing in its coastal zones. Another example of the use of tradable development rights comes from the US, where "rights to develop wetlands" are traded via mechanisms known as "wetland banks" (see box below). Likewise, in Puerto Rico the

government has instituted a system of "tradable development permits" to control development of its coastal resources.

Box 2.9

Wetland Banks in the U.S.

The U.S. has had a system of "Wetland Mitigation Banking" ever since 1970. The system allows for the development of a wetland to be offset against works that rehabilitate wetlands offsite. By 1992 in excess of 40 wetland banks were operating in the U.S. and they had facilitated the rehabilitation of about 20,000 acres of wetlands. Today there are several hundred wetland banks, and the system of mitigation banking (a variation on the tradable development right) has been extended to activities that help protect the habitat of species listed under the U.S.'s Endangered Species Act. A wetland bank is created when a sponsoring organization undertakes a major wetland restoration task. Once the restoration project is completed, the organization is given credits for the value of the work undertaken. Different credit rates are given for creation, protection, enhancement, or restoration of wetlands. These credits can then be used to offset developments that affect other wetlands, or else sold to parties interested in undertaking projects that will degrade other wetlands. Here again, the principle is that those who conduct wetland restoration activities are compensated for their actions, and those who conduct activities that destroy wetlands are forced to incorporate the costs of that destruction into their economic analysis.

Source: adapted from *CSIRO, mimeo*

Deposit Refund Schemes / Performance Bonds

Deposit-refund schemes and "performance bonds" are mechanisms for forcing potential polluters to incorporate the costs of pollution into their economic analysis before undertaking certain types of activities. Most people will be familiar with deposit-refund schemes because many countries use a deposit-refund scheme to encourage recycling of glass bottles or aluminum cans. In this case, the system works by imposing a small "deposit" or surcharge on the cost of drinks sold in glass or aluminum containers, and then returning the surcharge to those consumers that recycle the containers. The system, however, can be used at a much larger scale as a way of mitigating damage caused by mining activities. To do this, the country where the mining will take place forces the company interested in conducting mining activities to but money in a "performance bond" before they are allowed to undertake any activities. If the government determines that the mining operations are causing environmental damage, it keeps the bond as a sort of fine and to cover remediation costs. If, on the other hand, the government determines that the mining was carried out in an environmentally-sensitive manner, the money is returned to the mining company (Pearce et. al., 1997).

The benefit of this system is that it shifts the responsibility for controlling pollution, as well as some of the costs for monitoring and enforcement, to the potential polluters (Panayotou, 1994). For this reason, it helps internalize the true costs of environmental degradation into the economic calculations of the market, forcing companies to consider the costs of pollution before they undertake environmentally damaging activities.

Environmental bonds have been used in Malaysia and Thailand as a way of discouraging environmental destruction by mining companies and oil exploration companies.

Markets for Ecosystem Services

What are ecosystem services and how does one create a market for them? Costanza et. al. (1997), in a paper which attempted to assess the value of ecosystem services, provided the following definition: "Ecosystem functions refer variously to the habitats, biological or system properties or processes of ecosystems. Ecosystem goods (such as food) and services (such as waste assimilation) represent the benefits that human populations derive, directly or indirectly, from ecosystem functions. For simplicity, we refer to ecosystem goods and services together as ecosystem services." Under their definition they grouped the ecosystem goods and services into 17 broad categories. They then calculated the value of these services per year across a range of ecosystems and came up with the following figures:

Ecosystem Service	Total value ($ trillion/yr)
Nutrient cycling	17.075
Cultural Services	3.015
Waste treatment	2.277
Disturbance regulation	1.779
Water supply	1.692
Food production	1.386
Gas regulation	1.341
Water regulation	1.115
Recreation	.815
Raw materials	.721
Climate regulation	.684
Erosion control	.576
Biological control	.417
Habitat	.124
Pollination	.117
Genetic resources	.079
Soil formation	.053
Total Service Value	**33.3**

In short, according to Costanza et. al. (1997), although our economic system does not require us to pay for many of the goods and services provided by ecosystems, we derive tremendous benefits from these services (benefits worth an estimated $33 trillion per year). If their calculations are correct, it means that if we were to pay a fair market value for the services provided by natural ecosystems, it would cost us nearly twice as much per year as the combined annual GDP of all of the world's countries (which in 1997 stood at an estimated $18 trillion). Given the immense value of these services (some of which could not be replaced if they were to be destroyed), and the increased degradation of the systems that provide them, it is likely that markets for these services will develop over time.

It should be noted that creating functioning markets in many of these services will be extremely difficult, requiring agreed-upon regulation, agreement by society to pay for services that have previously been provided for free, as well as mechanisms for determining the value of services, all of which will be extremely difficult to obtain. These difficulties notwithstanding, recent developments in the field of climate change have shown that generating markets in ecosystem services is feasible and that, once the sense of urgency is there, it tends to be followed (albeit slowly) by political will, which, in turn, leads to quasi-functioning markets.

Carbon Sequestration

Of the non-traditional ecosystem services, the one whose market is developing most rapidly is carbon sequestration. This development is clearly the result of the negotiations surrounding the UN Convention on Climate Change and its Kyoto protocol, which have made many governments and businesses aware that emissions of greenhouse gasses are likely to be heavily regulated in the future. In addition, the Kyoto protocol has made provisions for the creation of a market in tradable emission rights through its articles on a Clean Development Mechanism and on Joint Implementation.

