

8

PAYMENTS FOR ECOSYSTEM SERVICES
AND CONSERVATION BANKING

Lead authors:	Haripriya Gundimeda (Indian Institute of Technology Bombay), Frank Wätzold (University of Greifswald)
Reviewers:	Mugariq Ahmad, Michael Bennett, Sergey Bobylev, Kii Hayashi, Karin Holm-Müller, José Javier Gómez, Tilman Jaeger, Gopal Kadekodi, Emily McKenzie, Wairimu Mwangi, Leander Raes, Nik Sekhran, Kerry ten Kate
Acknowledgements:	Nathaniel Carroll, Nigel Dudley, Enrique Ibara Gene, Ann Neville, Alice Ruhweza, Christoph Schröter-Schlaack, Marc Teichmann
Editor:	Heidi Wittmer
Language editor:	Jessica Hiemstra-van der Horst

Content of this chapter

8.1	What PES is and how it works	142
	Relevance of PES to local policy makers	142
	Defining PES	143
	What kind of PES schemes are there?	143
	Financing PES schemes.....	144
8.2	Designing PES schemes	147
	Addressing key issues.....	147
	Avoiding common pitfalls	151
	Are PES schemes instrumental in poverty alleviation?	154
	Action points for PES scheme implementation	155
8.3	Conservation Banking	156
	Offsetting	156
	How conservation banking works.....	158
	Advantages of conservation banking.....	159
	Pre-conditions for successful conservation banking	159
	For further information	160

Payments for ecosystem services (PES) and conservation banking are both relatively new instruments for conservation. This chapter outlines the challenges policy makers face when using payments for ecosystem services and conservation banking to promote sustainable natural resource management. It explains why PES is relevant to local policy makers (8.1) and offers a description and definition of PES and outlines

issues related to the effective design and implementation of PES (8.2). The sub-chapter on conservation banking (8.3) starts with a description of offsetting and a discussion of its opportunities and limitations. It then turns to conservation banking, addressing its advantages and the pre-conditions for conservation banking to be successful.

Key Messages

- **Finding balance may be possible.** When the actions of one stakeholder group are carried out at the cost of another, payments for ecosystem services (PES) can compensate for lost ecosystem-related benefits.
- **Make sure everyone's on the guest list.** A successful PES scheme is socially, ecologically and economically appropriate. It should incorporate transparent, credible governance; appropriate incentive-based structures; and effective monitoring and enforcement.
- **Static schemes don't help in dynamic settings.** Sustainable PES schemes are adaptable to changing ecological and economic conditions.
- **Some doors may already be open.** Significant opportunities for local governments may arise from REDD and REDD-Plus schemes.
- **It's possible to take the pressure off.** Well-designed conservation banking can alleviate development-related pressures on biodiversity at a regional level.
- **If the shoe doesn't fit, don't wear it.** Conservation banking and offsetting are not always appropriate. To be viable, they must meet several preconditions.
- **You might find out you're on the same team.** Defending biodiversity need not create economic adversity. Offsetting and conservation banking systems may be flexible, cost-effective instruments for mitigating tension between development and biodiversity conservation.

“I would feel more optimistic about a bright future for man if he spent less time proving that he can outwit Nature and more time tasting her sweetness and respecting her seniority.”

Elwyn Brooks White 1977

8.1 WHAT PES IS AND HOW IT WORKS

PES is an incentive-based approach to protect ecosystem services by compensating landowners or managers who adopt practices that are favorable to an ecosystem. Simply put, those who use →*ecosystem services* pay those who provide them – and when providers are compensated, conservation becomes more attractive. PES can focus on a variety of services, from water flows to carbon sequestration and storage, →*biodiversity* protection, landscape beauty, salinity control and soil erosion prevention. →*Stakeholders* are encouraged through incentives to conserve or engage in less environmentally-damaging activities on a voluntary basis.

RELEVANCE OF PES TO LOCAL POLICY MAKERS

Local governments can effectively initiate both small and large-scale PES schemes, and local authorities play a key role from inception onwards – they can help with design, implementation, policy-enforcement and fundraising.

PES schemes are of interest to local policy makers because they:

- **aid in biodiversity conservation** and sustainable ecosystem service provision (where conventional regulatory approaches have failed);
- **provide revenue and employment** opportunities at the local level;
- **finance and mobilize sustainable conservation initiatives** that support the economic development of rural populations;

- ensure that →**ecosystem benefits are compensated by those exploiting them**;
- create **opportunities for local governments to benefit from REDD-Plus**, projects which reduce Emissions from Deforestation and Forest Degradation and enhance carbon stocks. Significant potential for these projects exists from various national and international donors. Carbon mitigation potential is estimated at € 23.6 billion (~ US\$ 33 billion) annually (Point Carbon 2007);
- can help **alleviate →poverty**;
- can be **combined with other programs** like →*eco-labeling*, local subsidies and →*ecotourism* to strengthen such programs.

PES schemes, however have a number of preconditions. Policy makers should keep in mind that any social hurdles, such as low levels of →*institutional* and legal capacity, may result in failure of PES schemes. PES programs require a great deal of cooperation that depends on state and/or community engagement. Local confidence often has to be won and small stakeholders often need increased bargaining power with more powerful stakeholders.

DEFINING PES

Direct private payments are transactions that take place between private service providers and users. Typically, they involve firms, conservation NGOs or households that benefit directly from certain environmental services. Stakeholders are motivated to conserve for a diversity of reasons – from ‘pure profit’ (for example, a mineral water company that depends on water quality and availability) to conservation concern. Payments may also be made by stakeholders who want to manage risk (avoid running short of a →*resource* they rely on) or to pre-empt anticipated regulations. For example, firms are increasingly participating in carbon offsetting because of climate change concerns. These are often voluntary and initiated without regulatory incentives or requirements. Direct private payment schemes tend to work well because it is in the buyer’s interest to secure and monitor the service. Local policy makers can consider initiating and supporting direct private payment arrangements.

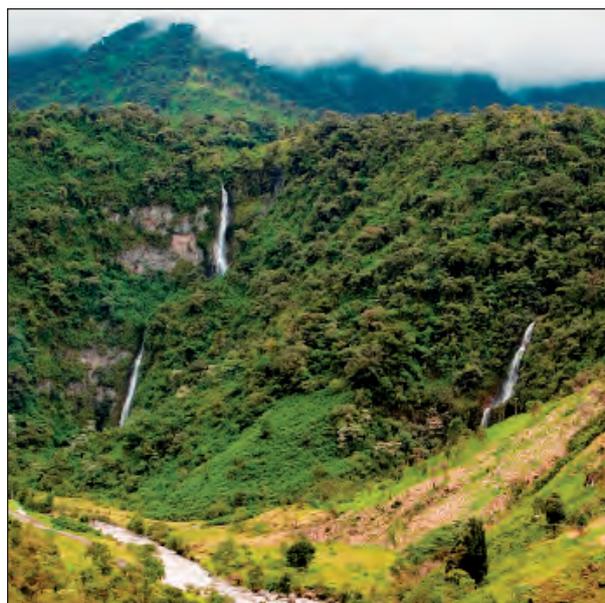
Direct public and government payments are government-financed schemes where the government pays service providers on behalf of their constituents. Governments participate in these schemes to secure ecosystem services:

- where the service is a →‘*public good*’ with many beneficiaries (like water provision);
- where the beneficiaries are difficult to identify;
- if an asset such as an endangered species will be lost if government does not act.

Communities profit from payments for ecosystem services that are a public good by receiving income from such payments and by shifting to less environmentally damaging economic activities.

