Quick start manual to PES in Agricultural Lands

This document combines the information in the PESAL website

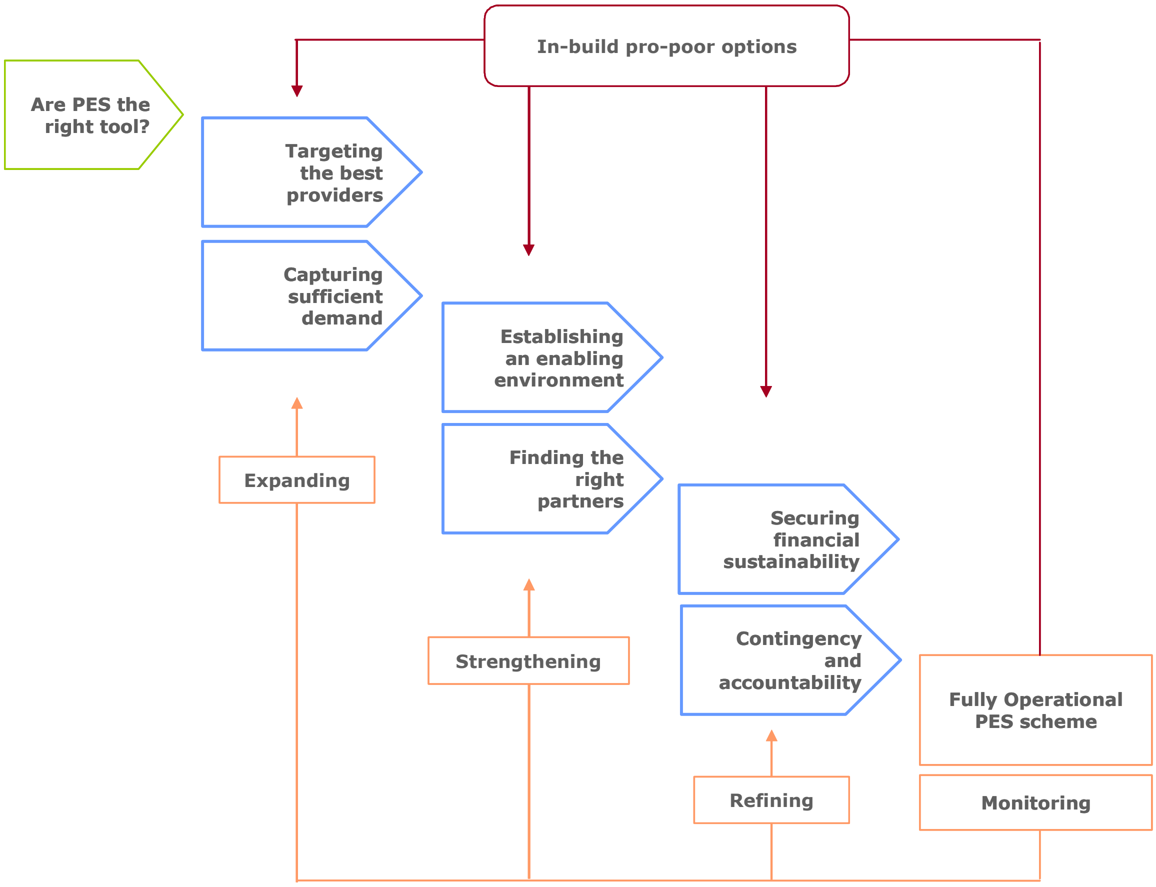
Menu Setting up a PES scheme and
Menu Materials (go to page 26)

www.fao.org/es/esa/pesal

This manual was prepared by Bernardete Neves,
with contributions from Leslie Lipper, Giacomo Branca and Monika Zurek,
all at FAO Agricultural Development Economics Division (ESA) at the time of writing June 2008

Quick start manual to PES in Agricultural Lands

PESAL WEBSITE- MENU SETTING UP A PES SCHEME



Is PES the right tool?

A first step in assessing the PES feasibility

Payments for Environmental Services (PES) are first and foremost an incentive-based environmental management tool to protect and enhance the provision of environmental services - loading it with other objectives and then achieving none may reduce confidence in the mechanism and prevent it from being applied in situations where it could be effective. Given the appropriate context, well-designed PES schemes can increase both the efficiency and accountability of funds invested in environmental protection:

A Good ground to strike a PES deal

Supply and demand are in place

- Assessment of ecosystem goods and services indicates the potential for providing environmental services which are in demand.
- There are feasible land use and/or farming system changes proven to generate environmental services that can be adopted in the ecosystem.
- Property/use rights of the ecosystem providing these services are clear or easily clarified.
- The amount of funds that the scheme can attract is sufficient to achieve changes on a scale needed to generate the environmental service requirements for all the important landowners and overcome eventual scale effects.
- The users' willingness and ability to pay is higher than the providers' opportunity costs.

The institutional and regulatory environment is favourable to PES programme development

- Beneficiaries and suppliers are numerous but already organized, or few and easily identifiable and organized, preferably through an existing institution.
- Regulations are already in place to facilitate the implementation of PES programmes. This includes regulations that support the demand for environmental services (eg environmental, health, food safety regulations) as well as regulations and institutions that support the supply of environmental services such as security of land tenure and contract enforcement.

PES are only one tool to promote improved environmental management and is generally implemented in conjunction with other complementary policies. Environmental problems that require strict levels of control or where high incentive levels are need to change behaviour may be better managed with other tools. A PES approach can be very useful where relatively little additional incentive can stimulate desired changes.

PES schemes are not a poverty reduction tool but the two objectives may (and often are) linked. Considerable improvements in livelihoods should not be expected from a PES scheme on its own. The extent to which a PES scheme can improve the livelihoods of the rural poor groups depends mainly on how the scheme is made accessible to them and how the land use or farming system changes required affect their livelihoods. However, if this concern is inbuilt in the design, a PES scheme may make a contribution in the form of additional income, stronger land tenure claims and ultimately improved food security.

To address multiple goal complementary policies, tools and specialized funding (e.g. for infrastructure development and improvement of rural living conditions) can multiply the scheme's benefits, while safeguarding its environmental goals and the effective investment of funds contributed by the beneficiaries. This is often the case with national programmes, with multiple objectives and financed by public funds from different sources.

Box 4.1 below illustrates this by describing the eligibility criteria for the Costa Rican National PES programme, one of the best known and long-standing programmes, ongoing since 1997 and continuously growing. Priority criteria include location specific requirements and characteristics of the applicants, and vary according to the type of project. All priorities are overlaid on a Geographical Information System (GIS) database which allows the national forestry fund office (FONAFIFO) to identify areas where most priority criteria overlap- see below. Within those priority areas, incoming applications are dealt on a "first-come-first-served" basis.

Box 4.1. Eligibility Criteria for the Costa Rican National PES Programme(1)

[1] adapted from Map "Servicios Ambientales, 2001 Fuente: ICE, 2000; Lucke y Ramírez, 1980; ICT 2000; MINAE, 2000" Sistema de Información de Recursos Forestales (SIReFOR)

A) Projects for Protection
- areas located in biological corridors especially those considered of high priority by the ecomarkets project funded by the Global Environmental Facility (GEF);
- areas within the influence area of the Huetar Norte Forestry project (financed by the German Cooperation;
- renovation of previously existing PES contracts with landowners, as long as they are located within the above mentioned priority areas;
- forest areas located in strategic areas for the protection of water resources of interest for rural aqueducts, national or municipal utilities;
- privately owned areas, within the protected areas, that have not been acquired or expropriated by the State;
- Projects located in areas where the Social Development Index is under 40% (a relative index combining educational, health indicators with social indicators e.g.. number of single mother births and electricity consumption, where 0% is the poorest area and 100% the best in Costa Rica (Ortiz et al 2003).

B) Reforestation projects
- Land use aptitude for forest plantations;
- Location in relation to:
i) Conservation District in which the project is located; however, in the case of reforestation with native or endangered species, or natural regeneration, this does not apply, as the entire country is prioritised;
ii) donor target areas (Huetar Norte Forestry Project-KfW);
- renovation of previously existing contracts;
- Projects located in areas where the Social Development Index is under 40% .

C) Agro-forestry
- Projects submitted by organizations or individuals with certified capacity in managing 'forest'/timber trees in agro - forestry regimes;
- land use aptitude for forestry;
- areas of high risk of soil or water degradation and biodiversity loss.

D) Natural regeneration in areas that were deforested before December 1989 and that are left for natural regeneration and used for pasture, or areas abandoned for over a year left for natural regeneration.

Targeting providers and accomplishing additionality

Targeting the most efficient providers and making sure that the scheme does result in an improvement in the ecosystem service provision remains the greatest challenge.

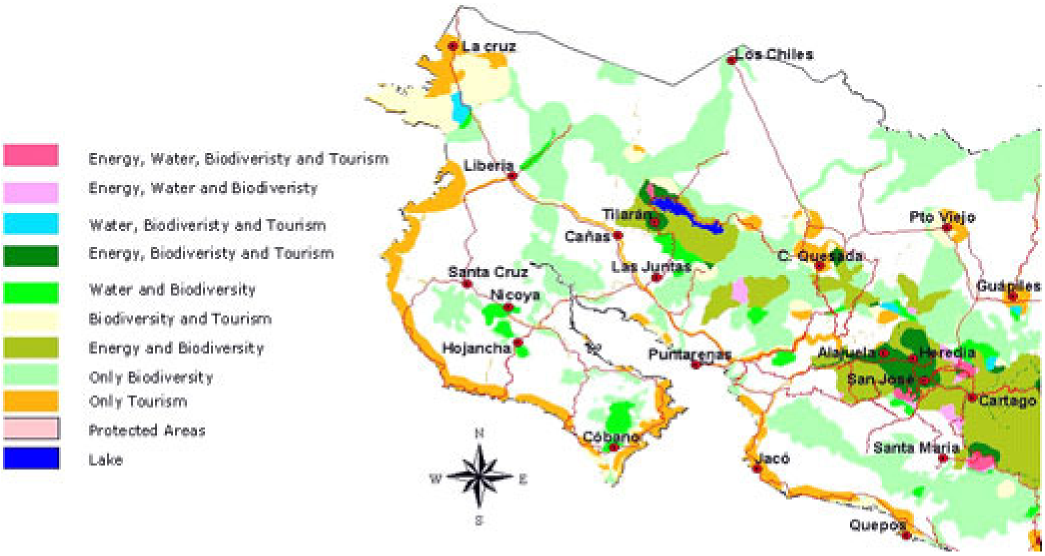
The best providers

Payment for Environmental Services (PES) Programmes are directed to the protection or improved management of a particular land area that has the highest potential to protect or enhance specific environmental services (see figure 4.1). **Priority areas, for example may include:**

• important water infiltration areas contributing to groundwater reservoirs recharge
• restoration of riparian strip vegetation to trap pollutants and silt, reducing pollution and sediment load in water courses
• natural vegetation islands in farmland providing important habitat for local or migrant fauna

- areas of forest under threat of deforestation
- degraded lands suitable for reforestation

Figure 4.1. Potential for Environmental Service Provision in Costa Rica[2] partial view of original map, click on it for full view at its original source



Within the environmental priority area, some land managers will be in a position to provide greater improvements in the provision of environmental benefits than others, in relation to:

- what they are providing now, i.e. those currently using less environmentally friendly techniques
- the current or future threat to their provision: to ensure that the investment made by the PES programme does provide additional environmental services benefits - a key issue for many programs -, the suppliers selected must also be those that are less likely to protect or improve the environmental values in their land (without the PES incentive) - see section "Rewarding Bad Behaviour"
- the degree to which they can be differently affected by outside influences that would render the PES programme unnecessary. E.g. due to new legislation or changes in market forces, the lower price of a particular agriculture commodity would reduce pressure on the expansion of the agriculture frontier for example- see table 4.1 below.