Although the details of the Clean Development Mechanism have yet to be negotiated, it looks likely that the system will allow Annex I countries (essentially developed countries) to buy certified emission reductions (created when a project or activity causes emissions to be lower than they might otherwise have been) from countries not in Annex I (essentially developing countries). Some estimates of the market resulting from the CDM have posited that the CDM could lead to nearly $10 billion per year in capital flows for developing countries (Grubb and Vrolijk cited in Sandor, 2000). This is a substantial amount of money, some of which might be used for conservation in developing countries.

Already there are signs that a market in carbon sequestration is imminent. A number of organizations, including The Nature Conservancy, have recently negotiated sizeable carbon sequestration deals in developing countries (see box below). These deals involve carbon emitting corporations (usually electric utilities) in a developed country (usually the U.S.) contributing money to the conservation of an endangered ecosystem in return for carbon sequestration credits that they hope to be able to use if and when the market for carbon sequestration credits is sanctioned by the Climate Change convention.

Box 2.11

TNC Carbon Sequestration projects in Belize, Bolivia, and Brazil

The Nature Conservancy (TNC), in partnership with various groups, has helped fund and implement conservation projects that are specifically structured to slow the build-up of greenhouse gases in the atmosphere and encourage the economic development of local communities. The first such project was undertaken in Belize, in partnership with the Programme for Belize, a Belizean non-profit organization. The project involves the conservation and sustainable forest management of more than 146,000 acres of lowland forest. At the cost of $5.6 million, the project will sequester an estimated 2.4 million tons of carbon over 40 years. Financing for the project came from a consortium of energy companies: Wisconsin Electric, PacifiCorp, Cinergy, Detroit Edison, Suncor, and

Utilitree.

The second project is in Bolivia, where the borders of a national park were extended after logging rights on neighboring forest concessions were retired. It is estimated that this project will avoid the emission of some 15 million tons of carbon over 30 years, making it the largest fully-funded carbon sequestration project in the world. In order to finance the "sequestration" of this carbon, a series of industry investors (including American Electric Power, PacifiCorp, and British Petroleum) paid more than $9.5 million to permit the conservation of the forest sites. Partners in this project include the Bolivian government and Fundacion Amigos de la Naturaleza, a Bolivian non-profit organization.

A third project is taking place in the Guraqueçaba Environmental Protection Area of Brazil's Atlantic Rainforest (where the World Heritage site of the Atlantic Forest Southeast Reserve is located). The goal of the project is to purchase, restore, protect, and tens of thousands of acres of land that had been degraded (some as the result of water buffalo farming). The project was composed of three separate deals: one with the Central and Southwest Corporation, a U.S. utility, for $5.4 million; another with GM for $10 million; and a third with Texaco for $3 million.

In short, via the sale of carbon sequestration credits, The Nature Conservancy has raised more than $33.5 million for conservation, all before a market in such credits has even been sanctioned by the UN Climate Change convention.

Source: adapted from *TNC, mimeo*

So far, most of the carbon sequestration and carbon emission reduction deals have involved individual transactions between carbon emitters and those reducing emissions or sequestering carbon. However, as the market develops, we are likely to see larger deals being negotiated, as well as the emergence of funds designed to invest in a broad portfolio of carbon reducing or carbon sequestering projects. In a foreshadowing of what is to come, both the World Bank and the Union Bank of Switzerland (UBS), one of the largest banks in the world, have created carbon funds designed to invest in a range of projects that can generate certified emission reductions.

Box 2.12

UBS Carbon Fund

The Union Bank of Switzerland (UBS) has proposed the creation of an international carbon fund that would invest in projects that qualify under the Climate Change Convention's two market-based mechanisms for greenhouse gas reduction: the Clean Development Mechanism (CDM) and the Joint Implementation (JI) mechanism. The fund hopes to raise SFr 100 million ($65 million) for these investments. Once the carbon trading mechanism takes off, the emissions bought by the fund could either be sold at a premium (thereby generating return for the fund's investors), or they could be distributed to investors interested in using the reduction credits themselves. The UBS fund would invest in both developed and developing countries.

Source: Environmental Finance, November 1999

Finally, given the rapid development of markets in certified emission reductions as well as carbon sequestration credits, there has been some interest from commodities and futures exchanges in creating secondary markets in carbon credits. The Sydney Futures Exchange (SFE) in Australia announced the start of trading in carbon credits in 2000, and the International Petroleum Exchange (IPE) in London has announced that it hopes to set up a market in carbon credits sometime in 2001.

Water Regulation

Another important environmental service is the regulation of water flows, and/or the provision of fresh water to nearby cities, towns, or villages. By serving as watersheds to important water resources, Environmental sites provide an indispensable service to thousands of people. In many parts of the world, however, fresh water is a free good, one that the government provides at no cost to the consumer so the value of these watersheds is seldom recognized. As it becomes clear that maintaining watershed services costs money, paying for watershed services is likely to become increasingly common. The exact nature of the market in this ecosystem service, however, has yet to be determined.