WHAT KIND OF PES SCHEMES ARE THERE?

At present, most PES schemes protect **watershed services** (sediment and salinity control and flow regulation, for example). These schemes benefit easily identifiable local and regional users such as households, municipalities, industry, hydroelectric facilities, farmers, fisherfolk and irrigation services. Often, different users experience different benefits from the same area. The farmer, the fisher and the mineral water company, for example, all depend on a watershed for different services. These stakeholders’ interests may intersect or conflict, but there is usually room for collaboration.



Copyright: Erika Nortemann (2010) / The Nature Conservancy



Box 8.1 PES as private and public payments

Direct private payments in Japan: The recharge ability of the Shirakawa river is forecasted to decrease by 6.2% between 2007 and 2024 due to a combination of reduced rice production and increased groundwater extraction. In 2003, Kumamoto Technology Centre, extracting groundwater for manufacturing purposes, developed an agreement with local farmers to re-use the water to flood farmers' fields between crop cultivation. This facilitates the recharging of groundwater, which the company uses (Payments for ground water recharge, Japan, TEEBcase by Hayashi and Nishimiya).

Direct public payments in China: The 'Paddy to Dryland' program, initiated in 2005, involves direct payments from a Beijing municipality to farmers in the upper watersheds of reservoirs. These payments provide financial incentives to convert water-intensive rice paddies to corn and other low water-use dryland crops. Payments were originally set at approximately US\$ 980/ha and have been increased to approximately US\$ 1,200/ha in 2008 (all values calculated using 2010 exchange rates). To date, more than 5,600 ha of paddy fields have been enrolled in the program (Converting water-intensive paddy to dryland crops, China, TEEBcase based on Bennett).

While watershed services schemes often benefit stakeholders at more local levels, **carbon markets** mostly have global beneficiaries. Potential buyers include local, regional and national governments, international organizations, national and international carbon funds, conservationists, and firms. Carbon sequestration schemes can include agroforestry, reforestation and REDD programs. Markets for REDD have significant funding potential. International donor agency funding for REDD projects is strong and growing, providing a unique opportunity – the linking of local PES schemes with international conservation strategies.

Determining which ecosystem services are targeted varies among PES schemes. In certain cases, the protection of a single service protects several others. Often, if a forest is protected for carbon sequestration, an area's beauty, biodiversity and watershed services are also protected (a '**bundling of ecosystem services**').

FINANCING PES SCHEMES

PES schemes succeed only if payments can be sustained over the long-term. Their success depends on funding availability – from implementation and operation to the cost of program maintenance, including continued payments to service providers.

 **Biodiversity conservation services** include habitat, species and genetic resource protection. These services benefit local, national and global communities. Potential buyers include international and national NGOs. Increasingly, governments act as buyers as well. For example, agro-environmental programs in Europe target conservation of endangered species.

 **Landscape services** encompass a variety of services such as wildlife conservation and the protection of landscape beauty. They also benefit a variety of stakeholders, from the local to the global level. Potential buyers include municipalities, park authorities, tourism operators, rafting companies and hospitality-related businesses. These markets are similar to biodiversity markets but target services that depend on access to scenic beauty and wildlife.

Often, external funding is required to establish a PES scheme. External funds can be raised through contributions from international organizations such as the World Bank and the Global Environment Facility, or from subsidies from national governments with conservation mandates. Further financial support can be raised by earmarking revenues, collecting taxes, direct voluntary payments from beneficiaries, trust funds, user fees and charges and public-private partnerships. These direct payment mechanisms require that beneficiaries are convinced of program benefits. Local governments are advised to explore various financing solutions, rather than relying solely on external funding. To ensure a program's long-term sustainability, a PES scheme can be linked with other programs and partnerships (such as international carbon markets, or public-private partnerships).

Box 8.2 Cases from around the globe: different PES initiatives

Hydrological services: In China, the NGO Shan Shui Conservation Centre initiated a fresh-water conservation program in 2007 in response to over-harvesting of community forests and the use of chemical fertilizers in farming (in Pingwu County, Sichuan Province). These village practices threatened both water quantity and quality downstream. The NGO, in cooperation with local government, designed a program for lending money generated through water fees in Pingwu city to the village community. Villagers were given loans and provided training for new, profitable, skill-sets (such as bee keeping and techniques for converting animal waste to fertilizer and domestic biogas). (Payments for fresh water conservation in China, TEEBcase by Lu Zhi).

Biodiversity protection: In Rhode Island (United States) the practice of harvesting hay twice a year has been identified as a key reason for a 40 percent drop in the bobolink population – because the bird's nesting season coincides with the hay harvest. The bobolink project was created, an initiative that raises money through voluntary contributions. These contributions subsidize farmers for the cost of delaying their first harvest – giving the birds time to nest (Conserving Bobolink through voluntary payments, Rhode Island, TEEBcase based on Stephen Swallow et al.).

Carbon sequestration: Farmers who participate in the Scolel Té program in Chiapas (Mexico) exchange responsible farming and reforestation practices for carbon offset payments. They receive financial incentives through the sale of voluntary emission reduction credits to private individuals and firms (Carbon offsets for sustainable land use, Mexico, TEEBcase by Alexa Morrison).

Landscape beauty: The Bunaken Marine Park in North Sulawesi, Indonesia, is located in the Coral Triangle. The park contains nine fishing villages that were engaged in environmentally destructive fishing practices. Through a seven year process, central and local stakeholders established the 'Council for the Park Governance,' which comprises park authorities, local government, local businesses and community leaders. The council rezoned the marine park and established a dive fee and a park entrance fee in 2000. Park communities also agreed to acknowledge rezoning and participate in a park patrol system. A portion of the fees covers the costs of increased management effectiveness and administration. In addition, it supports economic empowerment (village infrastructure and microcredit schemes). As a result, the reef and fish populations are improving and the community is benefiting (Revenue sharing from marine park benefits communities' livelihood and conservation, Indonesia).

Bundled services: In 2004, the Mexican government launched CABSA, a program aimed at developing markets for carbon capture and biodiversity in order to establish and improve agroforestry systems and complement existing PES schemes for hydrological services. CABSA supports reforestation activities and land-use change in Mexico by linking them to national and international carbon capture and biodiversity programs (Bundling of ecosystem services in agroforestry, Mexico. TEEBcase based on Kosoy et al.).



Box 8.3 Financing PES programs through water funds

The Quito water fund in Ecuador (also known as FONAG) is a sustainable finance mechanism that allows for long-term protection of natural ecosystems and the provision of important ecosystem services. The watershed in Quito supplies around 80% of fresh water. Water users pay into the funds in exchange for the fresh clean water that they receive. The fund in turn pays for forest conservation along rivers, streams and lakes and also funds community-wide reforestation projects to ensure the flow of safe drinking water. FONAG has served as a model for other water funds across the region. PES programs are financed through water funds in some municipalities of Columbia, Peru and Brazil as well.