Table 4.1. Comparing the potential for environmental service delivery with level of opportunity costs

	LOW opportunity costs	**HIGH opportunity costs**
HIGH potential for environmental services (ES) delivery	• providers requiring low compensation • **and in** a position to provide high ES value • PES approach a competitive option compete and can get best value for money	• Providers requiring high payments • **but in** a position to provide high ES value • hardest for PES to compete despite high value • supporting environmental regulation may be necessary to reduce the level of payment required (i.e. the provider sees in PES a flexible way of complying with newly introduced limits to his/her activity)

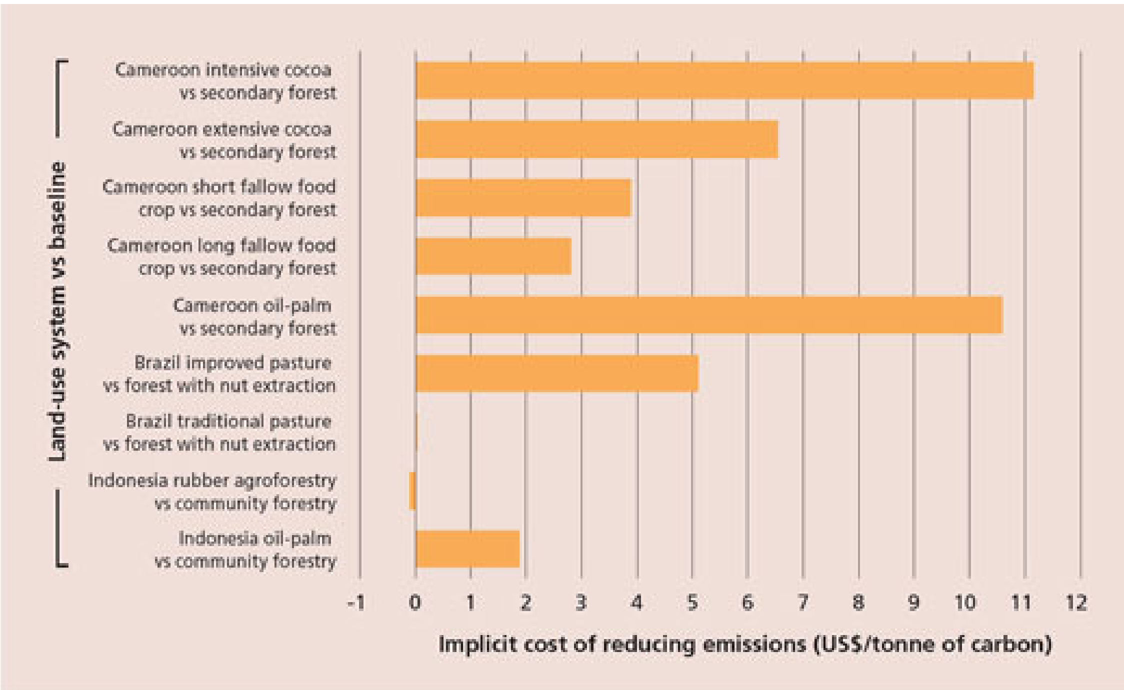
[2] adapted from Map "Servicios Ambientales, 2001 Fuente: ICE, 2000; Lucke y Ramírez, 1980; ICT 2000; MINAE, 2000" Sistema de Información de Recursos Forestales (SIReFOR)

LOW potential for environmental services (ES) delivery	• Providers requiring low payments • **but not** in a position to provide valuable ES • PES approach over large groups of producers and associated with high co-benefits a good option	• Providers requiring high payments • **and not** in a position to provide valuable ES • difficult for PES to compete and not worth the ES value to be generated - not worth pursuing

From the most promising providers identified in the previous stage, some will require higher payments (higher compensation) than others. This depends on the returns they draw from their current activity, in comparison with the costs of adoption of the new management measures, or on the forgone benefits if they comply with the resource use limitations brought in from participating in the scheme (opportunity costs of participation).

This selection process will probably single out several groups of participants, with different combinations of levels of compensation for differentiated levels of potential environmental services delivery. This will identify the best "value for money" providers and exclude others, either because their potential to provide environmental services is low, or despite it being high, it would require a very high investment. This happens in cases where returns to current unsustainable activities are high and improved environmental services would cause a reduction in profit (e.g. by changing land use altogether or setting larger land areas aside). Here the level of compensation required may well be higher than the buyer's willingness to pay- see figure 4.2 below for examples.

Fig. 4.2 Examples of levels of carbon payments required to provide incentives for reducing emissions by avoided deforestation(3) click on the picture to enlarge



On the contrary, when the environmental benefit would be very valuable (e.g. avoiding conversion of old growth tropical forest), a push from newly introduced regulation might just make the PES approach an attractive soft mechanism for the farmer to comply with the new legal limitations (that e.g. render deforestation illegal and actively enforce it).

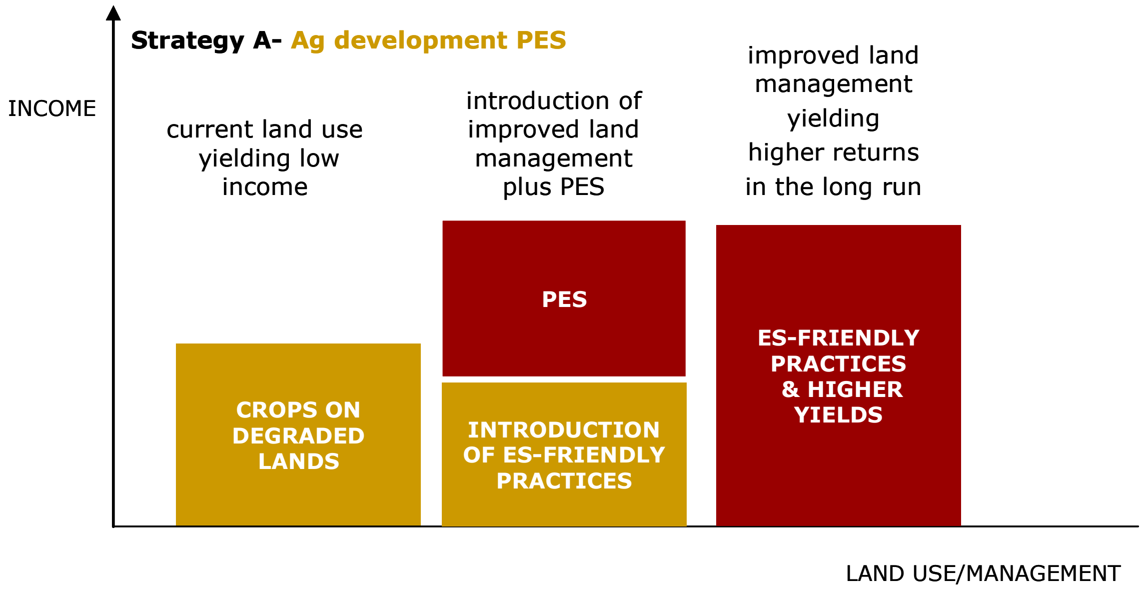
3 FAO.2007.The State of Food and Agriculture 2007. Part I: Paying farmers for environmental services. Rome (fig. 10)

In cases where high benefits can be achieved with little reduction (or even a gain) in agricultural production and income, even low payments can raise interest among farmers. Those are the two PES programme cases scenarios that can present "win-win" opportunities for the development of PES schemes, and are explained in the next section.

Win-win strategies for PES programme development

Win-win strategies for PES programme application are those where improved land management can generate environmental benefits and increase the returns to the farmer's activity (Strategy A - Agriculture development PES schemes) or where areas of low value for agriculture overlap with high conservation value (Strategy B - Conservation PES schemes).

Strategy A - Agri-development PES Schemes



In cases where PES programme-fostered measures can result in an increase in the farmers' returns, farmers may only require training in the adoption phase or financial support while the benefits of these new measures aren't yet visible. For example, soil and water conservation measures can result in a loss of a small share of cropping area require investment in the form of labour, time and materials, while improvements in water and soil quality may only be seen a few years down the line (4).

Thus a PES programme would be required only to bridge the gap between adoption of the measures and the time they would become privately profitable. After that, it could be in the farmer's best interest to continue using the new more environmentally friendly and privately profitable measures. In some cases, a small incentive payment could remain to encourage maintenance (see strategy A above)

In lands with low potential for agriculture (with low soil fertility or water scarcity) or restrictions to land use change (e.g. laws against deforestation), farmers may require very little to convert to more environmentally friendly land uses (e.g.. natural regeneration) in return for a long-term payment (see strategy B below). Map 4.1 gives a rough indication of where croplands poorly suited for rainfed agriculture coincide today with areas of high biodiversity conservation.

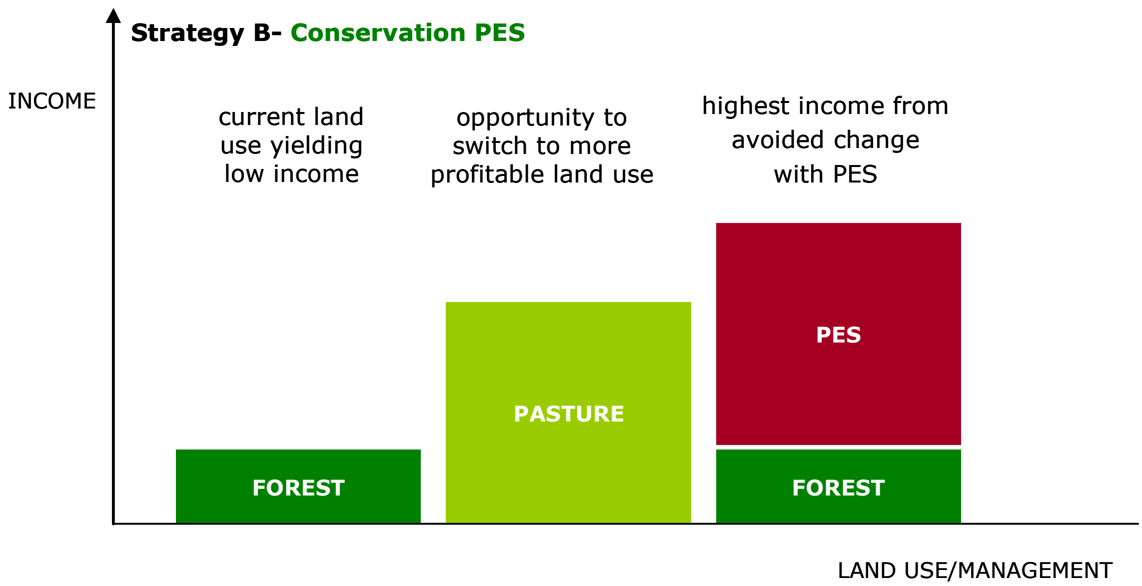
Thinking ahead, one could also target the providers with lands under risk of future conversion, but that are unlikely to generate benefits in the long run. Map 4.2 highlights this opportunity by giving an

(4) for more on watershed management for increase environmental service delivery see section 2 on The Role of Agriculture

approximate picture of the areas where the projected expansion of cropland and pasture coincides with lands that are poorly suited for rainfed agriculture.

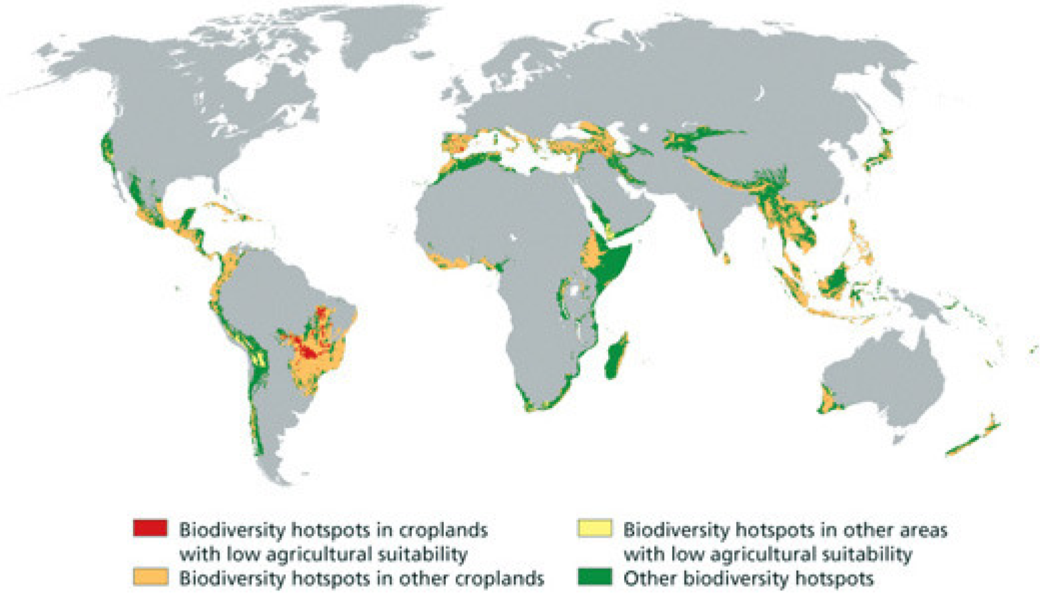
Even more important than the method used to target providers, is the capacity to properly implement its resolutions and ensure that the final result does reflect the technical considerations used to screen the participants. It is vital that the environmental goals of the scheme are not moved to the background throughout the many negotiations that take place during the design process. (5)