Examples that illustrate the direction that this market might take come from New York and Ecuador. In 1997, the U.S. Environmental Protection Agency (EPA) became concerned with the quality of water provided to the citizens of New York City. It therefore approached the city government and alerted them to the rapid degradation of their freshwater supplies. It also gave the city a choice: they could either build a new water filtration plant, costing approximately $4 billion to build, and an average of $300,000 per year to operate and maintain, or they could invest in protecting the city's watersheds located hundreds of miles from the city in the areas surrounding the Delaware, Croton, and Catskill rivers. After looking at the problem, the city realized that protecting the watersheds would be much cheaper in the long-run than building a new water filtration plant, so they decided to invest in the watersheds. The program they established led to the city of New York buying land in particularly sensitive watersheds, financing watershed protection programs, upgrading water treatment plants upstream, and educating people who live around the city's watersheds on conservation. In total, the city is expected to spend approximately $1.4 billion over 10 years to protect its watersheds (some of which was raised via the emission of a bond), a savings for the city of more than $4 billion.

Similarly, in Ecuador, the city of Quito relies on two protected areas outside the city (Antisana and Cayambe-Coca) for its water. In 1998, it became clear that these protected areas needed additional finance if they were going to be protected. Working with The Nature Conservancy, the city of Quito decided that one way of financing the protection of these sites would be to create a "National Water Fund" (FONAG) financed by the imposition of a small surcharge on the provision of water to the citizens of Quito. Although the program is not yet fully operational, it is expected that FONAG and the water users' fee will raise approximately $1.5 million per year for the conservation of Quito's watersheds.

Storm Protection

Another service of ecosystems that is often overlooked is the role they play in mitigating the damage caused by storms, floods, hurricanes, tornadoes, and other extreme weather events. According to insurance companies, recent years have seen increased incidence of

extreme weather events around the world. Some people argue that this is due to global warming, so in and of itself, the problem may be environmental in nature. But whatever the cause of this trend, it has become clear that increased environmental degradation has resulted in greater damage from these extreme weather events. Two examples that illustrate this point are the floods in China in 1998 and Hurricane Mitch in Central America, also in 1998.

A number of multinational agencies, including the World Bank, have recently become aware of this connection between protection of the environment and the mitigation of damage from natural disasters. The magazine "Environmental Finance" reports in its March 2000 issue that the World Bank has initiated a multi-national partnership of insurance companies, development banks, national governments, aid agencies, and academic institutions aimed at reducing the costs of natural disasters in the developing world. This partnership, called the ProVention Consortium, aims to raise more than $10 million a year for a trust fund that would help finance all sorts of disaster prevention initiatives, including environmental protection. One of the people in charge of the consortium at the World Bank notes that part of the consortium's work will be to save natural resources such as forests, coastal mangroves, and coral reefs.

If we take this realization to its logical conclusion, it is possible to make the claim that natural ecosystems play a key role in mitigating the effects of storms, floods and other disasters. If that is the case, then insurers, governments, land-owners, and others who face risks as a result of natural disasters might be willing to contribute money towards the conservation of as protection against these risks. Here again, this mechanism will work for those that provide clear storm/flood protection to large populations or valuable properties.

Pollination, Genetic Diversity, and Other Services

Other ecosystem services that have the capacity to generate revenues include pollination and pest control (where insects living in natural areas help pollinate or control the pests on the crops of farmers), provision of genetic diversity (for instance to pharmaceutical companies), soil generation, protection against salinity, etc. Very few attempts have been made to gauge the size of these markets, or even to consider how these markets might develop, but here again, as the ecosystems are degraded and the services become increasingly scarce, it is likely that the value of these services will increase and push governments and the private sector to consider the development of ecosystem service markets.

In a deal that may herald what is to come in terms of markets for ecosystem services, the Guanacaste Conservation Area in Costa Rica (which was made a World Heritage site in 1999) signed an agreement with a local orange growing company, Del Oro Ltd., whereby the company agrees to pay the conservation area for a variety of ecosystem services, including the biological control of pests on the company's orange plantations by parasitic wasps living in the Guanacaste park (for a full description of the Guanacaste case, see box 2.14 below). Likewise, there is talk in Australia of selling salinity-reduction credits provided by forests and wetlands, thereby putting a value on this particular ecosystem service.

Pooling of Services and Revenue Streams

While it is unlikely that any single ecosystem service will be able to generate the large sums of money needed to finance the conservation of a particular World Heritage site (the one possible exception being carbon sequestration), if the revenues from a string of ecosystem services were aggregated and pooled, they would go a long way towards financing increased conservation of World Heritage sites. In fact, one World Heritage site in Costa Rica, the Guanacaste Conservation Area, has already sold a pool of ecosystem services (see box below).

Box 2.14

The Guanacaste Conservation Area (GCA) in Costa Rica

In August 1998, the Guanacaste Conservation Area, a Costa Rican National Park and World Heritage site, signed an innovative contract with an orange producing company called Grupo Del Oro. As part of this contract, Del Oro has agreed to pay the Guanacaste Conservation Area (GCA) a total of $480,000 in land for the provision of 20 years of environmental services which it is currently receiving from the conservation area. The services which make up the contract include: biological pest control, water supply, natural decomposition of orange peels, and ecological consulting services from the staff of the GCA. Del Oro has almost 2,000 hectares of orange orchards between La Cruz and Santa Cecilia in northwestern Costa Rica, near the Nicaraguan border. Part of the farm adjoins the northern boundary of the GCA, which is one of Costa Rica's most important National Parks, with approximately 87,000 hectares of dry forest, rainforest and cloud forest ecosystems.