Source: Water fund for catchment management, Ecuador. TEEBcase by Veronica Arias, Silvia Benitez and Rebecca Goldman

Table 8.1 Schemes for financing PES programs

Type of scheme	Location	How it functions
Voluntary contribution	Mexico (Coatatepec Municipality Veracruz)	Domestic and commercial users may voluntarily contribute (Mex\$ 1) on their water bill to finance watershed conservation, to recognize the link between deforestation and water scarcity (Voluntary user contributions for watershed protection, Mexico. TEEBcase based on Porras et al.).
Monthly salary contribution	China (Xinjian Autonomous Region)	In China, the Forest Ecological Benefit Compensation Fund was set up to provide → <i>economic incentives</i> to organizations, collectives and individuals who manage key protection and special-use forests. Local and provincial governments are encouraged to provide matching funding. The Xinjian Autonomous region raises the funds through wage deductions from the monthly salaries of employees (PES scheme funded through monthly salary contributions, China. TEEBcase based on Xiaoyun et al.).
Annual fee	Indonesia (North Sumatran district government)	PT INALUM, an aluminum smelter and hydroelectric producer, pays an annual fee to the North Sumatran district government. The fee covers investment in the rehabilitation of critical lands in five districts within the catchment areas of the Lake Toba – where the company draws its water for hydropower generation (Critical land rehabilitation through annual industrial user fee, Indonesia. TEEBcase based on Suyonto et al).
Endowment fund	Brazil	The program Bolsa floresta rewards traditional communities for their commitment to stop deforestation. The funds are generated by the interest on a core fund first established with contributions from Amazonas Government and Bradesco Bank (Financing forest conservation through grant funds, Brazil. TEEBcase mainly based on FAS).
Share of water charge	Japan (Aichi Prefecture and others)	Citizens pay the fee of JPY 1 per m ³ of water usage and the city setup the 'Toyota city tap water source conservation fund' (Tap water fee for forest management, Japan, TEEBcase based on Hayashi and Nishimiya).
Watershed protection fee from industry	South China (Xingguo County)	The 'Household Responsibility' system requires that industry pays a share of their sales revenue to support tree-planting and management for soil conservation (chemical 3%; metallurgy 0.5%; coal, 0.1 Yuan/ton produced; hydropower, 0.001 Yuan/kWh) (Industries share sales revenue for watershed protection, China, TEEBcase based on Bennett).
Certificate for environmental services	Costa Rica	Individuals or organizations purchase certificates to pay for environmental services (1 certificate = 1 ha of forest set aside for conservation). Buyers can specify how they would like their funds invested or let the National Forestry Finance Fund decide. Individuals can deduct their contribution from their gross income tax (Certificate for environmental services, Costa Rica. TEEBcase based on Russo and Candella).
Ecological sales tax	Brazil	Funds raised through sales tax are allocated by ICMS Ecológico (a common name for initiatives launched by several Brazilian states) to municipalities depending on their support and maintenance of protected areas or their level of municipal sanitation infrastructure (Financing conservation through sales tax, Brazil. TEEBcase based on Ring).

8.2 DESIGNING PES SCHEMES

When designing PES initiatives, policy makers are faced with several important considerations:

- the form of payments and how to disperse them;
- which services to pay for – and who to pay;
- the size of the payment;
- how to evaluate the program's cost-effectiveness and effectiveness;
- the role of intermediaries;
- whether secure tenure rights are necessary;
- how compliance with the program's requirements will be monitored and enforced;
- whether PES should be linked to poverty alleviation.

ADDRESSING KEY ISSUES

HOW ARE PAYMENTS MADE AND DISPERSED?

Program designers can determine whether payments will be made in kind, in cash, or a combination of the two. Whether to choose cash or in-kind payments is entirely context-specific, as each has its own advantages and limitations.

Cash payments offer considerable flexibility, as well as financial autonomy for participants. In-kind payments may take several forms such as loan waivers, access to finances, provision of inputs for agriculture, the provision of drinking water facilities and access to micro-credit. In some cases, in-kind payments are

both more effective and more favored by participants than cash. Payments made in the form of agricultural input or credit-access may be of great benefit if these markets are limited or non-existent, for example. When an ecosystem service requires community-level *management* in order to regulate an even and fair distribution of benefits, payments in the form of social services (such as health care and education) may be preferable to cash.

Once the form of payment has been determined, a decision has to be made – whether payments should be 'one-off' or be made in periodic installments. While investments in PES schemes are immediate, environmental benefits often arise later and take place over the long-term. Although participating landowners may experience immediate income losses, they may eventually experience high-returns. If this is the case, 'one-off' payments may be sufficient. However, if the long-term returns of land-use changes are not sufficient, continuous payments may be necessary. In some circumstances, a combination of 'one-off' and continuous payments may be most effective (see Box 8.10).

WHO GETS PAID FOR WHAT?

In some developing countries, land is often collectively owned with rights to common access for local community members. In this situation, an important issue

Box 8.4 PES Benefits from in-kind payments for farmers and communities

Colombia: In Cuencas Andinas, a municipality initiated a PES scheme to reduce nutrient loads in Fuquene Lake. Payments were made in-kind in the form of provision of inputs (such as farm tools) to promote and implement improvements such as a transition to organic fertilizers. Farmers in the municipality also benefited in another way – funds from the PES scheme served as a guarantee (for 10% of the debt) to assist them in securing loans (Reducing nutrient loads through providing debt-guarantees, Columbia. TEEBcase by Marcela Munoz).

India: The Biorights Program in East Kolkatta is an innovative financial mechanism that provides micro-credits to local communities in return for active involvement in conservation and restoration of wetlands. The micro-credits are converted into definitive payments upon successful delivery of conservation services at the end of a contracting period. The global and local stakeholders pay local communities to provide ecosystem services (Conserving wetlands through microfinance programs, India. TEEBcase based on Dipayan).

to consider is whether payments should be made to individuals, communities or to community representatives. For example, in Mexico land was redistributed among organized groups of peasants (called 'ejidos') as part of agrarian reforms. While individuals have land rights, land is community-owned, so authorities decided, rather than paying individuals, to pay representatives of the 'ejidos' who chose how to distribute and use the PES funds.

Because the aim of PES is to deliver a well-defined commodity, both a careful identification of ecosystem services and consideration of the degree to which service provisions are measurable, determines whether payments can be made directly or require proxies (such as particular land-use requirements). Forest protection schemes, for example, have clearly measurable benefits for carbon sequestration, but not necessarily for biodiversity. When determining who gets paid for which service, payments can be made directly for carbon sequestration. Payments for biodiversity may be made through a proxy – such as biodiversity-friendly forestry practices or the rehabilitation of degraded areas.

A related issue is to consider whether payments should be based on adherence to certain measures or on obtaining specific results – whether they will be 'effort' or 'performance' based. In Indonesia, a community group that performs soil and water conservation practices (River Care) is paid according to sediment load reduction (from US\$ 250 for reductions of less than 10% to US\$ 1,000 for a reduction of 30% or more) (Outcome based payments for improved water quality, Indonesia, TEEBcase). Measuring performance, however, is not always possible. In such cases, easy to monitor substitutes may be available such as afforested or undistributed area.



HOW MUCH SHOULD PARTICIPANTS BE PAID?

To ensure that providers participate, incentives need to compensate for →*opportunity costs* – what participants would expect to make if they engaged in other land-use practices (such as agriculture, animal husbandry or construction). In addition, further costs of program participation, such as administrative costs for providers, must be covered by the payments. Given that conservation budgets are limited, payments that exceed costs mean that fewer providers can take part in the scheme. This results in less benefit.

When participants provide equally, local governments can pay all providers the same amount. When benefits differ, however, and funds are not sufficient to cover the costs of incentives to all participating providers, governments may examine the feasibility of paying more to those who provide more, prioritizing projects with the greatest benefits (Boxes 8.5 and 8.9). Accounting for both opportunity costs and the quality of the environmental service delivered may lead to the inclusion of more environmental services within a given conservation budget.