Strategy B- Conservation PES Schemes

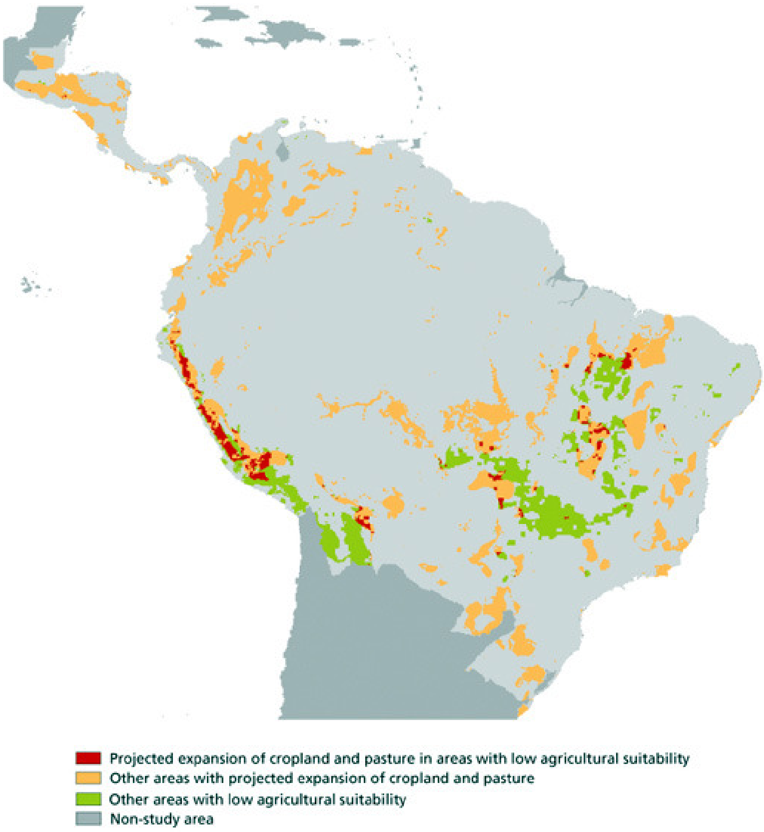


(5) for more on how difficult this process can be see FAO. 2005. An assessment of Mexico's payment for environmental services programme. Mexico country case study report. Roles of agriculture project (ROA). Environment services, by J. Alix-Garcia, A.d. Janvry, E. Sadoulet, J.M. Torres, J. Braña & M.Z. Ramos. Rome , FAO

Map 4.1 Biodiversity hotspots in croplands poorly suited to rainfed agriculture (6) click on the picture to



Map 4.2 projected expansion of cropland and pasture to lands poorly suited to rainfed agriculture (7)



(6) FAO.2007. The State of Food and Agriculture 2007 . Part I: Paying farmers for environmental services. Rome
(7) ibid

Are PES about rewarding bad behaviour?

"The ideal PES programme recipient is not the environmentally benign community too poor to do much harm to the forest, but rather the guy who had enough capital to buy a chainsaw, and is on the verge of putting it to work." (8)

PES programme investment will not deliver additional results if directed at those that already have a responsible environmental performance - **the maximum added value of PES programme investment** is with those whose environmental performance can improve the most.

This **may not be the fairest option** , but in economic terms is the most efficient and the financial survival of the scheme depends on it. It is also true that paying the "bad guys" can create perverse incentives where more environmentally friendly participants find no incentive to continue their good stewardship. A balance between fairness and equity will have to be negotiated in each context, perhaps offering different kinds of payment.

In fact many PES schemes do not specifically seek additionality as a primary goal and look instead for compensation for maintaining good stewardship roles of communities living within protected areas or in indigenous domains. The goal here is to support these communities in keeping traditionally sustainable land management and in doing so reduce the risk of worsening environmental conditions.

Conservation organizations also look to PES schemes as a source of sustainable finance for the appropriate management of protected areas. In Coahuila (Mexico), the water users of downstream Saltillo have agreed to make regular contributions to the management of the uptstream Reserva of the Sierra de Zapalinamé with a view to safeguarding its water stewardship role. In Costa Rica, the La Esperanza hydropower plant makes regular contributions the Monteverde Conservation League to support their work and ensure that the forest in the headwaters of its reservoir stays protected, thus insuring against future increase of sediment load in the water and increasing the plant's production costs.

Payment level

Ultimately, farmers' decisions to participate depends on costs (investment required, risk of loss of income or of food security) in relation to the compensation being offered (implementation costs that support additional income from the PES programme, improved productivity and food security).

To secure the participation of the selected providers the PES scheme must offer them payment levels and types attractive enough to convince them to join the programme. Not all farmers provide the same benefits when participating in the programme, and ideally schemes should offer **differentiated levels of payment** to correspond to these differences. In practice, it would be very costly to do this adjustment to each provider, and so PES schemes often offer only a set of differentiated payment levels - for more on this see table 4.2.

Table 4.2- Adjusting payment levels- from flat rate to monitored outcomes

Criteria	**Description**	**Advantages/ Disadvantages**	**Best opportunities**
Flat rate based on input	flat rate based on opportunity cost of land use/management adopted (input)	easier and cheaper to administer	moderately effective if combined with highly prioritized eligible areas
The PES national programme in Costa Rica offers flat rate payments for conservation, reforestation and agroforestry			
Prioritized	differentiated rates based on	more expensive to	effective if based on

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(8) Sven Wunder, Is PES implementation presenting trade offs between conservation efficiency and fairness? POLEX: *CIFOR's Forest Policy Expert List server Fast and effective Policy alerts*
In Katoomba East and South Africa Newsletter, August 2007. Accessed at
http://www.katoombagroup.org/newsletter/ESA_Newsletter/Vol1_No9.html

differentiated rates based on estimated output	estimated output: comparison between baseline and environmental services delivery potential of land use/management adopted	design (establishing different categories)	scientifically sound estimates of environmental services provision
The Mexican National PES scheme uses payments rates proportional to the expected outcome - landowners protecting cloud forests get a higher rate. In Central America, a Silvopastoral PES project (RISEMP) used indices of additional ES generated to calculate payment. In this project indices of additional ES generated were used to calculate payment			
Monitored environmental services provision	differentiated payments according to actual performance in environmental services provision (only adopted in carbon schemes)	more expensive to administer as it requires continuous monitoring and updating of payment terms; highly effective in insuring environmental services delivery	good for high value environmental services

This differentiation is generally made **based on the grade of change to land use or management change required** - the more change the higher the cost for the farmer (but also the higher incremental environmental services provision)- see examples indices used to capture this different grades of improvement in tables 4.3 and 4.4 below.

More frequently, PES schemes define the scheme's requirements (i.e. reforestation of degraded lands or forest conservation) and offer a **flat rate to all eligible farmers (**9**)** that are willing to comply with them, **or a few differentiated levels according to the environmental services delivery potential** of habitat the farmer would be protecting or improving. In some cases, offering a flat rate can be more politically acceptable and more appropriate in places of strong community ties.

Table 4.3. PES scheme in Jesus de Otoro, Honduras (US$/ha/year) (10**)**

Forest Conservation			
Primary forest	5.5		
Secondary forest	4.1		
Young forest	2.8		
Improved Land Management Practices Adopted	Two practices adopted	Three practices adopted	Four practices adopted
Short cycle crop	5.5	8.3	11
Permanent crop	8.3	11	13.8
Agro-forestry	11	13.8	16.6

Table 4.4. Environmental Service Indices in the Silvopastoral Project in Colombia, Costa Rica and Nicaragua (points per hectare, unless otherwise specified) (11**)**

The environmental service index attempts to assess the level of environmental services generated by different types of land use. It combines two indices: an index for biodiversity and an index for carbon sequestration.

(9) see previous section for more on the selection of providers
(10)adapted from Kosoy, N., Martinez-Tuna, M., Muradian, R. & Martinez-Alier, J. 2007. Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America . Ecological Economics/Elsevier, 61(2-3): 446-455
(11)adapted from Pagiola, S., Agostini, P., Gobbi, J., de Haan, C., Ibrahim, M., Murgueitio, E., Ramírez, E., Rosales, M. & Ruíz, J.P. 2004. Paying for biodiversity conservation services in agricultural landscapes, World Bank Environment Department Paper No. 96. Environmental Economics Series. Washington, DC, World Bank

• The biodiversity index assigns a number from 0.0 to 1.0 from most unfriendly to biodiversity to most friendly.

• The carbon sequestration index assigns 0.1 points per tonne of carbon sequestered.

• The two indices are added to arrive at a single environmental services index which influences the level of payment

Land Use	**Biodiversity Index**	**Carbon sequestration index**	**Environmental Service Index**
Annual crops (annual, grains, and tubers)	0	0	0
Degraded pasture	0	0	0
Improved pasture with recently planted trees	0.3	0.4	0.7
Windbreaks (per km)	0.6	0.5	1.1
Diversified fodder bank	0.6	0.6	1.2
Shade-grown coffee	0.6	0.7	1.3
Diversified timber plantation	0.7	0.7	1.4
Riparian forest	0.8	0.7	1.5

If payment is set above the level the farmers were willing to accept, the scheme will have a higher cost than necessary. Plus, if the scheme works on a first come, first served basis, then it might also leave the best suppliers out. If in turn, the PES scheme has strong income-support goals, it's important to make sure the most environmental effective providers are included as well.

A useful method to further adjust payment levels at a low cost is to let providers self-select themselves. Once the environmental priority area is identified, opening a **"reverse auction"** to the farmers within the area, requesting that they propose the minimum compensation they are willing to accept, will single out those that are willing to adhere to the PES scheme's requirements at the lowest cost. The programme implementers can then further select volunteers based on the best match between payment required and environmental services delivery potential (12)

Regardless of the method used to set the payment level or type of payment offered, it is often the conditions to adhere and the rules to comply with the programme that determine whether farmers will be able and willing to participate. This is especially relevant for the poorer groups. For more on this, see Pro-poor PES section .

Making sure that the PES scheme fosters land management options that fit with the user's interests and capacities, and that can provide them with direct benefits (such as increased productivity or diversified sources of income) will increase their interest in implementing them well, and in the long run, with less emphasis on the payment offered.

Payment type

Direct payments to land managers can take different forms. **Cash is the most common form but in-kind payments are also used.**

Some schemes offer tree seedlings when the scheme involves reforestation or agro-forestry, or other materials to replace forgone production such as grain (like in the Chinese national sloping lands conversion programme-SLCP) or conditional investments in activities that can compensate the farmers for restriction of resource use (in Pimampiro, Ecuador, in return for conservation of cloud forest the project in which a PES component is embedded supported the development of orchid nurseries) - see table 4.5 for examples.

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(12) For an example of application of this technique, see the case of the Australian Bush Tender scheme in box 19, page 96 of The State of Food and Agriculture 2007

Table 4.5. Examples of payment forms in PES programmes (13)

Chinese Sloping Lands Conversion Programme- SLCP

Priority areas	farmers on erosion-prone sloping land (slope greater than 25 degrees) within the upper watershed of the Yangtze river and in the upper and middle parts of Yellow river
Compensation levels	• In cash, regular : 417 Yuan/ha/yr (US$ 50) for farmers in the Yangtze River Basin and 290 Yuan/ha/yr (US$ 36) for those in the Yellow river basin. • In cash, one-off : seed and planting subsidy: one-off 750 yuan/ha ($US 93). • In kind, regular : grain rations: 300kg/ha/yr (worth US$ 60 ha/yr) to compensate for land set-aside in Yangtze River watershed and 200 kg/ha/yr (worth US$ 40 ha/yr) for those along the Yellow River. • Both cash and grain payments are awarded for five years for production trees and eight years for protection trees. All together, farmers get about 100USD/ha/yr (50 in cash and 50 worth of grain in kind)

Costa Rica National PES programme

Priority areas	Priority criteria combine environmental and social indicators. For example, projects must be as many of these criteria as possible: • biological corridors forest areas • strategic areas for the protection of water resources • in privately owned areas, within the protected areas • areas where the Social Development Index is under 40%
Compensation levels	• Forest conservation: US$ 64/ha/yr for 5 years • Natural regeneration: US$41/ha/yr for 5 years • Reforestation: US$ 816 over 10 years (being the first payment of 46% to cover plantation costs) • Agroforestry: US$ 1.3 per tree

Mexico National PES programme (PSAH)

Priority areas	*Private or communal landowners* well-preserved forest (with at least 80% forest cover) in: Critical recharge areas for the over-exploited aquifers of the country (according to CNA spell out/footnote classification); OR near streams, in regions with problems of water scarcity, poor water quality and high sediment loads and where hydrological natural disasters are more frequent; OR in areas that supply urban centres of more than 5,000 inhabitants; OR in priority mountain areas (designated by CONAFOR, IF they are also facing water problems).
Compensation levels	Forest conservation

(13) adapted from case study profiles available at www.watershedmarkets.org

- primary forest: $300 pesos/ha/yr (about US$27)
- cloud forest: $400 pesos/ha/yr (about US$36)

Other more indirect types of payments also exist. For example exemptions from land-based municipal taxes for landowners willing to adopt certain practices or to set aside priority land for conservation, or allowing access to public protected areas to pastoral communities who agree to do it under specific conditions that do not harm the protected ecosystems (or may even have positive effects - pastoralist groups allowed to move into protected areas in certain times of the year).

