Environment Strategy notes

Payments for Environmental Services

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The valuable environmental services provided by natural ecosystems are too often lost as a result of mismanagement and lack of incentives to preserve them. Helping countries find innovative solutions to such problems—which intersect with livelihood, vulnerability, and health issues—is a key element of the World Bank's Environment Strategy. The Bank's innovative work on payment for environmental services (PES) is an example of these efforts.

Natural ecosystems provide a variety of environmental services. Forests, for example, in addition to all their other functions, retain rainfall and snowmelt, filtering the water and releasing it gradually. Yet these hydrological services may not be appreciated until deforestation results in floods and degradation of water quality, increasing the vulnerability of downstream populations and threatening their health and livelihoods.

It is easy to understand how, despite their value, environmental services can be lost. Land users typically receive no compensation for the services their land generates for others and therefore have no economic reason to take these services into account in making decisions about land use. Responses to this problem have tended to fall into two categories: regulations that attempt to dictate particular patterns of land use, and remedial measures such as repair of the damage caused by flooding or the construction of civil works intended to protect downstream communities from floods. Neither approach has proved effective. Remedial measures are often imperfect and expensive—often far more expensive than preventive measures. Regulations are extremely difficult to enforce because of the spatial dispersion of land users, and they may impose high costs on poor land users by preventing them from undertaking privately profitable activities.

Recognition of this problem and of the failure of past approaches to dealing with it has led to efforts to develop systems in which land users are paid for the environmental services they generate, thus aligning their incentives with those of society as a whole. The "payment for environmental services" (PES) approach is an example.[1] The central principles of PES are that those who provide environmental services should be compensated for doing so and that those who receive the services should pay for their provision. (Box 1 illustrates the economics of this method.) This approach has the further advantage of providing additional income sources for poor land users, helping to improve their livelihoods. Several countries are already experimenting with such systems, many with World Bank assistance, as described in Box 2.

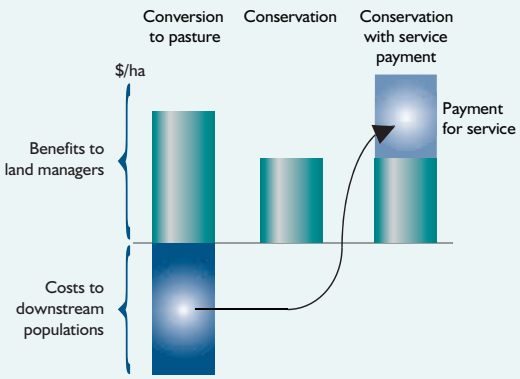
Identifying Environmental Services

Ecosystems can provide a wide variety of services. The environmental services derived from forest ecosystems, for example, typically include (but are not limited to):

- *Hydrological benefits:* controlling the timing and volume of water flows and protecting water quality
- *Reduced sedimentation:* avoiding damage to downstream reservoirs and waterways and so safeguarding uses such as hydroelectric power generation, irrigation, recreation, fisheries, and domestic water supplies
- *Disaster prevention:* preventing floods and landslides
- *Biodiversity conservation*
- *Carbon sequestration.*[2]

Both qualitatively and, especially, quantitatively, we often know less about the services generated by different land

BOX 1. THE SIMPLE LOGIC OF PAYMENTS FOR ENVIRONMENTAL SERVICES



As the figure shows, land users receive few benefits from forest conservation—often, less than the benefits they would receive from alternative land uses, such as conversion to pasture. But deforestation can impose costs on downstream populations, who no longer receive the benefits of ecological services such as water filtration. A payment by the downstream beneficiaries can help make conservation the more attractive option for land users. The payment must obviously be more than the additional benefit to land users of the alternative land use (or they would not change their behavior) and less than the value of the benefit to downstream populations (or they would not be willing to pay for it).