EVALUATING EFFECTIVENESS AND COST-EFFECTIVENESS OF PES PROGRAMS

Evaluation of a PES program ensures that environmental services are actually provided and that financial resources for PES are not wasted. The effectiveness of a PES scheme can be measured by its outputs. It is effective if the result of implementation is an increase in ecosystem services or a halt in ecosystem degradation. This is not always the case, especially if the effect of measures on intended outputs is not well-known (Box 8.6). Therefore, monitoring results is important.

Box 8.5 Determining payment size

Mexico: Mexico faces both high deforestation and severe water scarcity. The Payment for Hydrological Environmental Services Program was designed to respond to these problems. It is designed as a two-tiered fixed-price program. Cloud forest comprised the upper tier and non-cloud forest the other tier, because cloud forests provide higher benefits than other forest due to their important role in capturing water from fog in the dry season. To reflect these differences in benefits, it was determined that participants would be paid Mex\$ 400/ha (US\$ 36.40) for cloud forests and Mex\$ 300/ha (US\$ 27.30) for other forests.

Source: Munoz-Pina et al. 2005

Box 8.6 Implementing a PES scheme does not guarantee program effectiveness

The Netherlands: Roughly 20% of farmland in the European Union is regulated by agri-environmental schemes aimed at counteracting the negative impacts of modern agriculture on the environment. A study of agricultural land in the Netherlands which compared land managed under agri-environmental schemes and conventionally-managed land revealed that those under the schemes were not effective in protecting the species richness of certain groups. It was determined that there were no positive effects on plant and bird communities and in fact, the four most common wader birds were observed even less frequently on fields with agri-environmental management.

Source: Kleijn et al. 2004

→ *Cost-effectiveness* is measured by a program's ability to achieve targeted ecosystem service-provision goals at minimal costs. It can be improved with a targeted approach to site-selection or measure-selection – an approach that designs payments in such a way that participating sites or measures are selected for available financial resources where the benefit/cost ratio is highest. This implies that sites with high benefits and low opportunity costs are preferable to ones with low benefits and high opportunity costs. Scoring indices can help to enable targeting. For example, in silvopastoral projects in Costa Rica, Colombia and Nicaragua, the payments were linked to such a scoring index. It combined an index for biodiversity that assigns a numerical → *value* to operations based on biodiversity friendliness, and an index for carbon sequestration that assigns points per ton of carbon sequestered. The project resulted in a 71% increase in carbon sequestered and an increase in bird, bat and butterfly species as well as a moderate increase in forested area along with reduction in use of pesticides (Measuring ecosystem services through scoring index, Costa Rica, Colombia and Nicaragua, TEEBcase based on Pagiola et al.).

WHAT IS THE ROLE OF INTERMEDIARIES IN PES PROGRAMS?

In theory, direct transactions between providers and beneficiaries are ideal. While intermediaries can contribute to the success of programs, they increase transaction costs. However, an intermediary is often necessary to facilitate transactions because exchanges between buyers and providers can be complicated. Intermediaries can be national or local governments, environmental NGOs, development NGOs and donors, or they can be created by the PES program. Intermediaries can play three different roles:

- Represent beneficiaries (buyers such as NGOs, private businesses or government agencies)
- Represent providers (the suppliers of the ecosystem services such as farmers)
- Serve as wholesale managers (acting as a financial intermediary that buys services and sells them to national and international buyers)

Intermediaries can be utilized at various stages, from facilitating stakeholder dialogue to program administration support. At the dialogue stage, they can identify

Box 8.7: Identifying sites with high benefits through a two-tier target approach

In the municipality of Copán Ruinas, Honduras, a PES program was developed to mitigate the impacts of damaging activities to the watershed on which many families depend. A two-step approach has been adopted to target sites where the provision of ecosystem services is both high and under threat. First, the municipality ranked water sources based on the number of households they service, current levels of water extraction, and the number of potential future households using the sources. Second, they ranked sites based on their potential for providing watershed services and their → *vulnerability* to reductions of these services. After targeting the program to high-benefit, high-risk sites, the next step was to precisely measure the hydrological services these sites provide by developing an index of 15 combinations of land uses and land management practices commonly observed in Copán.

Source: PES as incentive for farmers to shift to sustainable activities, Honduras, TEEBcase based on Madrigal and Alpizar

which environmental services buyers expect and then negotiate the prices for trading these services. At the program design stage they can conduct feasibility studies, design mechanisms for payments, develop management plans, establish monitoring systems and ensure the delivery of services. At the support stage, intermediaries can design technical, social and institutional land-management instruments for both providers and buyers. Finally, at the administration stage, they can draw up contracts, manage funds, coordinate monitoring and oversee technical issues that arise (Porrás et al. 2008).

THE ROLE OF TENURE RIGHTS IN PROGRAM DEVELOPMENT

Determining who ‘gets paid’ for services usually hinges on who ‘owns’ the area in question. Providers with land tenure have a lot of control – they can choose whether or not to participate and they can stipulate how much their cooperation is worth. If providers have access rights, but not private land tenure, they retain rights to access the services provided by the area in question. If these services will be limited by the proposed scheme, these providers should be entitled to a share of payments.

Property rights relevant for PES program development are:

- rights to land, water, forests or other resources, as well as the right to buy and sell ecosystem services (government or private ownership).
- rights to manage resources, even if resources are collectively owned (by traditional communities, for example).
- rights to income and other benefits from ecosystem services (these are guaranteed by law in the case of some indigenous peoples).

When implementing PES programs, preference may be given to areas with clear tenure rights. Secure tenure rights are generally necessary for a well-functioning PES scheme, especially as they decrease the risk of ‘elite capture’ – when more powerful individuals or groups benefit over others. However, this bias may act against landless or mobile communities (pastoralists). Therefore, in appropriate contexts, strategies for including people without formal rights or

titles can be explored. For instance, when customary rights exist but land titles are unclear, policy makers can make an effort to legalize titles or clarify individual or group ownership. Such efforts may improve the participation of small landowners. For example, when Costa Rica’s PES schemes were first developed, only landholders with clear titles to land could participate (Pagiola and Platias 2007). This regulation blocked many poor farmers and so, in later schemes, methods were developed to include the landless. In another case, in Indonesia, community forestry permits have been issued since 2000 (TEEBcase Community forest permits as rewards for provision of ecosystem services, Indonesia). These permits were instrumental in the implementation of a conditional land tenure scheme using tenure security rather than cash payments as a reward. Cooperation between government and local community for this type of mechanism is important.

The success of a scheme is dependent on its socio-economic, cultural, political and institutional context. A careful assessment of tenure rights followed by the implementation of small but significant changes in access or regulations may ‘make or break’ a PES scheme.

MONITORING COMPLIANCE AND RESULTS

Close monitoring in three areas in particular is crucial to a successful PES program:

1. program implementation and participant compliance;
2. the scheme’s impact on the generation of services;
3. the scheme’s impact on local users.

Careful program monitoring ensures that services are generated, payments are adjusted and technical assistance is provided where necessary. Beneficiaries need evidence that their investments are instrumental in effective change in order to continue participating. Well-regulated monitoring practices allow for payment adjustments and contributions – they optimize the system.

Depending on the scale of the project, several methods can be employed, from regular site visits to small sites, to random inspections in the case of more remote and inaccessible ones. Satellite imagery can also be used, followed up by ground-truthing assessments.

Box 8.8 Providing legal support for PES programs

Costa Rica: In 1996, the country adopted a law which explicitly recognized several of the services provided by forests: mitigation of greenhouse gas emissions; hydrological services; biodiversity conservation; and the provision of landscape beauty for tourism and recreation. This law provides both the legal framework for regulating contracts with landowners as well as a mechanism for paying participants. Under this law, the National Forestry Investment Financing Fund (FONAFIFO) is also empowered to issue contracts for environmental services provided by privately-owned forests.