Because in some contexts, cash payments can be confused with a payment for the land itself (14), in some parts of the world in-kind compensations are more welcome and even more valuable. In an emerging scheme in Indonesia (Sumberjaya, Sumatra, led by RUPES (15)), offering farmers the possibility to legalize their land tenure situation has very valuable multiplier effects: it frees them from fear of eviction and allows them to access government social services, such as health and education.

In- **kind payments** can also be a more lasting benefit as **cash payments** are more vulnerable to rapid spending. However cash allows participant recipients greater flexibility in the use of resources, more readily replaces (temporary or permanent) loss income complying with the introduced land use changes and is less prone to being seen as a paternalistic. For more pros and cons, see an example in the table 4.6.

Table 4.6 Cash vs in-kind payments - Perceptions in a case in Bolivia (16)

Beehives preferred

• Some recipients reject money

• Cash would be spent rapidly and leave no long-term benefits

• Receiving cash 'smells' more like giving up future property rights

• Honey is a useful subsistence or sellable product

• Beekeeping includes an incentive to protect forest as bee habitat

• Demonstration effect (to neighbours) of bees and the sweet taste of honey gives
• ES programme implementers more goodwill than a corresponding cash transfer

Cash preferred

• Some recipients little skilled and little interested in beekeeping, thus losing benefits
• Beehives are inflexible assets to sell, compared to animals or equipment
• Beehives are inflexible assets to subdivide, compared to cash
• Beehives represent extra training costs for implementing NGO
• Beehives represent extra costs for recipients to benefit - beekeeping demands labour inputs

Capturing demand

Prepare these “business case” arguments that can gain the interest of the buyer.

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(14) See for example Beyond "Markets" Why Terminology Matters by Sven Wunder and Maria Teresa Vargas

(15) RUPES - an ICRAF program for developing mechanisms for rewarding the upland poor in Asia for the environmental services they provide - RUPES

(16) Nina Robertson and Sven Wunder. Fresh tracks in the forest: assessing incipient payments for environmental services initiatives in Bolivia. CIFOR, Bogor, Indonesia

Capturing enough demand is the bane of every PES programme. For location-dependent services, such as water quality protection, it might be easier to identify and engage beneficiaries for an undetermined period of time. For others such as carbon sequestration or landscape beauty, competition leads customers to schemes offering best quality service at the lowest cost. A business-like commitment becomes a requirement.

Begin by **identifying the beneficiaries** who benefit most from the protection or enhanced environmental services - now or in the future. These can range from direct beneficiaries of the service (such as water users), to businesses interested in supporting the scheme as a way of gaining competitive advantage with environment-conscientious customers, public authorities with the mandate to support responsible resource management. **For more on who is currently investing in PES schemes see menu "Buying Environmental Services**".

For location-specific schemes it is important to identify all beneficiaries of the services that the nascent scheme will support right from the start, even if not intending to engage with all in the initial stages. Involving and consulting widely at the beginning will facilitate participation later on and scope out any conflicting views that may undermine the development of the PES programme at more advanced stages.

As in any other investment, the buyer will want to be assured that his or her money will yield profit or save costs. In this way, the key is to **show the buyer how much cheaper it will be to invest in the PES scheme** instead of investing in expensive technological greenhouse gas emission reduction methods or incurring in breaks in production, e.g.. due to lack of sufficient water supply, or higher water tariffs.

Many **water supply companies** around the world support PES schemes to manage the watersheds that supply their cities with water (Quito in Ecuador or New York, USA), **water bottling companies** have also began liaising with farmers upstream from their water extraction sites (e.g.. Vittel waters in France) and **hydroelectric power producers** pay land managers to reduce their reservoir dredging costs by reducing the sediment loads running off their field into the water courses on which their electricity production depends (La Compania Nacional de Fuerza y Luz –CNFL, Platanar and other companies in Costa Rica).

To **prepare strong buyer-engaging arguments**, PES programme developers might need to hire out experts to provide an estimation of these figures for each buyer group. Buyers must be made well aware of how much investment will be required from them, and for how long - showing decision-makers how much participating in a PES scheme will save them, instead of how much it will cost.

Current PES schemes are paying very much attention to this. CARE International, along with WWF and IIED, with support from the Dutch and Danish cooperation agencies, are supporting the development of PES schemes where a requirement is being able to make a business case and securing financial support from the main buyers, right from the start(17). One of these initiatives, in the Sierra de las Minas Biosphere Reserve, Guatemala, has been working with large water users to increase their water use efficiency. Resulting savings are channelled into a fund for the sustainable management of the farms in reserve's buffer zones.

Establishing an Enabling Environment

PES are about sharing power- flexible and decentralized negotiations over resource management

(17) More on the Equitable Payments for Watershed Services Programme
http://assets.panda.org/downloads/pes_report_2006.pdf

Supportive policy and regulation

PES schemes require the clarification of property rights of environmental services and the adaptation or creation of institutional and administrative arrangements to collect and distribute funds locally. It may require investment in areas covering different administrative boundaries requiring combined efforts from different scales and domains of public administration, within a country or even across countries. It is common to require the creation of new municipal laws or the creation of decentralized offices of national bodies. Often, a new entity is created to bridge the gaps.

National regulations, such as cap and trade policies on greenhouse gas emissions, biodiversity offsets or wetland banking (more on Menu 1- add link), can also encourage support for PES schemes as ways of generating environmental improvements which will help buyers to comply with the new imposed limits on environmental impacts.

Effective negotiations

Because PES agreements require voluntary commitments from land managers and environmental service beneficiaries and the combined efforts of different institutions, negotiations are really the core of the PES development process.

Rather than offering a wish list, listen to what providers are willing to do.
Ensure that the beneficiaries' different needs are acknowledged - some might be interested in increasing tree cover for carbon sequestration, others may be against the increased water use that new tree plantations would generate.

Allow for wide participation of stakeholders, providing them with information in formats that they can understand and access easily. Farmers, urban communities, business, tourists, government officials, NGOs and donors will look for different levels and types of information about the goals and methods of the deal, its expected impacts and their own costs in it.

The right partners

Institutional needs are plenty and varied. Setting up and operating a PES scheme will often require collaboration of a variety of advisory bodies, at different scales and stages of the development of the scheme.

A strong team leader - the intermediary

So far, very few deals on a PES scheme are kept between a provider and one user. In most cases, deals are supported and managed by an **intermediary who promotes and manages the scheme**. This institution acts as the corner stone of the scheme, acting as a focal point for all stakeholders. It must be a strong, trustworthy and enduring institution. Several other institutions will be involved at different points in time and at different scales, but it is important that there is an **enduring focal point to push the entire process**, from design and implementation, to operation and continuous adaptation.

Often this intermediary role takes the shape of a PES programme committee built on a trust fund to where contributions from all beneficiaries converge. This new entity includes representation from all the main bodies involved - user associations, farmer cooperatives, local government authorities, NGOs - and is collectively responsible for steering the programme.

Its duties range from leading the negotiations between providers and beneficiaries and making the bridge between them and the relevant partner and statutory institutions consulted, and often even international donors. It deals with hiring expertise at different levels and stages, coordinating response from national regulatory bodies to identify priority areas and eligible land use/management and set payment levels. In some cases, this institution may also take on the role of monitoring the environmental performance of the measure introduced (or this could also be provided by an independent body), and for adjusting eligible areas and activities and correspondent payments, as appropriate(18)- see table 4.7

Table 4.7- The possible roles of the intermediary and facilitators in PES schemes

ROLES OF FACILITATORS *International to Local Institutions*			**ROLES OF INTERMEDIARY** *Local Institutions or with local representation*
Finance	**Information**	**Technical/ Governance**	**Governance**
Providing donations (or loans) for •feasibility studies •and start-up costs	•Providing policy guidance •Establishing social and biophysical baseline	•Promotion •Contracting buyers and sellers •Collecting and transferring payments •Monitoring	•Negotiation •Management •Supervision •Revision

The support team - governance and technical facilitators

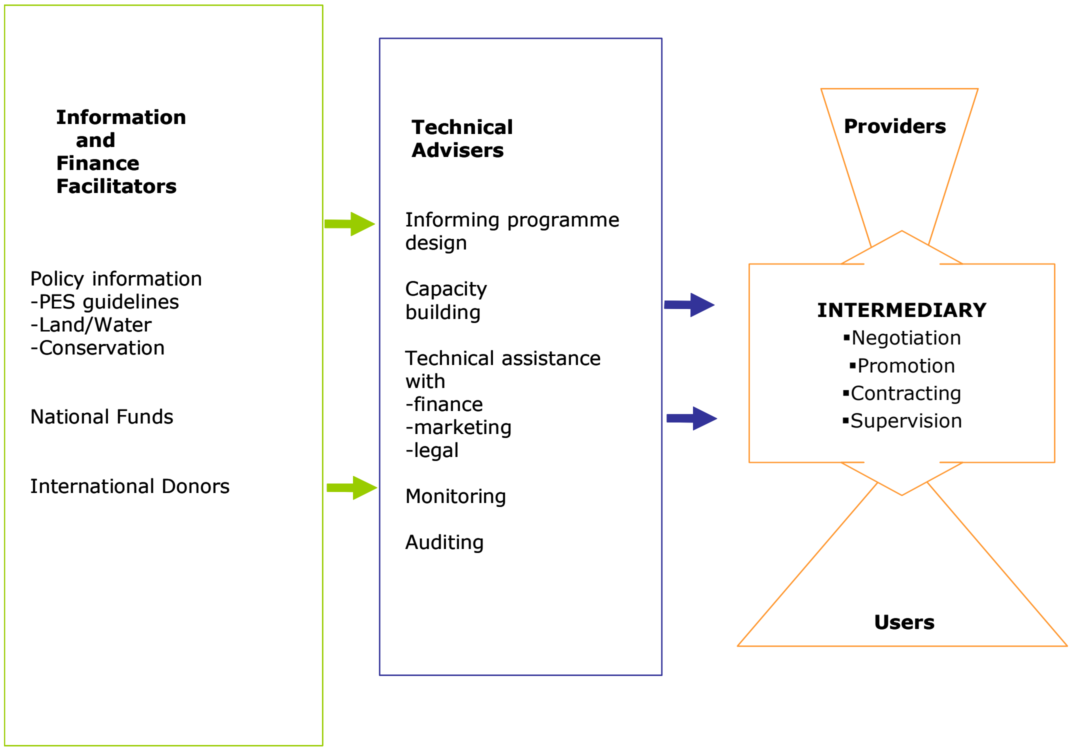
Drawing on existing capacity of trustworthy institutions, with an established management capacity and stakeholder representation, can help **keep costs low and reduce initial hesitation** about the capacity and trustworthiness of an entirely new institution.

Hiring out specific expertise helps reduce investment in training and technical resources: financial institutions are better prepared to manage funds and research institutes may even be willing to carry out baseline information for free, through their research projects.

Different stakeholders will come in at different stages, and remain for different periods. While international policy advisers and donors might be present only in the initial stages, national research institutes may be needed to provide biophysical information to support decisions on land management options in the design phase. A research institute may also be called in to monitor and provide more impartial verification of the scheme's environmental performance (see fig. 4.6)

Figure 4.6- illustrates tasks and roles of the support team

18 The National Forestry Fund of Costa Rica-FONAFIFO- the main intermediary of the Costa Rican national PES scheme adjusts eligible areas and payment levels for each modality of land use change.