BOX 2. WORLD BANK SUPPORT FOR THE PAYMENT FOR ENVIRONMENTAL SERVICES APPROACH

The World Bank is working with several countries to develop PES systems that could help substitute for the absence of markets and promote the maintenance of environmental services—especially in Central and South America, where the effects of Hurricane Mitch in 1998 underscored the dependence of the population, especially poor people, on the environmental services and the protection provided by natural ecosystems. Bank-supported operational work on PES includes:

- *Costa Rica.* The Ecomarkets Project, which supports the country's PES program, includes a US$32.6 million loan from the World Bank to help the government ensure current levels of environmental service contracts and a US$8 million grant from the Global Environment Facility (GEF) to assist the program's conservation of biodiversity.
- *Colombia, Costa Rica, and Nicaragua.* The Regional Integrated Silvopastoral Ecosystem Management Project is piloting the use of PES as a means of encouraging a shift from unsustainable agricultural practices to sustainable silvopastoral practices.
- *Dominican Republic, Ecuador, and El Salvador.* Pilot PES programs are under preparation in these countries.
- *Mexico.* The World Bank is supporting a survey of land management practices in the *ejido* (communal land ownership) sector, which includes most of the country's remaining forest area and most of the rural poor. The goal is to help design a PES system and provide a baseline to monitor its implementation.

In addition, the World Bank Institute (WBI) has developed a training course on PES targeted to technical personnel in ministries, conservation agencies, and nongovernmental organizations involved in implementing PES programs. As of 2002, the course has been presented four times.

uses than we think we do. This is partly because of the diversity and complexity of the conditions encountered (hydrological benefits depend on the rainfall regime, on the type of soil and vegetation, and on topography, for example) and partly because of the diversity of objectives being sought (regulating water flows to avoid flooding and dry-season deficits may require different interventions than maximizing total water volume).

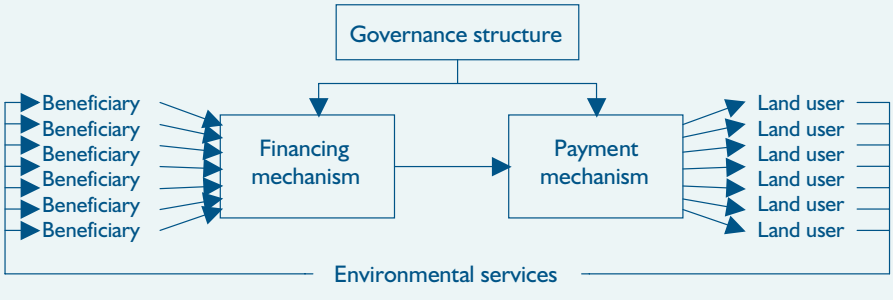
Financing Compensation for Environmental Services

For PES programs to survive, they need secure sources of financing. This is especially important if the payments have to be long term and open ended—as is usually necessary if land users are to have a continuing incentive to maintain the environmental services. This entails identifying not only the beneficiaries but also the specific services they receive. Beneficiaries do not receive generic "ecosystem services"; they are interested in very specific ones. Even within specific service categories, there are differences. Domestic water supply systems require a constant flow and high quality, but hydroelectric power producers with reservoirs usually prize total volume and care little about water quality except for the absence of sedimentation. The willingness to pay of a given group of beneficiaries will depend on the specific service they receive, on the value of that service to them (compared with the cost of alternatives), and on the size of the group.

Once the beneficiaries of a service are known, a means must be devised to capture part of their willingness to pay. This is obviously easiest when the beneficiaries are easily identifiable and are already organized, making it relatively simple to negotiate with them and to collect payments. For example, an additional fee can easily be added to water bills paid by municipal and industrial water users. In contrast, populations in flood-prone areas are not organized as such, although they may be included in other beneficiary groups, and there is no preexisting mechanism for collecting payments from them.