The contract has the following provisions:

Biological Control: Each year, the company will pay the GCA for the services of insects and other organisms living in the forest which help control pests in the company's orchards. This service will be paid at a rate of $1 per hectare of orange grove protected. With 1,685 in production around the GCA, this amounts to $1,685 per year.

Technical Services: The company will pay the GCA $3,500 per year for the consulting services of biologists and other scientists provided by the GCA. These experts will help the producers find natural solutions to agronomic problems.

Water Supply: The watershed of the Rio Mena, which begins in the GCA, is 1,169 hectares. This watershed supplies water to the Del Oro groves and, for this service the company will pay $5 per hectare per year for a total of $5,885 per year.

Biodegradation Of Orange Pulp: The company extracts juice from the oranges and essential oils from the peels, leaving a clean pulp. Some of this pulp may be fed to cattle. Some is used on the farms as natural fertilizer. The GCA is experimenting with the processed pulp to see if the organic material can help rebuild soils in areas that were deforested and used as cattle pasture. The company will pay $11,930 per year for the services of GCA (including its microorganisms, fungi, insects, etc.) in converting 1000 truckloads of this pulp into soil.

Isolated Nursery: The company will pay $1,000 a year to rent one hectare of pasture inside the GCA to grow new orange seedlings that are free of diseases and pests.

Carbon Sequestration: In addition, if the land transferred by Del Oro is used in carbon sequestration deals, the resulting credits will be divided evenly between the GCA and Del Oro.

The total costs of these services is therefore $24,000 per year, so that over 20 years the total cost of these services will be $480,000. The company has agreed to pay this amo unt up front by transferring 1,200 hectares of forested land (at a price of $400 per hectare) to the GCA.

Source: Rainforest Alliance Press Release, 1998; and GCA-DelOro contract, 1998

Some might argue that the Guanacaste Conservation Area sold its services much too cheaply, but that is missing the point. The importance of this case lies not so much in the dollar figure paid for the services, but rather in the fact that it was the first of its kind, and was the first time that a park had received payment for services such as pest control, decomposition of waste, etc. In this, and in the fact that it sold a pool of ecosystem services, the Guanacaste deal is a pioneering initiative, one that is a sign of what is to come in terms of alternative finance for protected areas and World Heritage sites.

Departing from the Guanacaste example, it seems evident that pools of ecosystem services can take one of two forms:

1. A pool of all the services provided by a particular site (**site-based pooling** along the lines of what was done in Guanacaste); or
2. A pool of similar services from a range of different sites (e.g. all the storm protection services of protected mangroves in Asia, a form of **service-based pooling**).

Site-based pooling probably makes most sense when the customer for the service is local, and when the linkages between a particular site and a suite of services are abundantly clear. Service-based pooling, on the other hand, might make sense when the customers are many and far away, or when the hope is to be able to sell the services to the international capital markets. International investors like to invest in clearly delineated assets, they like liquidity, and they like to control their risks to the greatest extent possible. For this reason, a broad mix of services may not appeal to them (too many risks, not enough standardization). For these investors, the ability to pool income from similar services across a range of sites might make more sense. This is the principle behind the UBS carbon fund described in box 2.12 above, so it is already happening in terms of carbon emission reduction credits (and is likely to happen in terms of carbon sequestration credits in the future).

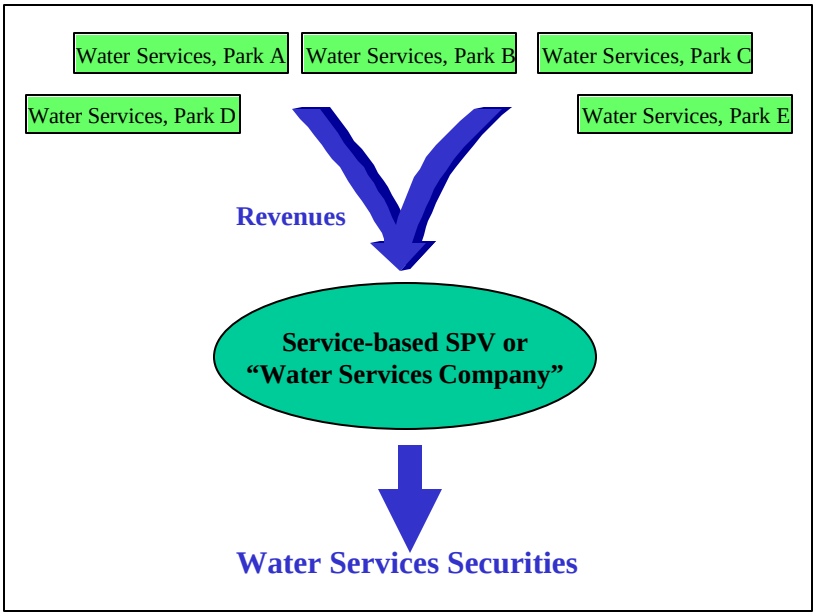
Although service-based pooling may be most appropriate for international investors, site-based pooling has a number of benefits. Chief among them is the fact that by pooling the ecosystem services of one particular site, you are making abundantly clear the linkage between a specific national park or conservation site and a series of ecosystem services on which a variety of stakeholders depend. This may not only help raise money for the protection of the park, but it could also serve to generate strong political allies for the park from among the park's beneficiaries (usually the wealthy). In contrast, if the services of a particular site are pooled with the services of a dozen sites around the world, the importance of each individual site may be lost in the aggregation.