Source: Enabling the legal framework for PES, Costa Rica, TEEBcase based on Bennet and Henninger



Policy makers often need to ‘get the law on their side’. As compliance with PES regulations is critical to PES success, compliance also needs to be monitored. Legal enforcement, one of the most complicated aspects of PES programs, is often crucial. In some cases, failure to monitor compliance with the law may result in the degradation of the ecosystems concerned. If contracts have been breached, adequate sanctions need to be imposed. Such sanctions are easy to implement in schemes involving periodic payments but more challenging in the case of ‘one-off’ payment strategies.

In general, a healthy legal environment is necessary for a healthy PES program. Such an environment allows for amendments to existing laws, explicitly recognizes the environmental services provided by certain ecosystems, clearly defines buying and selling rights, legally acknowledges property rights, acknowledges the autonomy of certain communities, ensures compliance with legal requirements and has the ability to issue decrees in regards to environmental compensation. In some cases, the recognition of environmental services in national law helps pave the way for local schemes. At the same time, local schemes can be implemented without changes to national laws – through minor changes to municipal legislation (for example, investing revenues from water levies).

AVOIDING COMMON PITFALLS

Common pitfalls for policy makers include:

- sub-optimal payments to encourage desirable land-use practices;
- paying for practices that would have been adopted regardless of the scheme (lack of additionality);
- direct and indirect ‘leakage’ (whereby the PES scheme only displaces a certain ‘undesirable’

activity to a different area);

- lack of permanence (the program is not viable over the long-term);
- high transaction costs.

SUB-OPTIMAL PAYMENTS

Payments must, at minimum, cover opportunity costs. Payments that are too low will not be sufficient to motivate landowners to adopt socially desirable practices. Another common problem arises out of concern to motivate participants. This may lead to the overpayment of service providers. Overpayment is a problem because available financial resources are limited and if some providers are overpaid, too little is left for others. This results in less environmental services provision.

The ideal scenario for avoiding this pitfall is to offer differential targeted payments depending on the opportunity cost of land. However, opportunity costs may not be known to the policy maker. Service providers have an incentive to overstate them in order to receive higher payments. One way to overcome this problem is to use →*auctions* to determine the payment. Auctions often reveal information about opportunity costs. Participants know that if they exaggerate opportunity costs there is a risk that they cannot participate in the program. However, this approach is expensive and may present problems with implementation, particularly in countries with limited institutional capacity. Several countries, however, are testing this approach – among them Vietnam, India, New Zealand and Australia.

LACK OF ADDITIONALITY

If a program’s desired outcomes would occur without the scheme, the program lacks additionality. Targeting

Box 8.9 Avoiding overpayments through auctions

USA: The Conestoga Reverse Auction Project in Pennsylvania was a two-phase scheme that paid farmers to implement best management practices (BMPs) to reduce phosphorus losses in local waterways.

- In phase one, farmers bid to implement specific BMPs based on the USDA Environmental Quality Incentive Program (EQIP). The cost of these practices was pre-determined based on standard BMP costs and cost-share amounts.
- In the second phase, farmers bid on the price they were willing to accept to implement a BMP (which could exceed the BMP implementation costs).

Bids were ranked based on the cost of phosphorus reduction. Based on the ranking, policy makers determined the cut-off price for the auction budget. Bids lower than the cut-off price were successful.

Source: Reverse auctions help farmers to reduce phosphorous content in local waterways, USA. TEEB case based on Selman et al.

financial resources at practices that would be adopted anyway is certainly not a good use of limited financial resources!

For this reason, ensuring additionality is an important step in achieving the desired outcomes. Projects demonstrate additionality when:

- they face implementation barriers that can only be overcome with PES schemes;
- without a PES scheme, a project is not the most economically or financially attractive course of action for participants, although it is socially desirable.

Local governments can help ensure the additionality of a project by prioritizing areas with high degradation rates (due to competing land-use practices) over those with relatively low degradation rates. But sometimes even if projects do not satisfy the additionality condition, they are still implemented in order to minimize risk that ecosystem services are lost.

DIRECT AND INDIRECT LEAKAGE

In some cases, a PES project may only displace environmentally damaging activities. Rather than creating benefits, it shifts environmentally harmful activities somewhere else. This unintended side-effect is referred to as 'leakage' or 'spillage.' For example, a project aimed at restoring pastureland degraded by overgrazing in an area may simply cause herdsman to shift the same overgrazing practices elsewhere.

Leakage, however, is a risk that can possibly be addressed in program design. For example in the case

of pastureland recovery, allowing restricted grazing within project areas may limit displacement and associated impacts. As discussed earlier, a well-designed monitoring plan can help mitigate project-related risks.

Besides this type of 'direct leakage', 'indirect leakage' is also possible. For example, enrolling agricultural land in a scheme aimed at afforestation may cause the price of agricultural goods to increase. A reduced crop area may lead to a reduced supply of agricultural goods – raising the price of these goods. If the price of agricultural goods rises, agricultural activities may become more attractive relative to other activities and land in neighboring areas may be converted to agricultural production.

Unfortunately, indirect leakage is more difficult to avoid than direct leakage. However, it may only take place in circumstances where PES programs are large enough to affect the price of goods, through reduced supply.

LACK OF PERMANENCE

The long-term success of a program depends on its sustainability which, in turn, depends on the scheme's ability to maintain payments over the long-term – either through government funding or payments from willing beneficiaries.

Similarly to the issue of leakage, some permanence issues can be addressed at the design stage. If payment schemes and contracts are designed to provide a structure of rewards that encourage landowners or users to continue targeted activities far into the future, a program is likely to be successful in the long run. This may present a challenge, however, since long-term

Box 8.10 Controlling leakage

The Costa Rican national carbon offset program: In 1997, the government established the Protected Areas Project to consolidate their national parks network. It purchased privately owned land within the park in order to prevent the release of CO₂ from deforestation in these areas. The government, however, anticipated that the landowners would continue with their damaging activities outside the park boundaries. It initiated a parallel program, the Private Forests Project (PFP), which provided farmers with financial incentives to engage in forest-related land-use practices to prevent deforestation. The environmental services of the program included CO₂ fixation, biodiversity, water quality, and landscape beauty. The project was independently certified, and the potential for slippage and leakage was considered negligible.

Source: Vöhringer 2004

contracts may lack the flexibility necessary to adapt to changing market conditions. This may deter some landowners, who want to keep their land-use options open, from participating.

For this reason, policy makers may opt to design a scheme that differentiates between short and long-term payment options. While long-term payments may be more attractive as they fetch a higher price, short-term payments are still available for 'hesitant' participants. Under the →*Kyoto Protocol*, for example, participation in CDM afforestation and reforestation projects can be increased by creating temporary credits that are issued with a defined expiry date. These credits can be reissued or renewed every five years after independent verification confirms that sufficient carbon has been sequestered.

HIGH TRANSACTION COSTS

Transaction costs refer to costs incurred by buyers, providers and the authorities to set up and run PES schemes. They include the costs for gathering the necessary information to design and implement a proper scheme, the administrative costs related to running the scheme (including monitoring and enforcement activities) and the administrative costs of participants. Taking transaction costs into account is crucial because if they are too high they may render a scheme unsustainable.

Transaction costs tend to be highest during the start-up phase, decreasing significantly over time. Several factors determine transaction costs, such as:

- size of the scheme (a large program may have

lower costs/unit than smaller programs);

- number of parties included in the scheme (many parties with many small land parcels may drive operational costs up per parcel);
- type of contract the scheme employs;
- waiting-times for contract approvals;
- mode of payment for participants.