As with the supporting institutions, mechanisms to collect, distribute and manage funds for a PES programme are easier and cheaper if building on existing and related channels.

Collecting PES programme contributions from beneficiaries using existing formal channels can keep arrangements simpler, cheaper and easier to monitor. For example, PES programme introduced watershed protection fees can be charged through water bills (this already happens in several cases, for example in the city of Heredia, Costa Rica or Saltillo, in Mexico), additional biodiversity conservation donations can be collected with protected area entrance fees or contributions to a country's Climate change mitigation efforts collected along with the usual airport tax charged to air passengers.

Payment to participating land managers can also be transferred to them through channels already in place. For example, training in the adoption of new land management techniques may be done by existing farmer associations, or cash payments may be distributed through community councils.

Financial sustainability

Investment in environmental services is a long-term affair. Long-term financial resilience is still a major difficulty for current PES schemes: Once start up funds (usually from government programmes or international cooperation agencies) run out, the scheme's developers find it very difficult to raise enough funds from the beneficiaries to cover payment commitments to farmers and the scheme's own running costs.

Long-term contributions

In most current PES schemes, the land management options fostered require continuous payments to land managers (19). If the contributions from the beneficiaries stop, incentives for environmental services-inducing management options will also end- threats to the ecosystems will return and possibly even undermine previous investment.

It is crucial that a PES scheme manages to strike strong and binding deals with buyers. Apart from a few cases where contribution commitments are easily enforceable, most contributions from private buyers have so far been voluntary and often without clear periodical commitments. Similarly, public schemes are also vulnerable to changes in budget allocations.

While it is a security measure for the buyer to have the chance to assess whether his or her investment is being worthwhile, it also generates insecurity in the scheme's investment and may prevent it from delivering results in due course. A balanced between both must be feasible from the start - buyers must agree to some degree of commitment to allow the scheme to take off.

In the long run it is vital that buyers are kept well informed of performance and are assured of the scheme's monitoring capacity and the contingency of payments to providers - for more see contingency and accountability

Transaction costs

Keeping transaction costs low relative to the value of the transaction will optimize the use of resources collected from beneficiaries and ensure long term survival of the scheme. These costs range from engaging buyers and targeting providers of environmental services(20), contracting them and monitoring their compliance, collecting and distributing payments and liaising with the programme's facilitators and partners. The key in keeping all these operations relatively cheap is to keep arrangements simple and to make the most of partnerships with institutions with already existent capacity for the different tasks required (see also section on The right partners).

For the participants, transaction costs range from preparing application to enter the programme, to implementing the land use changes required. A commonly used strategy to reduce these costs is in making a group application and signing group contracts, although the latter can raise compliance problems if peer pressure isn't strong enough.

While participants can generally measure easily whether the benefits of participating in the programme are high enough to compensate the investment they have made, for the PES programme developers this is not as easy at the initial stages, as costs depend on how well the scheme takes shape, unforeseen obstacles appear and unpredicted costs arise. Sometimes, overall transaction costs can be higher than the cost of payments to providers.

Sources of funds

Apart from pooling contributions from direct users of complementary environmental services, there are other sources of funding that a PES scheme can tap, such as Government revenues from related sectors: in Costa Rica for example, the national PES scheme that pays mainly for forest conservation is funded by a share of the fuel tax, or there might be grants from international institutions or donations

(19) This happens mainly in "Conservation PES schemes", where the new land use, or land use changes, result in a reduction in the farmer's benefits, thus requiring a continuous compensation for this loss. "Agro-development" PES schemes deals aim to increase farmers' benefits on their own, and do not require more than support with adoption costs. For more on this see "win-win"-strategies for PES programme development.

(20) For more on this, see Abatement and Transaction Costs of Carbon-Sink Projects Involving Smallholders, Oscar Cacho and Leslie Lipper, ESA Working Paper No. 06-13 December 2006

from the international community. Like in a sponsoring scheme commonly used to protect flagship species, the same scheme in Costa Rica also gets contributions from business, NGOs and individuals from around the world by offering certificates of investment in environmental services for a flat rate per hectare.

Donor funding can play a very important role. At the initial stages this could be by supporting the update of legal framework and strengthening general institutional capacity for PES programme design, or by implementing and monitoring the scheme. In the long run, donor funding might be required to cover biodiversity values in which the private sector is not interested or public funds can't reach (e.g. in national PES programmes where donor agencies like GEF earmark funds contributed to biodiversity priority). The same applies to PES schemes with a very strong commitment to support poverty alleviation. In these cases, donor funds could be crucial in supporting poverty-specific characteristics of the scheme, and leave the contributions for the environmental services to be fully invested in priority areas to deliver the environmental goals they have been paid for.

Contingency and accountability

Being a deal that rests on continued voluntary commitments, a PES scheme's long-term survival rests on the rules that make the different parties responsible for the fulfilment of commitments they have taken on, and on which agreed compensations are conditional.

Monitoring

Effective monitoring is essential to prove beneficiaries that their investments are generating land use changes and eventually the expected environmental service they are paying for – thus, reliable scientific basis of the land management options and continuous monitoring of outcomes are crucial.

While rates of carbon sequestration in young fast-growing trees can be easily estimated, changes in water quality and quantity can take several decades to be realised. In addition, relationships between land management and hydrology are complex, site-specific and prone to misunderstandings(21).

Clear options for improvement in water quantity might include removal of alien invasive species that consume very high quantities of water (*Working for Water* Programme in South Africa (22)), or improvements in water use efficiency for example through improvements in the water supply infrastructure to avoid water losses. Other options could be adapting the varieties used to the biophysical conditions or improving irrigation techniques. Improving water quality by shifting to organic agriculture might also be a more straightforward option - click for example of monitoring indicators.

In some watershed or biodiversity cases, large enough areas may be required for benefits to be realised and the scheme may not be able to cover this right from the start. It is important to be clear about the level of uncertainty, thresholds and time lags so that buyers know what they will be paying for and providers are not asked to deliver what is not in their power.

A contingency plan is sometimes used, especially in carbon projects. For example, as part of the Chicago Climate Exchange (CCX) rules for agricultural and grassland soil carbon offset provision, a 20% share of the offset units traded is placed into a "contingency pool". This is a risk management option to compensate for eventual carbon storage reversal due to eventual non-compliance with the

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(21) See for example Monitoring Changes in Hydrologic Response Due to Land Management Changes at the Watershed Scale: Time Lag and Other Issues. And Hayward, B. 2005. From the Mountain to the Tap: How Land Use and Water Management Can Work for the Rural Poor.Forestry Research Programme. UK Department for International Development

(22) See Working for Water Programme , South African Department of Water Affairs and Forestry

conservation tillage management options adopted under the contract to supply soil carbon credits.((23))

Table 4.8- Examples of monitoring indicators((24))

Environmental services	Service attributes	State indicator
Wildlife habitat	• Wildlife and nursery habitats	• Resident and endemic species (number) • Surface area per ecosystem type (ha)
Water supply	• Precipitation, infiltration, soil water retention, percolation, streamflow, groundwater flow • Biotic and abiotic effects on water quality	• Water storage capacity (m3/m2) • Pollutant concentrations • Discharge (m3/year)
Regulation of water flows	• Retention of rainfall and release (especially by forests and wetlands) • Water storage by rivers, lakes and wetlands • Groundwater recharge and discharge	• Infiltration capacity (mm/h) • Water storage capacity of soils (m3/m3) • Baseflow volume (m3/year);
Water purification	• Reduced siltation of streams and lakes • Nutrient uptake and release by ecosystems • Removal or breakdown of organic matter, salts and pollutants.	• Nitrogen amount (kg/ha) • Total dissolved solids (kg/m3) • Electric conductivity (µS/cm) • Denitrification (kg/ha/year)
Control of soil erosion and sedimentation	• Protection of soil by vegetation and soil biota	• Infiltration capacity (mm/h) • Slope length (m) • Barren land (%) • Soil loss (kg/ha/year) • Sediment storage (kg/ha/year)
Hydro-electric power	• Flow for energy generation	• Storage capacity of riverbeds and lakes (m3/km2) • Slope (deg), elevation (m)
Carbon sequestration and storage	• climate change mitigation	• on-site biomass (including stemwood, crownwood, foliage and large roots) • off-site biomass (including thinnings and timber products)
Aesthetic and recreational services	• Landscape quality and features	• Stated appreciation • Recreational value (e.g. entrance fees (US$/visit) • Houses on lakeshore (number/km) • Visitors (number/year)

Compliance on the supply side: payment rules

Participating land managers commit to the PES programme agreement through periodically renewed contracts that specify what land management options are allowed and the consequences of non-compliance(25). While in more complex schemes, **compliance is monitored** using geo-referenced

(23) Soil Carbon Management Offsets, Chicago Climate Exchange

(24) adapted from PAY-Establishing payments for watershed services Smith, M., de Groot, D. and Bergkamp, G.2006. Gland, Switzerland, IUCN - The World Conservation Union

(25)For contracts see Getting Started - Step 3- Selecting a contract type and PASOLAC manual with examples of documents for the several steps (only in Spanish) - Elementos metodológicos para la implementación de pagos por servicios ambientales hídricos a nivel municipal en Centroamérica satellite imagery, in smaller schemes this may be done through random field inspections. Sanctions are generally limited to withholding payments.

Due to the difficulties mentioned in the monitoring section, so far **few payments are differentiated according to the level of the environmental services service provided**. In the case of water for example, it would be difficult to attribute specific improvements in water quality to individual land - water circulates within the watershed and effects can come from far upstream. For this reason, apart from carbon sequestration, most payments are based on a flat fee (or with a few variations) based on the compliance with the land management options implemented (for more on these variations see the section on Payment Level.

Payments should be continuous (to ensure continuous compliance it is easier to use **periodical payments** that can be discontinued if the provider does not comply with the rules) and open-ended. One-off payments, such as land titles or investments in community infrastructure can have very positive livelihood effects but are harder to use as a guaranty for compliance, as they cannot be taken back. In these cases, additional measures must be taken to ensure that an ongoing incentive for compliance remains (for example offering temporary tenure periodically renewed or adding restrictions to the use of communal structures).

In some cases a larger payment is given in the beginning to help participants adopt the necessary land management changes, and smaller amounts follow during the following years to ensure maintenance. Payment type and timing should also be flexible to adapt to changing needs and circumstances of the participants (for example, in the Los Negros scheme in Bolivia, payment for forest conservation changed from beehives to barbed wire, following the participant's priority in strengthening their claim over the land, instead of the added income from honey production(26)

Pro-poor PES options

PES schemes are not a poverty alleviation tool per se and can only be implemented where communities already have rights over their natural resources (property, access and/or use rights). PES schemes can then build on these.

PES schemes can contribute to improve livelihoods of the participants in the form of additional income, stronger land tenure claims and better environmental conditions. This depends on whether the poor are located within the environmental priority area and have the possibility of accessing and participating in the scheme. Setting up a PES scheme can be a lengthy process, requiring institutional change, extensive negotiations and substantial start-up funding, all of which are greater obstacles for poorer groups, generally with less access to information, negotiation channels and finance options.

Pro-poor PES programme options - participation requirements and types of payment

Often **eligibility criteria** exclude poorer farmers simply by requiring that only participants with larger properties can enter the scheme. In Mexico, for example, to enter the national PES programme, the minimum size to be eligible in 2004 was 50 ha of forest (the smallest area that can be observed with satellite images)(27).**Costs of application** may also exclude poorer groups as this may require clarification of property rights (or agree on use rights to allow for long term commitments) along with preparing all the necessary information and paperwork.

The most important costs however, are often the **costs of participation**. For land managers with smaller parcels and few extra money for investment, this may be the most limiting factor. Restricting use of limited land resources (and consequently of work opportunities) or introduced new techniques to the few land in use may considerably increase risk to food security and reduce access to insurance

(26)for more on this see Bees and Barbed Wire for Water on the Bolivian Frontier, by Nigel Asquith and available
(27) Alix-Garcia, J., de Janvry, A. & Sadoulet, E. n.d.. The role of deforestation risk and calibrated compensation in designing payments for environmental services (available at http://are.berkeley.edu/~sadoulet/papers/PES_EDE.pdf)

assets (such as the possibility of selling wood in time of crisis or moving cattle into land set aside from grazing in times of draught).

Certainly, as in every PES scheme, participation should be voluntary (although some PES schemes have used an "entire village" approach), and compensation offered for the farmers' investment and participation should cover these costs. However, especially **in poverty-oriented PES schemes, payments can be designed to maximize their multiplier effects**. Channelling the payments towards women has been shown to be particularly effective in increasing spending on education, health and nutrition. In cases of strong community ties, channelling the payment in to a fund for communal improvement in land management might also be a way of reducing costs and spread benefits to landless members of the community.