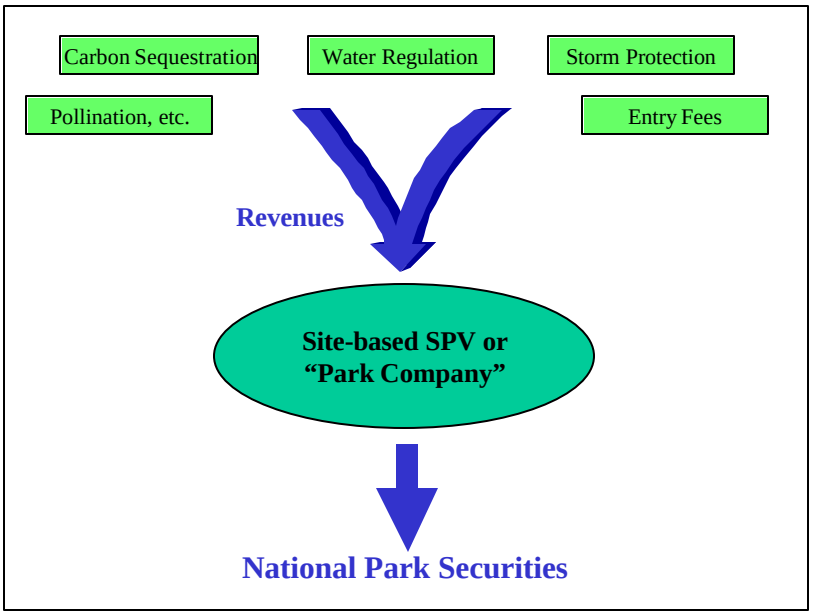
Regardless of how it is done, the concept of pooling will be of fundamental importance in securitizing the revenues of a particular site or National Park (see section on securitization above). At present it has not made much sense to issue a "National Park bond" or a "Galapagos World Heritage bond." First of all, the revenues obtained by these

sites via entry fees, concession fees, taxation, etc. have never been large enough to make the process of securitization financially viable. Secondly, securitization usually implies borrowing money from the capital markets and, to date, not many site managers have seen the utility of borrowing money and paying the requisite interest rates. After all, borrowing only makes sense if there is some prospect of using the borrowed money to make more money for the borrower. But if the markets for ecosystem services develop, if investments of money today will make it possible to raise sizeable revenues through the sale of ecosystem services tomorrow, the idea of borrowing money from the capital markets for a National Park (i.e. issuing a National Park Bond) may not be so far-fetched.

To issue securities based on future revenues, banks and other financiers create a so-called "Special Purpose Vehicle" or SPV, a company able to issue stocks and bonds and whose sole purpose is to aggregate income and sell equity or take on debt. One can imagine pooling the revenues gained by the sale of ecosystem services in an SPV and then having this SPV issue stocks or bonds backed by these revenues. Below are two diagrams illustrating how an ecosystem-based SPV might issue bonds in a particular national park, or how it might issue bonds backed by the water service revenues of a variety of National Parks.

To give these ecosystem services value, and to explore the various possibilities that exist for turning them into marketable assets, it would be worthwhile entering into a dialogue with financial experts from banks, insurance companies, mutual funds, and others who deal with securitization and the creation of synthetic financial instruments on a daily basis.


Water Services, Park A
Water Services, Park B
Water Services, Park C
Water Services, Park D
Water Services, Park E
Revenues
Service-based SPV or
"Water Services Company"
Water Services Securities


Carbon Sequestration
Water Regulation
Storm Protection
Pollination, etc.
Entry Fees
Revenues
Site-based SPV or
"Park Company"
National Park Securities

Environmental Funds[1]

No discussion of conservation finance is complete without a discussion of the mechanisms that might be used to distribute the money once it is raised. After all, conservation is not only about raising money, but also about using that money effectively. One of the tools that has recently emerged as an effective mechanism for channeling money for conservation is the Environmental Fund (or EF). Discussions on conservation finance often refer to environmental funds as if they were yet another source of finance for conservation, when in fact they are not sources of funds at all, but rather ways of managing money raised from a variety of other sources, including those mentioned above.

The principle behind environmental funds is simple: rather than seek small sums of money on a case-by-case basis to carry out environmental activities, EFs seek to obtain large sums of money up-front, invest it, and either use the interest on the money for conservation, or else draw down slowly on the fund to finance the desired activities. There is no typical Environmental Fund. The structures of each fund, its scope of activities and procedures for managing money all vary according to the purposes for which the fund was created, and the situation in the country where the fund operates.

That said, there are generally four types of Environmental Funds:

- environmental funds with a mandate to support a full range of activities included in a country's national environmental plan or strategy ("**strategy funds**");
- funds that support the conservation of protected areas, either specific parks or national protected areas systems ("**parks funds**");
- funds that make grants to others – typically non-governmental organizations (NGOs) and community groups – for conservation and/or sustainable development projects ("**grants funds**"). These EFs often have objectives that include strengthening civil society organizations, increasing environmental awareness, or expanding understanding of environmental issues; and
- funds that combine the above features ("**combination funds**").

Most EFs in operation are either "parks funds," "grants funds," or "combination funds." Few "strategy funds" exist, and where they do, such as in Bolivia, they have created separate windows –often with separate assets and management structures– that closely resemble the other types of funds.