While it may seem attractive to keep transaction costs down by selecting large parcels of land and minimizing the number of users, such actions may decrease cost-effectiveness and result in inequity – excluding poor people from involvement in PES programs. While considering strategies for minimizing transaction costs, policy makers may want to consider the following recommendations:

- **Simplify guidelines for design and formulation of PES schemes.** When feasible, contract directly between users and providers because intermediaries, though useful for facilitating the process, can also push up the transaction costs. Another way to simplify the program is to opt for collective contracting – where several small-scale farmers conduct the contracting process together, reducing the cost of individual transactions.
- **Reduce the costs of monitoring and measurement.** While proper monitoring is essential, there may be opportunities to save on monitoring costs. PES programs can utilize local experts (provided they are appropriately skilled and independent) rather than relying primarily on external experts. Policy makers can also keep up to date with technological advances in monitoring schemes which may decrease monitoring costs.

- **Adopt institutional innovations.** There is a lot of room for innovation – from forming specialized services to building on existing community development programs, bundling environmental service payments, reducing data costs, establishing large-scale area-wide projects and creating cost-sharing mechanisms (Smith and Scherr 2002).

these market handicaps may develop ways to assign equitable rights to land and environmental resources to financially disadvantaged participants. The scheme might invest in education and training, establish market support centers or provide start-up capital. They may also encourage land bundling and consolidation (Landell-Mills and Porras 2002; WWF 2006).

ARE PES SCHEMES INSTRUMENTAL IN POVERTY ALLEVIATION?



While the primary goal of PES programs is to manage environmental and natural resources effectively and cost-effectively, they also often help to alleviate poverty.

PES schemes have the potential to provide financial stability to poor households (as consumers or providers), generating income directly or indirectly. An equitable scheme typically considers those things that poor people often lack – well-defined or secure land rights and access to certain resources (market contacts, communication infrastructure, and capital for start-up costs). A PES strategy that overcomes

A recent study estimates that markets for biodiversity conservation could benefit 10-15 million low-income households in developing countries. Carbon markets could benefit 25–50 million. Markets for watershed protection could benefit 80-100 million and markets for landscape beauty and recreation could benefit 5-8 million by 2030 (Milder et al. 2010).

PES may lead to increased income for land-users if it is possible to market the improvement in environmental services. This may require participation in an eco-labeling scheme to be able to sell goods produced in a sustainable manner to consumers. If payments focus on the conservation of charismatic species and improving landscape beauty, eco-tourism can provide an additional source of income for a region.

Box 8.11 40 years of PES in Sukhomajri (India)

While the term ‘PES’ is fairly new, the concept has existed for quite some time. In the 1970s, agricultural land degradation led villagers in Sukhomajri to practice indiscriminate free-grazing, land-clearing and tree-felling – perpetuating a cycle of land degradation and poverty. These actions affected the water supply for communities downstream. In response, the Centre for Soil and Water Conservation Research and Training Institute, supported by the Ford Foundation, constructed soil conservation structures to reduce lake siltation and capture rainwater. As these structures could benefit only landowners, an important element of the plan was to have better water sharing arrangements which could benefit all the villagers.

In return for protecting vegetation, a water-users association constructed rainwater collection dams which improved village water supply and allocated tradable water rights to every household. Over time, the tradable water right system was replaced by a user fee and in return the villagers received the revenue from sale of forest products. In addition, families with no land or marginal land have been given land rights, and those who wish to can sell water entitlement. An affiliated reforestation project is further expected to benefit the community through timber extraction from communal property.

This PES scheme has, in the past 40 years, generated high economic returns for the once-poor community. It has improved agricultural productivity and increased household income. Siltation in Sukhna Lake has fallen by 95%, which saves the city downstream (Chandigarh) about US\$ 200,000 annually in dredging and related costs. The hillside vegetation is expected to raise the value of the forest to an estimated US\$ 700,000 annually (1997 exchange rate) from the sale of forest products and babbhar grass.

Source: Equitable sharing of benefits in Sukhomajri India. TEEBcase based on Kerr

Box 8.12 PES, Eco-labeling and Ecotourism in Toyooka City, Japan

The Oriental White Stork, reliant on traditional rice-paddies for hunting, nearly became extinct by modernized rice farming practices. In Toyooka, Japan, a **PES** scheme was introduced to restore the habitat quality of the fields and this has benefitted both rice farmers and the stork. Since 2003, rice farmers have been encouraged to use compost, organic fertilizers, and reduced or chemical-free pesticides. They have also been encouraged to flood paddies deeper, retain water longer and keep a diary of living creatures. From 2003-2007, participating farmers were paid US\$ 330 per 1000m³ (US\$ 80 to those joining today) for income and labor compensation. As a result, the stork population has increased to 36. Importantly, the reintroduction of the stork has raised municipal income by 1.4%.

Eco-labeling

Although growing rice to conform to eco → standards reduces yields by 25%, rice grown with reduced pesticide use can be sold at 23% higher and organically grown rice at 54% higher.

Ecotourism

Stork-related tourism is estimated to generate more than US\$ 11 million annually. Visitors to Toyooka include school children, students from China and Russia, farmers and researchers from Korea. Japan's largest travel agency sells 1,000 package tours to Toyooka every year.



Source: PES for habitat restoration to reintroduce Oriental White Stork. TEEBcase by Hayashi and Nishimiya

ACTION POINTS FOR PES SCHEME IMPLEMENTATION

Designing and implementing a successful PES scheme is a complicated but economically rewarding process. There are no simple prescriptions, but a plan that integrates local people, local infrastructure and the biophysical context of the ecosystem services associated with the scheme is most likely to be successful. Importantly, a successful plan is most likely adaptable, inclusive and creative – one that treats both land and people as valuable resources.

Find ways to use human resources that are available. This may involve generating commitment to participate from communities, landowners, institutions, organizations or local leaders.

- Collective action at the community level can be mobilized through education (describing and explaining the program's ground rules).
- Capacity building can take place for both buyers and service providers.
- Credible intermediary organizations like NGOs, civil society institutions, community-based organizations can help raise awareness about the link between new practices and their subsequent environmental benefits.

It may be possible to turn deficits into opportunities for improving institutional structures when ineffective government structures, corruption and poorly defined land-use rights are limiting resources and options.

- Land managers can be assisted in obtaining secure property rights or legal clarification about customary rights.
- Tailor-made PES schemes can be created when this is not possible.
- Legal enforcement can be improved, as it is key to PES success.
- The inclusion of poor people and women can ensure greater collaboration and increase program effectiveness.

Explore practical ways to support effective and cost-effective PES schemes

- Find ways to establish trust between buyers and providers. Support buyers of eco-products. This will help to increase demand for products that support sustainable resource use. Provide access to credit and promote appropriate technologies. Support the creation of new markets.
- Help community organizations or associations to keep transaction costs low.
- Choose payments that are slightly higher than the opportunity cost to the service providers,

and lower than the benefits generated from increased environmental services provisioning.

- Ensure that land enrolled in schemes passes the additionality test. Minimize leakages and do your homework to ensure permanency.

Make sure that the people who make decisions are informed

- Make use of credible scientific findings to show how changes in land-use practices affect the quality of ecosystem services provided.
- Make use of existing valuation studies that link PES with increased environmental service provision.

Find ways to make sure the plan can change when circumstances change. A flexible plan is open to improvements and new economic opportunities.