Avoiding regressive schemes - when the beneficiaries can't pay

In cases where some of the beneficiaries in a PES scheme are poor communities (for example in the case of watershed protection schemes, when the PES programme fee is added to already existing water use fees), and the community is not able to pay the extra cost of improved environmental service, there might be other ways in which they can contribute. For example, in Sukhomajri (India) some groups agreed to limit their use rights of grazing lands to sustainable levels as payment for investment in their water harvesting structures. In San Pedro del Norte, Nicaragua, some of the downstream beneficiaries participating in a scheme to protect water quality and increase downstream flows, who do not have the capacity to pay (fix water use fee of US$2 per month, a small share is earmarked for the scheme - US$ 0.30 per month) can instead contribute with labour helping to build soil and water conservation structures in the land of the participant providers upstream.

When the most efficient providers are the wealthier neighbours

Should the PES approach give up targeting and efficiency to be more egalitarian? Trade offs between efficiency and equity are in the end a political decision. However, sometimes it is possible to combine environmental priority areas with poverty alleviation goals. For example, if environmental priority land coincides with land poorly suited for agriculture, from where farmers draw only meagre benefits, a PES scheme can constitute an important additional source of income at relatively low opportunity costs for the provider- see maps 4.3 and 4.4 below.

Map 4.3.(top): Degraded cropland with soil carbon sequestration potential and high poverty rates Click on the Map to enlarge(28)

Map 4.4. (bottom): Biodiveristy hotspots in areas poorly suited to rainfed agriculture and with high poverty rates.Click on the Map to enlarge(29)

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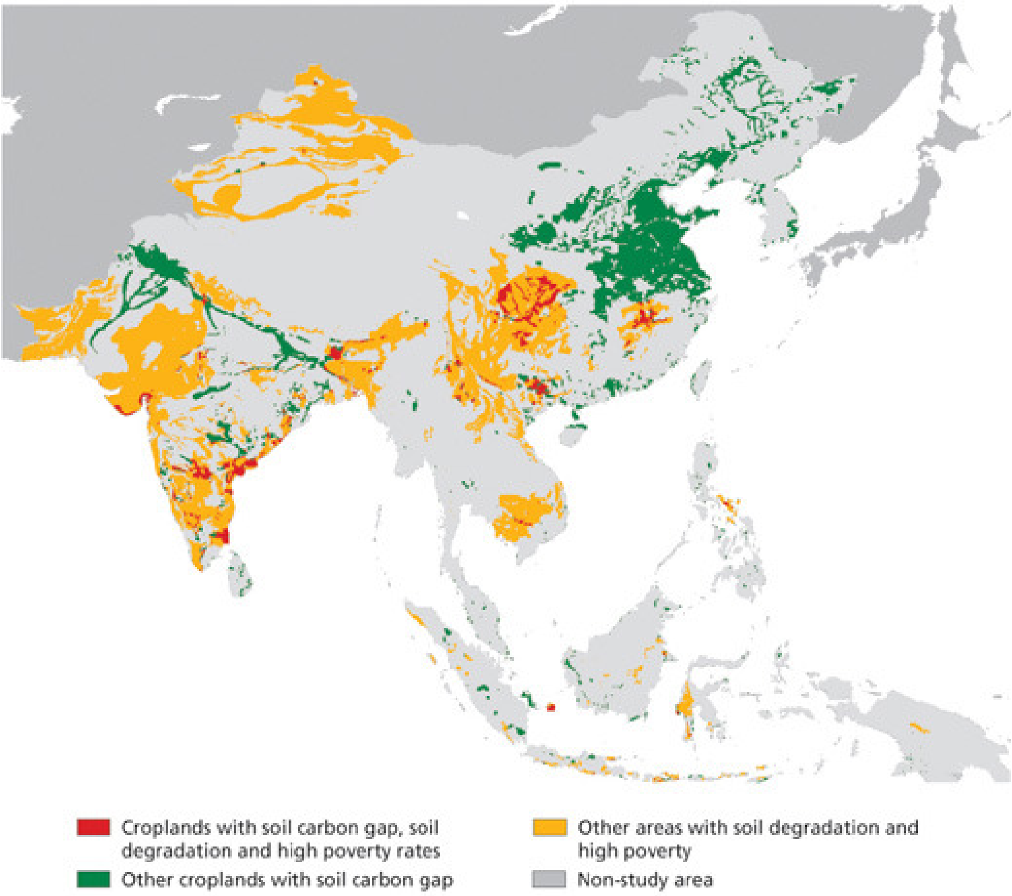
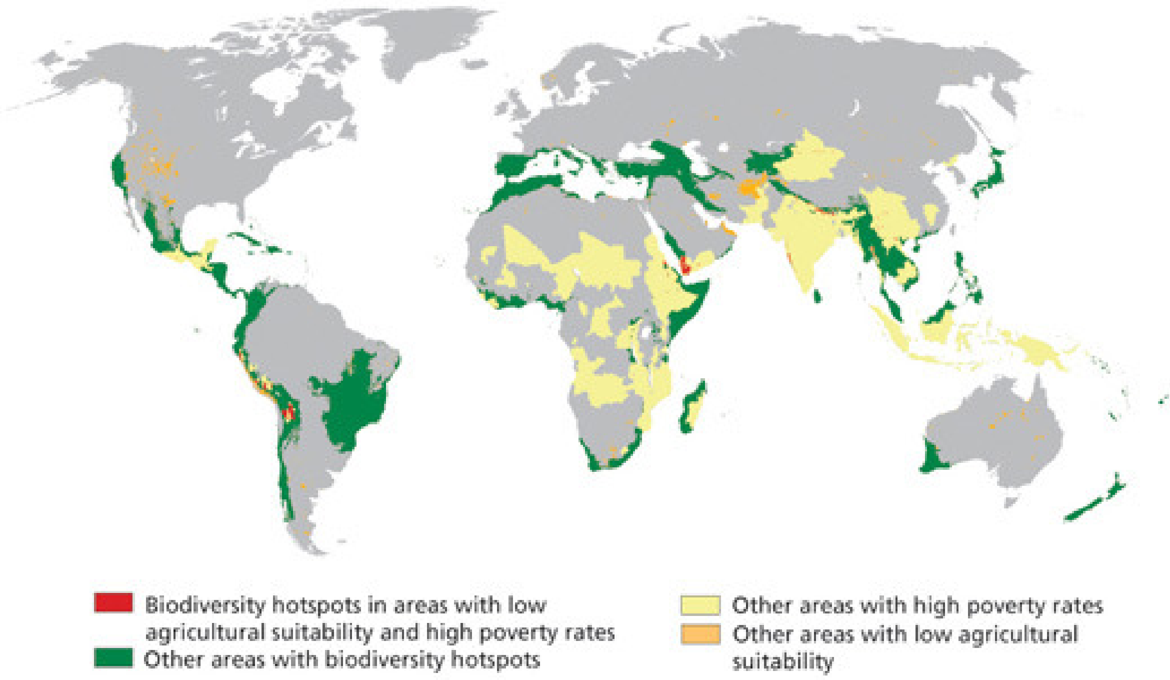
(28) FAO.2007.The State of Food and Agriculture 2007(map 7)

(29) ibid (map 8)


Croplands with soil carbon gap, soil degradation and high poverty rates
Other croplands with soil carbon gap
Other areas with soil degradation and high poverty
Non-study area


Biodiversity hotspots in areas with low agricultural suitability and high poverty rates
Other areas with biodiversity hotspots
Other areas with high poverty rates
Other areas with low agricultural suitability

Location specific schemes focusing on specific areas of high hydrological importance (such as surrounding water springs) or high biodiversity value (remnant patches of native vegetation in a farm or riparian strips, constituting habitat for specific species of fauna and flora) will target these areas regardless of the income level of the land manager. In such cases, a trade-off can present itself between maximizing environmental results and social benefits (see box 4.2). If the social benefits are a specific requirement of the scheme, then the sources of funding should include those sectors of society interested in supporting these social objectives, like governments and international donors supporting poverty-reduction strategies. If the delivery of environmental services is overridden by social objectives, the beneficiaries supporting the scheme may lose confidence in it and stop supporting it.

Box 4.2: Trade offs in combining environmental and social goals(30)

In the RUPES (i) action learning site in Sumber Jaya, results from hydrological assessment have shown that soil conservation efforts could be much more cost effective if efforts were channelled to privately owned lowland riparian areas instead of the upper slopes where the Social Forestry Programme (Hutan Kamasyarakatan-HKm) operates. “Applying this to Sumber jaya, it means targeting lowland riparian areas inhabited by relatively wealthy people will be 50% -100% more cost effective than targeting ridge line areas where Hkm operates and where poorer people live and use the land."

Focusing the scheme to the riparian providers would increase the environmental benefits delivered but undermine the opportunity for poorer groups upstream to improve their situation by being granted access to “protection forest” in return for environmental services provided by their soil conservation commitments. This is a common trade-off found in PES-type initiatives that must be made clear to all parties, particularly those contributing to the scheme and expecting the delivery of the service they are paying for.

(i) RUPES - an ICRAF program for developing mechanisms for rewarding the upland poor in Asia for the environmental services they provide - RUPES

Pro-poor PES Institutions

A way often used to reduce individual costs of accessing and participating in the programme (see section on Pro-poor PES programme rules) is to work in groups. However, poorer farmers are usually dispersed and unorganized so this may represent a very high cost on its own.

PES schemes must have consistent local representation to work with smaller farmers and improve their information about the scheme. This is to avoid misunderstandings on the farmers' side that lead to fear of loss of rights over their land and to support them in the application process and adoption of the required land use/management commitments (see box 4.3). An added concern, when aiming to involve small and dispersed farmers, is to make sure these are given the means to be included in the negotiation of the programme rules (from adapting the type of information given to them, to facilitating transportation to meetings, etc). Most PES schemes involving the poor include NGO/community organizations already active in the area well before the PES programme started. Building on pre-existing community natural resource management projects is likely to be an important way of moving forward pro-poor PES programmes.

Rural extension offices can provide crucial support (see box 4.3). They may be local government offices, NGOs or representations of the intermediary and main facilitators. In some cases, these local agencies act as real sub-intermediaries, getting the application procedures done and supporting the participant in fulfilling his responsibilities. However, in most cases this also has a cost that may be too high for poorer landowners. Often NGOs take over this role due to social concerns or conservation goals, but in cases where none of these are present, it is important to highlight the need for specific

(30) Kerr, J.2004.Trip Report: Property Rights, Environmental Services and Poverty in Indonesia. BASIS, University of Wisconsin-Madison

funding for this particular and very important role. It is usually possible to tap government funds or international donors for this purpose and even the direct users may be interested in sponsoring this component, as a bundled ethical and environmental investment.

Box 4.3 The important support role of rural extension technical advisors, in the Costa Rican National PES programme(31)

As part of the Costa Rican National PSA programme, local advisors and facilitators play a major role. They provide support through the entire process, working closely with the landowners and collaborating with FONAFIFO, the national "Wholesale" manager.

The Foundation of the Development of the Central Volcanic Cordillera (FUNDECOR) is one of such facilitators. FUNDECOR is an NGO established through international cooperation to help reduce deforestation, working to make conservation and sustainable use of forests an economic alternative for forest owners. They support forest owners interested in participation in the national PSA programme by assisting with clarification of the applicant's land tenure status (when the situation is not contentious), preparing the paperwork for the application to FONAFIFO, such as legal paperwork and management plan - 95% of FUNDECOR's applications are approved. In addition, FUNDECOR also provides other forest management support schemes, such as FSC (Forest Stewardship Council) certification and advance timber purchase and auctioning.

CODEFORSA, the San Carlos Forestry Development Commission, is another major facilitator at the local level. Their work is done on a personal basis - they know the landowners that might be interested in participating and approach them with the option of participating in the PES scheme; they also advertise on the radio. Because FONAFIFO's scheme works on a "first come-first served" basis and calls for applications are only made at a specific time of the year, CODEFORSA keeps a "database" of applications ready for the right moment.

Long-term adjustments

Given the appropriate context, well-designed Payments for Environmental Services (PES) schemes can increase both the efficiency and accountability of funds invested in environmental protection. Developing a PES scheme is mainly a negotiation process. It can take years and should be well thought through from the beginning, to result in the intended benefits and for an undetermined period of time. Designing a scheme with solid aims and realistic goals is key for stakeholder agreement, positive outcomes and long-term endurance.