Another important distinction that can be made between EFs is in the way they manage their capital. In this, there have essentially been three kinds of funds:

- **endowments** which invest their capital and use only income from those investments to finance activities;
- **sinking funds** which are designed to disburse their entire principal and investment income over a fixed period of time (usually 6-15 years); or
- **revolving funds** that receive new resources on a regular basis (e.g., proceeds of special taxes, fees or levies designated to pay for conservation programs) and which

[1] Some of this material taken from Bayon, Deere, Norris and Smith, 1999.

replenish or augment the original capital of the fund and provide a continuing source of money for specific activities.

EFs sometimes also receive funding to carry out specific projects. It is not unusual for a particular EF to combine all of the above features as part of one overall financial structure. For example, PROFONANPE in Peru has an endowment, several sinking funds created through debt swaps, and project funding. However, each of these different kinds of funds has very different characteristics, each has pros and cons, and it is essential to keep these characteristics in mind when determining what kind of fund is best suited to a particular country.

For instance, sinking funds enable larger amounts of money to be used more rapidly than can endowment funds. Whereas an endowment fund of $15 million will typically produce anywhere from $700,000 to $1 million in interest (depending on the market and the types of investments that are made) that can be spent annually over an unlimited amount of time, a sinking fund with the same capital base can decide to spend $1.5 million or even $2 million a year for a limited amount of time. So, through a sinking fund it is possible to generate more money up-front for a limited amount of time than is possible through an endowment. For this reason, sinking funds are most effective where the conservation problem that needs to be solved is large and urgent, and where there is a large absorptive capacity – where there are enough projects, enough NGOs, or enough trained people to enable the use of large amounts of money rapidly and effectively. Endowment funds, on the other hand, are most appropriate where this sort of absorptive capacity does not exist, where it is unlikely that large sums of money can be used rapidly and effectively, and where there is a long-term need for conservation finance. Both of these types of funds are different from revolving funds which can only work if there is regular and predictable source of funds (such as a tax on tourism, or a water usage fee) that can replenish the capital on an regular basis.

Still, most people, when they talk about "conservation trust funds," refer to endowment funds which obtain capital, invest it, and use the interest on those investments to finance conservation activities. Over the past ten years, numerous World Heritage sites have experimented with the creation of Environmental Funds as a way of managing money received via bilateral aid, debt swaps, or from multilateral sources such as the GEF (e.g. the Mgahinga and Bwindi National Parks Trust in Uganda). And over time, it has become apparent that EFs have a variety of benefits. These are listed below.

Benefits of an Environmental Fund[2]

The most frequently cited benefits of environmental funds include:

1. ***Provision of long term sustained funding***: They allow for money to be generated for conservation on an ongoing basis.

2. ***Ability to make small grants:*** International donor agencies sometimes prefer to make large grants because the transaction costs of administering small grants can be extremely high. EFs can serve as intermediaries in this regard.

3. ***Improved absorptive capacity:*** Environmental funds enable countries that have little absorptive capacity to spread large amounts of money over longer periods of time.

[2] This section adapted from Spergel, 2000

4. ***Financing recurrent costs:*** Environmental funds can be used to pay the recurrent costs of conservation, for which it may otherwise be difficult to obtain finance.

5. ***Strengthening civil society:*** Environmental funds often help stimulate civil society as well as encourage civil society's interaction with local governments. This is most often the case where the fund is governed by a Board made up of representatives from government, civil society, and the private sector.

6. ***Decentralization:*** Environmental funds can often shift the decision-making process on environmental priorities from the global scale to the national scale and, in some cases, even to the local scale. This is especially the case where the EFs establish a system of regional councils making recommendations to a board of directors at the national-level.

Key Questions and Lessons Learned

Despite the many benefits of EF's, experience has shown that they are not always the best mechanisms for using money raised for conservation (see GEF, 1999, and Bayon, Deere, Norris, and Smith, 1999). To summarize some of the lessons learned in terms of when to set up an EF –and when not to set up an EF– below are a series of questions that should be answered when considering the establishment of an environmental fund. The list is not intended to be exhaustive, but is merely provided as a preliminary guide for those considering the establishment of an Environmental Fund as a way of distributing finance to a World Heritage site:

1. **What are the main goals, objectives, and expected outputs of the proposed Environmental Fund?** This is clearly the first question that needs to be asked when designing a fund. It will determine whether a fund is necessary, what kind of fund should be established, and how that fund should be capitalized and managed. If this question is not properly answered, it is unlikely that the Environmental Fund will be successful.

2. **Is an Environmental Fund the best mechanism for achieving these goals?** Often, when the environmental goal is clearly defined, people find that an EF is not the best way of achieving the desired goals. They find that it is too cumbersome a mechanism or that it ties up money that could be more effectively spent in other ways. EFs are usually best in cases where the environmental problems it addresses are complex, ongoing, and require the investment of small amounts of money over long periods of time. EFs also make sense where large chunks of money are immediately available (for instance via a debt swap) but where there is no capacity (of NGOs or the government) to effectively absorb a rapid and large infusion of cash.

3. **If an Environmental Fund is deemed necessary, what kind of fund makes the most sense?** As described above, there are various different kinds of EFs that can be established. Sinking funds are most useful in situations where the environmental problems are urgent, where relatively large amounts of money are needed quickly, and where there is an established capacity to effectively use these large amounts of money effectively. They may also be useful in cases where up-front investment is needed for projects that are likely to become self-sustaining in the long run. Endowment funds, on the other hand, are most useful where the problem is a long-term and on-going problem, one that is not likely to be resolved in ten or fifteen years. They are also the most effective kinds of EFs in situations where there is little

or no absorptive capacity, or where it is unlikely that large amounts of money can be used quickly and effectively. Revolving funds are only feasible in situations where a source of money is available on a regular and consistent basis.