Figure 1

The Flow of Compensation from Beneficiaries to Land Users



Developing Effective Compensation Systems

PES programs will have the desired effect only if they reach the land users in ways that influence their decisions on how to use the land. Several general principles can be identified:

- *Make payments continuous and open-ended.* The benefits being sought will generally be enjoyed year after year, as long as appropriate land uses are maintained. Land users therefore must receive payments as long as they keep up the desired land use.
- *Target payments.* An undifferentiated payment system that pays everyone the same will be much more expensive than a targeted scheme. It will also make it difficult to tailor interventions to the particular requirements of given situations. A targeted payment scheme may, however, be more expensive to implement than a nontargeted one. A balance needs to be found between the efficiency advantages and the higher costs of better targeting.
- *Avoid perverse incentives.* For example, payments for reforestation can encourage land users to cut down standing trees so as to qualify.

Establishing the Institutional Framework

PES programs require a supporting institutional infrastructure. As Figure 1 illustrates, a portion of the benefits received by environmental service beneficiaries must be captured and channeled to land users to provide incentives to protect ecosystems. These systems depend on several prerequisites. Market participants must have access to information on the value and volume of the services being exchanged. Participants must have oppor-

tunities to negotiate payments. Property rights to service commodities need to be clearly defined, and ownership has to be assigned. Monitoring and enforcement mechanisms are required.[3] A network of supporting regulatory and institutional arrangements may be necessary if markets are to function effectively. Establishing such market infrastructure is not easy and is rarely cheap.

Effects on Poverty Alleviation

Many of the potential suppliers of environmental services are likely to be poor. The upper watersheds that are critical sources of water services, for example, are often inhabited by poor subsistence farmers, and payments for environmental services could be an important addition to their incomes. This will not happen automatically, however. Working with many small, dispersed farmers imposes high transaction costs, and special efforts are needed to ensure that the poor have access to the new opportunities created by PES programs. In Costa Rica a system of collective contracting has been developed through which groups of small farmers can join the PES program collectively rather than individually.

The World Bank and PES Initiatives

The PES concept ties in with many of the themes of the Bank's Environment Strategy. The environmental services provided by many ecosystems, such as regulation of water flows by forests, are a key dimension of the link between environment and the livelihoods, health, and vulnerability to natural disasters of the poor. Ensuring that such services are not lost is also critical to ensuring the long-term quality of growth. Box 2 highlights some recent World Bank initiatives to assist countries with implementing PES.

Further Reading

Chomitz, Kenneth M., and Kanta Kumari. 1998. "The Domestic Benefits of Tropical Forests: A Critical Review Emphasizing Hydrological Functions." *World Bank Research Observer* 13 (1): 13–35.

Pagiola, Stefano, and Gunars Platais. 2002. "Payments for Environmental Services." World Bank, Washington, D.C.

Pagiola, Stefano, Joshua Bishop, and Natasha Landell-Mills, eds. 2002. *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*. London: Earthscan, London.

Notes

1. Payment for environmental services is a relatively new approach, and there is not yet a settled definition of the term. It can be used very broadly to include, for example, pollution charges. Here we use it more narrowly to focus on mechanisms under which those who provide positive externalities are compensated for doing so, usually through payments from the beneficiaries. Pollution charges are in a sense the mirror image of this approach; they make those responsible for negative externalities pay for the damage they cause.
2. It should be noted that at present the eligibility of land-use based carbon sequestration under the Kyoto Protocol's Clean Development Mechanism is limited.
3. Monitoring is much simpler under a PES system than under a regulatory approach. Regulations penalize land users, creating incentives for them to conceal their actions; PES rewards them. Indeed, under a PES system the burden of proof can be inverted: rather than the regulator having to prove that land users have violated regulations, land users can be made to prove that they are providing the desired services in order to qualify for payments.

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The *Environment Strategy Notes* series aims to provide a forum for discussion on a range of issues related to the Environment Strategy, to help the transfer of good practices across countries and regions, and to seek effective ways of improving the Bank's environmental performance.

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