In any case, most PES schemes are still at their early stages and learning by doing as they advance. Expanding the supply and demand basis is a continuous process, and most programmes open new applications every year responding to growing interest from providers and greater engagement from beneficiaries.

Strengthening the relationships with the right partners to establish the enabling policy environment a and longstanding relationships that can respond to new needs as the scheme expands and evolves.

Refining the mechanisms that grant financial sustainabilityand acountability to the scheme will also be a constant concern to keep up with its increasing complexity, as its funds grow and partners multiply.

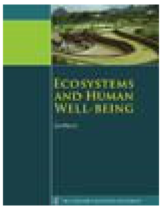
(31) Adapted from case study profile available in www.watershedmarkets.org

PES*AL* MATERIALS

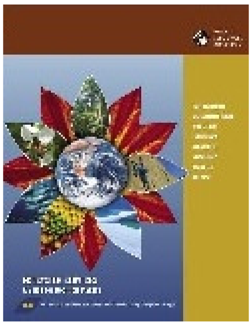
www.fao.org/es/esa/pesal/pesmaterials.html

Introduction to Environmental Services and PES

Ecosystem thinking



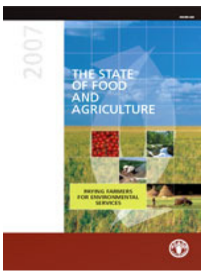
Millennium Ecosystem Assessment
World Resources Institute 2005. Island Press, Washington, DC
An assessment of the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being



Ecosystem Services: A Guide for Decision Makers
Ranganathan, J. Bennett, K., Raudsepp-Hearne, C., Lucas, N., Irwin, F., Zurek, M., Ash N. and West, P. World Resources Institute 2008. Island Press, Washington, DC

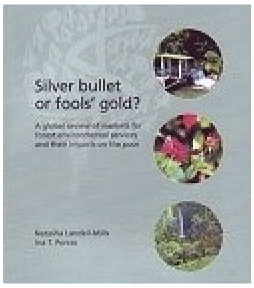
Presents various methods that use ecosystem services—the benefits of nature such as food, fuel, natural hazard protection, pollination, and spiritual sustenance—to enable decision makers to link ecosystems and economic development.

Introduction to Payments for Environmental Services



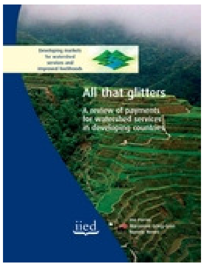
FAO State of Food and Agriculture 2007

The report explores the potential for agriculture to provide enhanced levels of environmental services alongside the production of food and fi bre, and highlights the need to improve farmer incentives to sustain and improve the ecosystems on which we all depend. PES are one of the approaches to provide these incentives and the report clarifyes the challenges that need to be addressed in implementing these schemes to contribute to the realization of its potential.



Silver Bullet or Fools' Gold: A global review of markets for forest environmental services and their impact on the poor
Landell-Mills, T. and Porras. I. T. 2002. International Institute for Environment and Development, London

A global review of emerging markets for previously non-traded forest environmental services, based on 287 cases from both developed and developing countries



All that glitters… A review of payments for watershed services in developing countries
Porras, I., M. Grieg-Gran. and B. Neves.2008. International Institute for Environmental and Development, London

An in-depth international review and analysis of all accessible ongoing initiatives and advanced proposals for market mechanisms for watershed services

Payments for environmental services: Some nuts and bolts.
Wunder, S. 2005. Occasional paper n.42. Cifor. Bogor, Indonesia

This paper aims to help demystify PES for non-economists, starting with a simple and coherent definition of the term. It then provides practical "how-to" hints for PES design. It considers the likely niche for PES in the portfolio of conservation approaches.

PES "manuals"

Overview of PES development stages and useful sources of information

Getting Started: An Introduction to Design & Implementation of Payments for Ecosystem Service. The Katoomba Group & partners.

PAY -Establishing payments for watershed services. Smith, M., de Groot, D. and Bergkamp, G.2006.IUCN - The World Conservation Union. Gland, Switzerland.

Also from IUCN- A Gateway to PES-resources useful for the different stages of ES thinking and PES development

World Bank Best Practice on PES Design see especially the powerpoint presentation: ES for Dummies

USAID PES Sourcebook- Lessons and Best Practices for Pro-poor Payments for Ecosystem Services.

ICRAF-IDRC Global Scoping Study on Compensation for Ecosystems Services providing recommendations for PES design and giving an overview of PES development in Latin America, Asia and Africa . The series includes nine working papers and reports from regional consultantions.

Negotiating For Nature's Services: A Primer for Sellers of Ecosystem Services on Identifying & Approaching Prospective Private Sector Buyers.Roberts, J. P. and Waage, S. 2007. The Katoomba Group & partners

Negotiating Watershed Services. Hope, R. Porras, I., Borgoyary, M., Miranda, M., Agarwal, C., Tiwari, S. and Amezaga, J. 2007. International Institute for Environment and Development, London.

Poverty Reduction and Environmental Management (PREM) Project Report- Designing Payments for

Watershed Protection Services of Philippine Upland Dwellers

Lessons learned from emerging PES projects

IIED Developing Markets for Watershed Services
A project to increase understanding of the potential role of market mechanisms in promoting the provision of watershed services for improving livelihoods in developing countries, ongoing since 2001 in South Africa, India, Indonesia, The Caribbean and also China and Bolivia.

Lessons learned during the first years of negotiations and implementation, are available as country reports, and capacity building materials like films, field trip reports and a cartoon booklet are also available.

The project also generated a review of over 50 PES projects ongoing in developing countries-case study profiles are available at www.watershedmarkets.org

RUPES- ICRAF programme to Reward the Upland Poor in Asia for the Environmental Services they provide
Visit the RUPES website for progress reports and synthesis of lessons learned in the implementation in their action-learning sites, in The Philippines, Indonesia and Nepal.There is also a regular newsletter reporting on progress

Green Water Credits: Lessons learned from PES- Report 2, July 2006, ISRIC- World Soil Information

Focusing on Pro-poor PES Design

World Bank Guidelines for pro-poor PES

FAO Agricultural Development Economics Division Working Papers on opportunities to combine PES tools and poverty alleviation
Less-favoured areas: Looking beyond agriculture towards ecosystem services.
Leslie Lipper, Prabhu Pingali and Monika Zurek, 2006. ESA working paper 06-08

When are payments for environmental services beneficial to the poor?
D. Zilberman, L. Lipper and N. McCarthy, 2006. Paper presented at the International Conference on Economics of Poverty, Environment and Natural Resource Use 17-19 May 2006 Wageningen University Netherlands: ESA working paper 06-04

Estimating the supply response among low income land users to carbon in Costa Rica. ESAE conducted a collaborative study with Columbia University School of International and Public Affairs on estimating the supply response to carbon payments among poor landusers, using empirical data from Costa Rica. The results of the study were published in 2004 as ESA Working Papers 4-19, 4-20 and 4-21 on the ESA working papers website http://www.fao.org/es/esa/en/pubs_wp.htm

Compensation for environmental services and rural communities. Rosa, R., Kandel, S., Dimas, L., Cuéllar, N. & Méndez, E. 2003. Lessons from the Americas and key issues for strengthening community strategies. San Salvador, Programa Salvadoreño de Investigación sobre Desarrollo y Medio Ambiente (PRISMA).

Pagos por Servicios Ambientales : conceptos, principios y su realización a nivel municipal
Programa para la Agricultura Sostenible en Laderas de América Central, Corredor Biológico Mesoamericano, Managua

Payments for ecosystem services- Issues and pro-poor opportunities for development assistance.Ravnborg, H. M., Damsgaard, M. G. and Raben, K. 2007. Danish Institute for International Studies-DIIS Report 2007:6

Can the Poor Participate in Payments for Environmental Services? Lessons from the Silvopastoral Project in Nicaragua.

Poor Household Participation in Payments for Environmental Services: Lessons from the Silvopastoral

Project in Quindío, Colombia.

Main international organizations working on PES

Forest Trends, an NGO working to promote incentives and accelerating the evolution of economic systems that will result in the maintenance and restoration of forest ecosystems.

As part of their team, the Ecosystem Marketplace provides information on markets and payment schemes for ecosystem services to bridge the gap between buyers and sellers on their website. It offers updates on the 4 main markets, and particularly carbon, also though a series of specialized newsletters: Marketplace eNewsletter, V-Carbon News, Mitigation Mail, or Community Forum.

The **Katoomba Group**, an international working group composed of leading experts from forest and energy industries, research institutions, the financial world and environmental NGOs, seeks to address the key challenges for developing markets for ecosystem services.

Communities, Conservation and Markets project. A World Bank joint project with the Ecoagriculture Partners and the Katoomba Group that provides support to rural resource managers to manage their landscapes using ecoagriculture approaches and payments for ecosystem services (PES).

Ecoagriculture Partners, an NGO who works to improve knowledge and capacity to manage agriculture activities to achieve three complementary goals: to enhance rural livelihoods, conserve biodiversity and sustainably produce crops, livestock, fish, and forest products. On their website its possible to download resource materials and read about case studies.

PES research and guidelines at the World Agroforestry Centre (ICRAF)

PES research and guidelines at the Centre for International Forestry Research(CIFOR)

See also ZEF-CIFOR workshop: Payments for environmental services in developed and developing countries- expert papers available at http://www.cifor.cgiar.org/pes/_ref/news_events/events/germany/papers.htm and the Toolbox for sustainable forest management

Work on economics and the environment, including PES, at The World Conservation Union (IUCN)

World Bank PES page providing guidelines on PES Design, pro-poor options and links to their own PES portfolio

PES page -Pro-poor Market for Ecosystem Services at the United Nations Environment Programme (UNEP)

PREM -Poverty reduction and environmental management. Research and policy analysis in environmental and resource economics in developing countries, specifically focused on the relationship between poverty and the environment. See for example the projects on PES for improved watershed management in Tanzania and The Philippines.

The Natural Capital Project is developing global support system to advance the mapping, modelling, measuring, and valuing of ecosystem services as well as to promote incorporation of these values into decision-making.

PES schemes by environmental service

On Carbon

A conceptual framework for analyzing the links between poverty reduction and payments for environmental services D. Zilberman, L. Lipper and N. McCarthy. ESA working paper 06-15

Abatement and Transaction Costs of Carbon-sink Projects Involving Smallholders. Oscar Cacho and Leslie Lipper. ESA working paper 06-13

Assessing the impact of transactions costs on carbon market participation with empirical evidence from Indonesia. An ESA working paper by Oscar Cacho, Graham Marshall and Mary Milne entitled "Smallholder agroforestry projects: potential for carbon sequestration and poverty alleviation" gives a comprehensive overview of the issue of transactions costs as they relate to including the poor in carbon sequestration payment programs

IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry projects

Winrock International Carbon sequestration monitoring methodology

Plan Vivo
a system for managing the supply of verifiable emission reductions from rural communities in a way that promotes sustainable livelihoods. Operational projects in Mozambique , Uganda and Mexico .

The World Bank Carbon Finance Unit
Including Community Development Carbon Fund . BioCarbon Fund , Forest Carbon Partnership Facility

Ecosystem Marketplace- Market Watch section
Updates on trading information for the 4 main markets

UNFCCC CDM Bazaar
The UNFCCC CDM Bazaar is a Web-based facility which serves as a platform for exchange of information on Clean Development Mechanism (CDM) project opportunities.

CCX- Chicago Climate Exchange
see specially project types Agricultural Soil Carbon Offsets
and CCX list of verifiers

Ecobusinesslinks.com Carbon Offset Survey
Regularly updated list comparing carbon offset prices

On Water

At FAO

FAO Foro Electrónico Latinoamericano on Payment Schemes for Environmental Services in Watersheds 2003-2004
Contributions on experiences designing and implementing PES in watersheds and their impacts. Case studies from regional forum in Arequipa , Ecuador and FAO Land-Water Linkages in Rural Watersheds Case Study Series

FAO Water Development and Management Unit

FAO Water website

Land-Water Linkages in Rural Watersheds, FAO's programme on hydrological services in watershed management. Land and Water Development Division

Water Management and Irrigation Systems Group FAO Water Resources, Development and Management Service

Unasylva -International Journal of Forestry and Forest Industries No. 229 Vol. 58, 2007/4

All that glitters: A review of payments for watershed services in developing countries Ina Porras, Maryanne Grieg-Gran, Nanete Neves. International Institute for Environment and Development, London

WOCAT- World overview of conservation approaches and technologies
a network of soil and water conservation (SWC) specialists who provides training support to build regional and national capacities in SWC. Through their website it's possible to access questionnaires , databases, guidelines, manuals and tricks/tips for SWC implementation.