4. **Given the fund's goals, who will be its main beneficiaries?** Determining the fund's beneficiaries is a crucial step in establishing an EF. The sorts of questions that will need to be answered include: will the fund make grants to NGOs and/or community groups, will it make loans to entrepreneurs that help protect the site, or will it provide added resources to help the government finance the conservation of the site? It is important to bear in mind that if the fund decides to make grants to NGOs and community groups that help protect the site, this will often imply sizable initial investments of the fund's capital in activities that help develop the capacity of these organizations to prepare project proposals, to manage funds, to manage projects, and to monitor and evaluate the results of these projects.

5. **Where might the fund obtain its capital?** Many of the potential sources of capital for environmental funds are described above. Which one is most relevant to a particular country or site depends on the country's debt situation, and on the goals the fund will seek to achieve. However, to date, most funds have been capitalized via debt swaps or by a grant from the GEF. Bi-lateral donors have been notoriously reluctant to provide capital for Environmental Funds other than through debt swaps.

6. **Taking into account the sources of funds, the EF's goals, and its intended beneficiaries, who are the people best suited to serving on the fund's Board?** It is important that the board of an EF be trusted, transparent, and that it contain representatives of government, non-governmental organizations, the private sector, as well as the fund's beneficiaries. It is also desirable that at least some of the people on board have an understanding of financial management, that they are able to determine investment strategies, and that they are able to oversee the activities of an asset manager.

7. **How should the fund be managed?** What institutional structures need to be established? Most funds are composed of a Board and a Management Unit headed by an Executive Director. Some also have Technical Advisory Bodies, and others regularly hire consultants to help them with some aspects of their work. The institutional structure depends to a certain extent on the fund's activities. If the fund is making grants to a large number of NGOs, it will require a strong technical staff and probably some form of Technical Advisory Body in addition to its Board. If, however, the fund is simply providing money to the National Park services for protection of a World Heritage site, it may not need such a large management structure.

8. **How will the fund invest its capital?** This will depend to a certain extent on how developed the financial markets are in the country concerned. If there is no financial markets, the fund's assets will need to be invested abroad. Regardless of where its funds are invested, the EF will likely want to hire a professional asset manager and set up systems to monitor/oversee that manager's performance. Most funds use the World Bank guidelines for asset management and select their managers through a competitive search process.

9. **How will the EF disburse its money?** Will the EF make loans or grants? Will it provide grants following a particular grant-proposal process? If it is responding to

proposals, how will people know to submit proposals, how will they be informed of the criteria against which those proposals will be judged, and how will the Board and Management Unit make decisions on grant allocation?

10. **How will the fund monitor and evaluate its success?** An issue that is often overlooked in the design of environmental funds is the whole question of monitoring and evaluation. Given the funds objectives, how will its success (or failure) be monitored and evaluated? This often requires M&E processes to be set up from the very beginning, which might mean training of grant recipients, as well as the investment of considerable financial resources up front.

When deciding to create an environmental fund, it is important the above questions be answered in as much detail as possible. This will help ensure that an EF is the right mechanisms for distributing money to a particular site, and that key issues in fund design are taken into consideration before the fund is created.

Bibliography

Asad, M. 1997. *Innovative Financial Instruments for Global Environmental Management*. Initial draft of a paper presented to a meeting of the World Bank Group on Financial Mechanisms for the Environment. Mimeo.

Bayon, R. and Deere, C. 1998. *Financing Biodiversity Conservation: The Potential of Environmental Funds*. Paper presented at a workshop on Financial Innovations for Biodiversity, Bratislava, Slovakia, 1-3 May 1998.

Bayon, R., Deere, C., Norris, R., and Smith, S. 1999. *Environmental Funds: Lessons Learned and Future Prospects.* Mimeo.

Bayon, R., Lovink, S., and Veening, W. forthcoming. *Financing Biodiversity Conservation.* Interamerican Development Bank. Washington DC: IDB.

Chomitz, K. et. al. 1998. *Financing Environmental Services: The Costa Rican Experience*, Economic Notes, Number 10, Central American Management Unit, Latin and American and the Caribbean Region. Washington DC: The World Bank.

Costanza, R. et al. 1997. The Value of the World's Ecosystem Services and Natural Capital. *Nature,* vol. 387, pp. 253-260.

CSIRO, undated. Markets for Ecosystem Goods – Trading in Ecosystem Resources. Mimeo.

de Moor, A.P.G. Key Issues in Subsidy Policies and Strategies for Reform. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Dourojeanni, M. J. 1997. Public Sector Roles and Economic Policies Affecting

Downes, J. and Goodman, J.E. 1998. *Dictionary of Finance and Investment Terms, Fifth Edition.* Hauppauge, NY: Barron's Educational Series.

Dupont, G. "ProVention is Better than Cure, says World Bank." In *Environmental Finance, March 2000.*

Echavarria, M. 1999. *Agua: Valoración del Servicio Ambiental que Prestan las Areas Protegidas.* Draft document prepared by the Regional Technical Unit of The Nature Conservancy. Washington DC: The Nature Conservancy.