- Monitor outcomes regularly. If there is a provision in national laws, local governments can use this or create their own guidelines and regulations to help raise finance for PES schemes.
- Remove perverse incentives which may impede the success of PES.
- Bolster the strength of the program by using a mix of subsidies, eco-labeling and ecotourism, if appropriate.

8.3 CONSERVATION BANKING

If a unique habitat is to be destroyed by an economic development project and it cannot be restored elsewhere, there are strong arguments in favor of halting development projects. However, many habitats, especially where landscapes have been dominated by human land use for centuries, can be restored relatively quickly. In these cases, there is an argument for allowing economic development projects when adequate compensation (habitat restoration, creation or enhancement) takes place elsewhere in the region (Briggs et al. 2009). This kind of compensation is often referred to as ‘offsetting’ (see also TEEB in National Policy 2011, Chapter 7.3). Conservation banking refers to the concept that markets can deliver ‘offsets’ to those who need them. The term ‘conservation banking’ covers both ‘habitat banking’, where particular habitat types are conserved through the compensation activity, and ‘species banking’, where the purpose of the compensation activity is to generate a gain in population of particular species.

Local authorities may be involved in offsetting and conservation banking as:

- **Regulators:** Approving sites, offset design, biodiversity and offset value assessment, monitoring and enforcement, ensuring that schemes meet the criterion of additionality;
- **Sellers and buyers:** Providing area for habitat restoration, voluntary or mandatory compensation of local road construction and industrial or residential zone establishment – necessitating the involvement of local authorities in offsetting trade;

- **Lobbyists:** Lobbying higher levels of government to establish offset legislation because it benefits local communities.

OFFSETTING

The goal of biodiversity offsets is to achieve no net loss, and preferably a net gain of biodiversity with respect to species composition, habitat structure, →*ecosystem function*, land use practices and cultural values associated with biodiversity. Offsets have a number of potential advantages and provide opportunities for local communities, business, environmental policy makers and conservationists.

There are, however, limits to offsetting and risks that offsets will fail to reach their goals (see ten Kate et al. 2004; BBOP 2009a; Wissel and Wätzold 2010). Some considerations for policy makers are:

- For areas of unique and irreplaceable biodiversity value, offsetting is neither possible nor appropriate. Proposed development projects, in this case, can be carried out on sites with lower biodiversity value complemented by compensation (or not carried out at all).
- The formulation of offset legislation needs to ensure compensation is appropriate. Otherwise, the goal of ‘no net loss of biodiversity’ is unlikely to be achieved.
- Using ‘currencies’, biodiversity losses (in destroyed areas) and gains (increases in biodiversity value of



Table 8.2: Opportunities from offsets

Who Benefits	Potential benefits created by offsetting
Local communities	<ul style="list-style-type: none"> • Avoid negative side effects of development projects. • Developers leave a legacy of rehabilitated project sites. • Increased amenity values of a region. • Local employment opportunities in restoration projects. • A mechanism for mitigating local conflicts between biodiversity conservation and economic development.
Environmental policy makers	<ul style="list-style-type: none"> • An opportunity to ensure that business makes increased contributions to biodiversity conservation. • Development projects required to meet the growing demand for energy, minerals, food, fibre and transport may be carried out in a way that biodiversity is not negatively affected.
Biodiversity conservation organizations	<ul style="list-style-type: none"> • Increased conservation activity. • An opportunity for more successful conservation – when impacts to areas of low biodiversity are offset with habitat restoration in more highly biodiverse areas (such as priority sites and ecological corridors). • A significant new source of funding. • A mechanism to integrate conservation into the investment plans of companies.
Developers, investors and other companies	<ul style="list-style-type: none"> • An enhanced reputation and better relationship with local communities and environmental groups. • Increased regulatory goodwill, leading to faster permitting. • A practical tool for managing social and environmental risks and liabilities. • ‘First mover’ advantage for innovative companies resulting from strategic opportunities in the new markets and businesses that emerge as biodiversity offsets become more widespread.

restored areas) can be measured. At present, currencies can be categorized under three principal approaches: area alone (increasingly discredited); area and condition or quality of biodiversity (current best practice, of which many of US and German

currencies are variants); and metrics of species’ populations and persistence (see for more details BBOP 2009b, BBOP 2009c).

- The principle that ‘destroyed and restored habitat should be as similar as possible’ needs to be balanced

Box 8.13 Developing a wetland offset to mitigate habitat losses from copper mining

In the mid-1990s, Rio Tinto Kennecott Utah Copper mine, North America’s largest copper mine, needed additional storage capacity for ‘tailings’. The company purchased an area of degraded salt pans and industrial land containing designated wetland habitat. To offset their impact on the wetlands (required by US law), Kennecott purchased water shares and 2,500 acres (1,011 hectares) of degraded lands for creation of a shorebird and waterfowl refuge. A wetland plan was designed, establishing Kennecott’s obligations for construction, operation, maintenance and monitoring. After the initial successes, Kennecott went beyond its obligation by purchasing additional land and water to expand the site to more than 3,600 acres (1,460 hectares) with the added benefit of mitigating for impacts from other projects affecting wetlands in the same watershed. After completion, ‘The Kennecott Inland Sea Shorebird Reserve’ now shows a 1,000-fold increase in bird use.



Source: ten Kate et al. 2004

with conservation priorities. These may suggest restoring a type of habitat unlike the destroyed one. Several governmental policies espouse a 'like for like or better' approach under 'no net loss' policies.

- Offsetting strategies depend on stakeholder support – which often hinges on stakeholder involvement. This does not mean that →*ecological values* are negotiable. However, stakeholder involvement can ensure that plans address local community needs (cf. BBOP 2009d).
- Adequate governance structures support successful plans. Well-trained personnel (able to assess the ecological value of sites) and adequate administrative resources (to ensure compliance with legal requirements for offsetting) are key to effective plans.
- To ensure additionality, offsets should achieve conservation outcomes above and beyond results that would have occurred if the offset had not taken place. It is important that offsets do not replace conservation activities carried out by government bodies or which are their original tasks.
- Restored sites often require long-term management. One way how policy makers can assure funds

for long-term management is by stipulating in offset arrangements that a trust fund is set up to finance management with the interest rates generated.

While individual offsets are a step forward (in comparison to no compensation on the part of developers) there are some pitfalls. This kind of 'case by case' compensation (restoration projects carried out separately for each impact), makes it difficult to ensure spatial cohesion of habitats and to find firms with a sufficient expertise in habitat restoration. For this reason, conservation banking may be a cost-effective, flexible and ecologically effective alternative to offsetting.

HOW CONSERVATION BANKING WORKS

The concept behind conservation banking is that the market can deliver suitable offsets for those who need them. It applies the policy instrument of tradable permits to biodiversity conservation. So far, very few conservation banking systems exist (Species Conservation Banking and Wetland Mitigation Banking in the US, Biobanking in Australia).

Box 8.14 Conservation Banking in California, USA

California introduced conservation banking to protect endangered species in 1995 (the term 'bank' is used for a mitigation project). To receive approval to sell endangered species offset credits, agencies must agree to preserve high quality habitat in perpetuity. Additionally, a conservation easement, legally restricting the usage of the conserved land, must be signed. Typically, a permanent (non-wasting) endowment fund is set up to pay for ongoing site management and maintenance. Credits can be sold to compensate for public infrastructure projects or the impacts of private development.