WOCAT-Where the Land is Greener -case studies and analysis of soil and water conservation initiatives worldwide.Hanspeter, L., Critchley, W. (Eds.)World Overview of Conservation Approaches and Technologies (WOCAT)

PASOLAC Guía técnica de conservación de suelos y agua
Programa para la Agricultura Sostenible en Laderas de América Central- PASOLAC. 1999.

PES page at the Sustainable Agriculture and Natural Resource Management (SANREM CRSP).
Collaborative Research Support Program SANREM CRSP Virginia Tech

ICRAF Watershed management research. A series of briefs on the relation between land use, erosion and water.
Land use and water flow models

ICRAF- Rapid Hydrological Appraisal (RHA)

Models from the Centre for Land Use and Water Resources Research (CLUWRR)
Newcastle University
HYdrology of Land Use Change (HYLUC)
and the GIS-dissemination tool- EXploratory Climate Land Assessment and Impact Management (EXCLAIM) .

Communicating ecosystem services- tolls for scientists to engage the public
A joint project Union of Concerned Scientists and Ecological Society of America, offering water purification and flood prevention information kits

On biodiversity and Landscape

ICRAF- Rapid Agrobiodiversity Appraisal (RABA)

IUCN list of existing private sector biodiversity initiatives

International Social and Environmental Accreditation and Labelling (ISEAL) Alliance
An association of leading voluntary international standard-setting and conformity assessment organisations that focuses on social and environmental issues, including Forest Stewardship Council (FSC), Marine Stewardship Council (MSC) and Rainforest Alliance.

BBOP - The Business and Biodiversity Offset Program (BBOP)
A new partnership between companies, governments and conservation experts to explore biodiversity offsets

Verde Ventures
A part of the NGO Conservation International, invests in small- and medium-sized businesses that are strategically placed to contribute to conserving Earth's biologically richest and most threatened areas

Examples of PES schemes, by region

(1) This section draws on the database "Watershed Markets" of the International Institute for Environment and Development (IIED), holding a collection of over 50 PES cases on watershed services. The case study database of the Nature Valuation & Financing Network facilitates information exchange in ecosystem management for sustainable livelihoods

This section provides a brief overview of some PES projects in each region and suggests additional sources of information. It draws on the database **Watershed Markets**, holding a collection of over 50 PES cases on watershed services.

Latin America

Latin America is the region of the world with greatest development to PES initiatives, including two of the largest national programmes- in Costa Rica and in Mexico, with others emerging in other countries in Central and South America.

Costa Rica National PES programme

A financial mechanism for the recuperation and conservation of forest cover in Costa Rica " has contributed to reverse forest loss by paying forest owners for four bundled environmental services (watershed protection, carbon sequestration, landscape beauty and biodiversity protection) their forests provide. While the scheme relies heavily on state funds derived from a fuel tax, it also counts with contributions from the private sector (hydropower producers and water bottling companies).

In nine years, it covered over 500,000ha of forest, mainly under protection, corresponding to over 6,000 contracts with landowners and invested over US$110 million into the protection of the country's forests and its environmental services.

The environmental Services Program: A success story of sustainable development implementation in Costa Rica. FONAFIFO, over a decade of action. 2005.Edited by Rodríguez, J.M.Costa Rica National Forestry Fund (FONAFIFO). San José
Watershed Markets. Technical trip report: active learning from Costa Rica's PES programme. IIED, 2006

Mexico National PES programme
Mexico began a national PES programme in 2003, focusing on forest and watershed protection(the PSAH- National Programme for Hydrological Environmental Services, later joined by the PSA-CABSA-Program to Develop Environmental Services Markets for Carbon Capture and Biodiversity and to Establish and Improve Agroforestry Systems). By 2005 it covered an area of over 500,000ha (surpassing Costa Rica's 9-year programme at that time) and had invested US$ 88 million, of which about US$ 20 million a year, are channelled from water use fees charged to domestic and industrial water users (Mexican Forestry Commission-Conafor).

The programme provides incentives for landowners to protect their forests, especially cloud forests, reforest or adopt agroforestry. It builds on previously ongoing individual watershed management PES projects (such as the example in Fondo Procuenca Valle de Bravo) and aims to supports their replication to other municipalities. It also supports carbon sequestration or avoided deforestation, and biodiversity conservation projects though its CABSA programme.

Farmers in the Sierra Gorda Biosphere Reserve, for example, have benefited from the support of this national programme in generating carbon credits being sold through the voluntary market.
Brazil

A state-wide programme the State Riparian Forest Restoration Project (PRMC) in São Paulo supports farmers in the restore and protect the vegetation in riparian strips in order to reduce erosion and improve water quality downstream.

Colombia, Ecuador and Peru

The Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN) is developing a sustainable land management project ongoing in fifteen watersheds in the Andean region of Colombia , Ecuador and Peru - Cuencas Andianas, which includes Payment for Environmental Services (PES) schemes as one of the incentive mechanisms. Three sites had already begun implementing PES at the end of this project. Work is continuing with the local teams

Bolivia

In Bolivia,the Los Negros scheme aims to protect the forest in the buffer zone around Amboró National park in return for beehives- the goal is to protect the forest, its bird life and watershed protection.

Fair deals for watershed services in Bolivia. Vargas, M. T and Asquith, N. 2007. IIED Natural Resource Issues No. 10. International Institute for Environment and Development. London, UK.
Fresh tracks in the forest: assessing incipient payments for environmental services initiatives in Bolivia. Robertson, N. & Wunder, S. 2005. Center for International Forestry Research, Bogor, Indonesia

Asia

The Philippines, Indonesia and Nepal

RUPES and partners developing schemes to Rewarding the Upland Poor in Asia for the Environmental Services they provide (RUPES). Work in ongoing in nine sites focusing mainly on watershed management for hydropower generation and on biodiversity conservation.

In the Sumber Jaya site, Sumatra, RUPES has been supporting local communities in accessing the Indonesian national social forestry programme (Hutan Kamasyarakatan- HKm), which grants use rights to state forests to groups willing to adopt sustainable land management options for watershed environmental services, such as agroforestry.

China

One of the largest national PES, the Chinese Sloping Lands Conversion Programme (SLCP) had US$ 43 million assigned to it, each year to compensate tens of millions of rural households for converting erosion-prone farm land into forest to reduce flood risk in the Yangtze and Yellow rivers.

India

Various examples of adoption of soil and water conservation measures to increase local water availability and reduce siltation in rivers downstream. In the 1970s, integrated management of the hills around Sukhomajri village dramatically increased water availability for irrigation and led to considerable improvements in the village's standard of living, while reducing siltation of the Sukhna Lake, the main water source for the downstream city of Chandigarh .
For more see: Agarwal, A. and S. Narain. 1999. Making Water Management Everybody's Business: Water Harvesting and Rural Development in India . no. 87 London , International Institute for Environment and Development. Gatekeeper Series.
Down to Earth Magazine-DTE. 2007. Saga of two villages in Vol 16, no 12 Thursday, November 08, 2007 . Down to Earth Magazine, Centre for Science and Environment, New Delhi.

The Bhoj wetlands, a Ramsar site, in the Bhopal-Sehore districts of Madhya Pradesh State , are under pressure from inflow of urban waste and agriculture fertilizer runoff. The decline in water quality is threatening its ecology and the urban drinking water supply. Madhya Pradesh Lake Conservation Authority and Winrock International India are working to connect farmers and downstream lake users through an incentive-based scheme to support organic agriculture.
For more see: Agarwal et al. 2007. Fair deals for watershed services in India . Natural Resource Issues No. 10. International Institute for Environment and Development. London , UK.

Africa

South Africa

In South Africa, the Working for Water Programme has been ongoing for over 10 years, for the removal of alien invasive plants, which use up more water than native species- about 1 million ha of invasive alien plants was cleared over the past seven years, which has yielded an estimated release of 48 -56 million cubic metres of additional water per annum. This programme has also a very strong poverty alleviation component- the work is carried out by teams hired from groups most affected by poverty and unemployment, focusing on women, youth and disabled individuals. A largest part of the programme's funding actually comes Poverty Relief Programme.

For more see the website of the Department of Water Affairs and Forestry and WeedBuster Week 2007- Media release by the Department of Water Affairs and Forestry

Kenya and Tanzania

Similar to RUPES, ICRAF is also developing a regional initiative in East Africa- Pro-Poor Rewards for Environmental Services in Africa -PRESA, with sites in Kenya, Uganda and Tanzania focusing on watershed management, but also including carbon and biodiversity initiatives.

Some of the PRESA sites are associate sites, being developed by other NGOs such as CARE International in Tanzania, working on a sustainable land management scheme in the Uluguru mountains, to improve the quality of the water supply reaching Dar es Salaam- for more see workshop materials, as part of a WWF-CARE-IIED programme on PES, with sites in Latin America and Asia

The East and Southern Africa branch of the Katoomba Group focuses on providing a forum to develop a shared understanding of PES in the region and produces monthly newsletter bringing together regional PES development news. The group has also produced a series of R egional PES Assessments and Case Studies 2005-2006, and more recently a s ummary of their findings: The State of Play: Payments for Ecosystem Services in East and Southern Africa and associated inventories. Katoomba Group

Europe and North America

European Agri-environmental measures

The EU Agri-environmental Measures are incentives offered under the reformed EU Common Agriculture Policy, to farmers willing to adopt additional good farming practices to protect and enhance the environment on their farmland and help maintain the countryside.

Measure adopted can include:

- environmentally favourable extensification of farming;
- management of low-intensity pasture systems;
- integrated farm management and organic agriculture;
- preservation of landscape and historical features such as hedgerows, ditches and woods;
- conservation of high-value habitats and their associated biodiversity.

For more see: European Commission > Agriculture and Rural Development > Agriculture and Environment

France

In France, a private water bottling company- Vittel (Nestle Waters) has invested 980 euros ha/yr to protect the quality of its water by paying farmers to adoption of land-management practices to reduce nitrates in the water source.
Practices adopted include adopting extensive cattle ranching, and pasture management (switching from maize to hay and alfafa), compost animal waste and give up agrochemicals. Farmers receive on average, about 200 euros/ha/year over five years. Of the 24.25 million invested in the first seven years: 9.14 million euros were spent on land acquisition, 3.81 million on investments in farm equipment, and 11.3 million in farm financial compensation (INRA-SAD-VDM 1996).

For more see the Vittel environmental management page and Perrot-Maître, D.2006. The Vittel payments for ecosystem services: a "perfect" PES case? International Institute for Environment and Development, London, UK

Bulgaria and Romania

The WWF Danube Carpathian Programme Office is developing a PES regional programme with sites in Bulgaria and Romania and replication activities in all 6 lower Danube countries, to reward the maintenance, improvement or adoption of conservation friendly land uses in several locations along the Lower Danube and Danube Delta.
For more see: WWF PES page and Danube- Carpathian Programme office page

United States of America

The US Conservation Reserve Program is probably the largest ongoing PES programme, with annual payments exceeding US$1.4 billion for activities on over 13 million hectares. Ongoing since 1985, its goals are to reduce soil erosion, improve water quality and enhance wildlife habitat and farmers receive up to 50% in cost share of implementation of conservation practices plus an annual payment. Eligible practices include building riparian buffer strips, wetland restoration, grass waterways, shelterbelts and contour grass strips.

For more see the programme's page at the US Department of Agriculture (USDA) website Natural resources conservation service and at the CRP page of the USDA Farm Service Agency
Since the nineties, the Catskill Mountains that provide 90% of the water to New York city, have been under a PES scheme to preserve drinking water quality. When it began, instead of investing US$6-8 billion in a water filtration plant, the city's authorities considered that investing in improving land use in the watershed was more cost-effective, requiring an investment of US$1.5 billion instead. Farms that opt to participate in the Watershed Agricultural Program receive technical assistance in designing a strategy for controlling potential sources of pollution on the farm, with New York City covering all costs associated with the implementation, and become eligible for other elements of the compensation package for specific environmental services, including from the CRP programme described above.

For more visit the NYC Watershed Council website. See also Appleton, A. F. 2002. How New York City Used an Ecosystem Services Strategy Carried out Through an Urban-Rural Partnership to Preserve the Pristine Quality of Its Drinking Water and Save Billions of Dollars. A Paper for Forest Trends -Tokyo, November 2002