EPA. 1997. *A Guidebook of Financial Tools.* Environmental Finance Program. Internet publication: www.epa.gov/efinpage/guidebk/guindex.htm

Gandhi, V.P., Gray, D., McMorran, R. 1997. A Comprehensive Approach to Domestic Resource Mobilization for Sustainable Development. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

GEF. 1999. *Experience with Conservation Trust Funds*. Washington DC: The Global Environment Facility.

Gentry, B. 1997. Making Private Investment Work for the Environment. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Grice, M. 2000. "UBS Plans Carbon Fund." In *Environmental Finance, October 1999.*

IDB. 1997a. *Mexico: Investment Fund for Small Business in the Environmental Sector* (TC-97-07-37-6). Washington DC: Inter-American Development Bank, Multilateral Investment Fund.

IDB. 1997b. *A Preliminary Review of Brazil's Fundo Nacional do Meio Ambiente: Lessons Learned.* Washington DC: Inter-American Development Bank, Regional Operations Department 1.

IDB. 1999. *Reducing Vulnerability to Natural Hazards: Lessons Learned from Hurricane Mitch:A Strategy Paper on Environmental Management*. Paper presented to Stockholm conference on Hurricane Mitch, May 25-28, 1999.

IFC. 1997. *Latin America Terra Capital Fund: Project Document.* Environmental Projects Unit. Washington DC : International Finance Corporation.

Lin, See-Yan. 1997. Chairman's Summary. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Markandya, A. 1997. Economic Instruments: Accelerating the Move from Concepts to Practical Application. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

McNeely, J. 1997. Achieving Financial Sustainability in Biodiversity Conservation Programs. In *Investing in Biodiversity Conservation-Workshop Proceedings*. ENV97-104. Washington DC: IDB.

MIF. 1997. *Confidential Report to the MIF Donor Committee on a Proposed Grant and Investment Facility for the Promotion of Environmental NGO Enterprise Development,* mimeo

Mikitin, K. 1995. *Issues and Options in the Design of GEF Supported Trust Funds for Biodiversity Conservation.* Environment Department Papers, Biodiversity Series. Washington DC: The World Bank.

Newcombe, K. 1997. Opportunities for the Inter-American Development Bank in Financing Biodiversity Conservation: A View from the World Bank. In *Investing in Biodiversity Conservation-Workshop Proceedings*. ENV97-104. Washington DC: IDB.

Panayotou, T. 1994a. *Financing Mechanisms for Environmental Investments and Sustainable Development.* Paper No. 15, Environmental Economics Series, Environment and Economics Unit, United Nations Environment Programme (UNEP). Nairobi: UNEP.

Panayotou, T. 1994b. *Economic Instruments for Environmental Management and Sustainable Development.* Paper No. 16, Environmental Economics Series, Environment and Economics Unit, United Nations Environment Programme (UNEP). Nairobi: UNEP.

Panayotou, T. 1995. *Matrix of Financial Instruments and Policy Options: A new approach to financing Sustainable Development.* Paper presented to the Second Expert Group Meeting on Financial Issues of Agenda 21, Glen Clove, New York, 15-17 February 1995.

Panayotou, T. 1997. Taking Stock of Trends in Sustainable Development Financing since Rio. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Pearce, D., Ozdemiroglu, E., and Dobson, S. 1997. Replicating Innovative National Financial Mechanisms for Sustainable Development. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD. Projects Unit Discussion Paper. Washington DC: International Finance Corporation.

Pieters, J. 1997. Subsidies and the Environment: On How Subsidies and Tax Incentives may Affect Production Decisions and the Environment. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Sandor, R. 2000. "The CDM: Opportunities and Challenges". In *Environmental Finance, April 2000.*

Seroa da Motta, R. Ruietenbeek, J., and Huber, R. 1997. Applying Economic Instruments for Environmental Management in the Context of Institutional Fragility: The Case of Latin America and the Caribbean. In *Finance for Sustainable Development: The Road Ahead*. New York: United Nations DPCSD.

Spergel, B. 2000. *Financing Protected Areas*. Washington DC: WWF-U.S. mimeo

Terra Capital Fund. 1997. *Terra Capital Fund: Confidential Business Plan for a Biodiversity Investment Fund for Latin America*. Washington DC: International Finance Corporation, Banco Axial, Sustainable Development, Inc., and the Environmental Enterprises Assistance Fund.

TNC. 1997. *Water: Together We Can Care for It! Case Study of a Watershed Conservation Fund for Quito, Ecuador.* Quito, Ecuador and Arlington, Virginia: The Nature Conservancy.

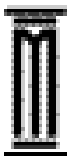
UNEP. 1992. *The United Nations Convention on Biological Diversity.*

UNEP and TNC, 1999. *Funding Protected Area Conservation in the Wider Caribbean: A Guide for Managers and Conservation Organizations.* Mimeo: The United Nations Environment Programme and The Nature Conservancy.

UNDP. 1997. Strengthening the Capacities of National Environment Funds in Latin America and the Caribbean. In *A Report on the Regional Consultation on National Environmental Funds in Latin America and the Caribbean held in Merida, Mexico, December, 1997*. New York: United Nations Development Programme

UNDP. forthcoming. Financial Mechanisms for Sustainable Forestry. Mimeo

USAID. 1999. *Improved Regional Capacity to Mitigate the Transnational Effects of Disasters: Special Report of USAID/Guatemala on Hurricane Mitch.* USAID web site.



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