More than 100 conservation banks have been set up in California since the introduction of the policy, and the annual market volume has been estimated to be around US\$ 200 million for the entire US. Prices for credits per acre can be more than US\$ 125,000, depending on habitat type and region. The majority of credits are sold for a given area's preservation, requiring either minor (or no) enhancements. In some regions, categories are used to determine threat levels for certain species and trade between categories is allowed. There are no explicit spatial trading rules but official guidance documents recommend that mitigation sites should be located in what has been identified as core habitat areas or corridors.

In general, conservation banking is seen as an improvement over previous 'case-by-case compensation', in which mitigation projects were often poorly implemented and carried out in close proximity to impact, which increased habitat fragmentation. In contrast, conservation banking projects tend to be spatially coherent and better implemented as they are carried out by specialized firms. A criticism of conservation banking is that it does not strictly follow a 'no net loss policy'. If a habitat is destroyed, there is no need to restore new habitat but just to preserve existing ones (though the quality of this habitat may be enhanced).

Sources: Carroll 2008; Madsen et al. 2010



Within a conservation banking scheme, habitat destruction for economic development projects is allowed if the developer submits a credit to a regulatory authority. Credits can be generated by restoring, creating or enhancing habitat elsewhere. Credits are tradable. For example, firms can specialize in habitat restoration, earning money by selling credits to economic developers. Effective trading rules ensure that the value of destroyed habitat is equivalent to the value of restored habitat. Similar to offsetting, a 'currency' is necessary to compare the ecological value of destroyed and restored habitats.

Demand for credits may come from private firms, government departments (planning economic development or infrastructure projects) or individuals and NGOs interested in enhancing a region's conservation value (keeping credits rather than selling them). Farmers, forest owners, ecological consultancies, state authorities and conservation groups may supply credits. The education and expertise of these groups potentially results in well-managed conserved areas. A competent regulatory authority is needed to best assess habitat values, oversee monitoring, enforcement and credit exchanges.

ADVANTAGES OF CONSERVATION BANKING

A properly designed and implemented conservation banking system has several advantages:

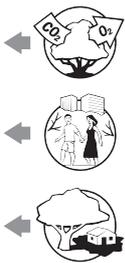
- It is a flexible approach which conserves biodiversity and allows for economic development simultaneously.
- Market forces work in favor of biodiversity conservation; land owners are able to earn money by creating or restoring habitats.
- Conservation banking is cost-effective; it generates incentives for conservation in areas with low opportunity costs (in terms of foregone benefits from economic development) and allows economic development in areas with high benefits from economic development.
- A sufficiently large credit market enables firms to specialize in restoration, resulting in better quality restoration and cost-saving.
- The conservation value of a region may be enhanced if trading rules stipulate that restored

habitat is of higher value than destroyed habitat. By better integrating new habitats into an existing habitat network, for example.

PRE-CONDITIONS FOR SUCCESSFUL CONSERVATION BANKING

In addition to meeting the basic requirements of any biodiversity offset, there are several important preconditions for conservation banking to be a successful form of offset implementation:

- A certain level of market activity is necessary. This enables sellers and buyers to find adequate trading partners. In extreme cases, an expected lack of demand deters land owners from engaging in habitat restoration, potentially leading to market break-down.
- Destroyed and restored habitat types should be the same; otherwise, there is a risk that certain habitat types will decline, potentially leading to a rise in extinction risks of some endangered species. However, if regulators focus on the conservation of highly endangered species, trading rules can be designed to provide incentives for scarce habitat restoration.
- For the conservation of many endangered species the spatial location of habitats and their connectivity are important. If spatial aspects are relevant trading rules need to take them into account.
- Conservation banking is only suitable for habitats that can be restored within a reasonable time frame. Lengthy restoration processes can lead to significant ecological damage (if destruction is allowed before restoration) or a lack of credit supply (if destruction is not allowed before restoration) because investors in habitat restoration have to wait too long to receive investment returns.
- It is particularly relevant for habitats with highly endangered species that at the time of habitat destruction, restoration or creation is completed. Otherwise, the time lag between destruction and creation may threaten the survival of the species. If a species is less threatened, a mechanism might be implemented to compensate for temporal loss. An example for such a mechanism is a multiplier that requires offsets to have higher conservation values than the destroyed habitat (see BBOP 2009b).
- Areas with habitats may provide ecosystem services other than conservation (carbon storage, recreation,



maintenance of water cycle). This does not present a problem for conservation banking if differences in these other services are not significant. If they are significant (for example, sites may differ in terms of recreational value), there is a risk that sites

of high value will be replaced by sites of low value. To avoid this, trading rules may forbid sites of low value replacing sites of high value. Bear in mind that the introduction of this kind of regulation has the potential to restrict credit trade.

Box 8.15 Conservation banking in New South Wales, Australia

In 2008, the New South Wales Department of Environment and Climate Change established Biobanking (a biodiversity banking and offsets scheme). The aim of the scheme is to allow for economic development while addressing biodiversity loss and threatened species. Credits are created by landowners through the establishment of Biobanking sites and active management is required (fire, weed, grazing and human disturbance). Credits may be purchased to offset the impact of economic development projects or to support conservation (retired credits).

Two main types of biodiversity credits exist: credits for species and credits for ecosystems. Each site may generate a number of different ecosystem or species credits which may be sold together or in groups. The number of credits generated depends on various factors such as site values (structure and function of ecosystems), and landscape context (values for connectivity and area of vegetation). Part of the revenue from selling the credits goes to a BioBanking Trust Fund which uses this money to pay Biobanking site owners for subsequent management of their areas. To protect valuable and scarce habitats and species, development is, in principle, not allowed in so-called 'red flag' areas.

Sources: Department of Environment and Climate Change NSW 2007; 2009

FOR FURTHER INFORMATION

Payments

Landell-Mills, N. and Porras, T. I. (2002) Silver bullet or fools' gold? A global review of markets for forest environmental services and their impact on the poor. IIED London www.cbd.int/doc/external/iied/iied-silver-report-2002-en.pdf This report sheds new light on the issues through a global review of emerging markets based on 287 cases from both developed and developing countries.

Wunder (2005) Payments for environmental services: some nuts and bolts, CIFOR Occasional Paper no 42. Can be downloaded from www.cifor.cgiar.org. This paper explains PES and provides practical 'how-to' hints for PES design for non-economists.

Payment for watershed services: The Bellagio Conversations, Fundación Natura Bolivia 2008 discusses lessons learned from recent global experiences with payments for watershed services (PWS). Available at www.paramo.org/portal/files/recursos/The_Bellagio_Conversations_FINAL_2.pdf.

Getting Started: An Introductory Primer to Assessing and Developing Payments for Ecosystem Service Deals – This primer is designed to provide a solid understanding of what Payments for Ecosystem Service are and how PES deals work for an audience interested in exploring the potential of PES. This includes also a comprehensive PES learning tool (www.katoombagroup.org/learning_tools.php).

Further material is available at: www.ecosystemmarketplace.com

Payments for environmental services from agricultural landscapes (Source: www.fao.org/es/esa/pesal/index.html) - This website has lot of information on the potential of agriculture to provide environmental services along with guidelines on how to set up a PES scheme that can potentially also contribute to reducing rural poverty.

Conservation Banking

BBOP (2009a-d) are handbooks for practitioners on various aspects of offsetting and conservation banking eg on Offset Design, on Offset Cost-Benefits and the Biodiversity Offset Implementation. They are available at www.bbop.forest-trends.org/guidelines/

An overview of current developments in credit markets can be found on www.ecosystemmarketplace.com/pages/dynamic/biodiversity_market.landing_page.php

Recent overviews of offset and banking schemes worldwide are found in Madsen et al. (2010) and eftec, IEEP et al. (2010)