



Food and Agriculture Organization of the United Nations (FAO)

Latin American Network for Technical Cooperation in Watershed
Management (REDLACH)

ELECTRONIC FORUM ON PAYMENT SCHEMES FOR ENVIRONMENTAL SERVICES IN WATERSHEDS

12 April – 21 May 2004

FINAL REPORT

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EXECUTIVE SUMMARY

This report is a summary of the discussion at the Electronic Forum on Payment Schemes for Environmental Services in Watersheds, held from 12 April to 21 May 2004.

Over the last years, the concept of Payment Schemes for Environmental Services (PES) has received much attention in various Latin American countries as an innovative tool for the financing of sustainable management of land and water resources. FAO and REDLACH have promoted discussion and exchange of experiences on this issue by organizing the Regional Forum on Payment Schemes for Environmental Services at the Third Latin American Congress on Watershed Management, held in Arequipa, Peru, 2003.

The current E-Forum was organized as a follow-up to the Arequipa conference with a view to validate conclusions and recommendations, as well as to compile experiences with design, implementation, and assessment of PES schemes in watersheds in Latin American and the Caribbean. During the 6 week discussion, 215 presentations of 118 professionals from 26 countries were made addressing the following issues:

1. Definition and scope of PES in watersheds
2. Design of PES schemes
3. Execution of PES schemes
4. Impacts of PES schemes
5. PES, sensitization and awareness raising
6. PES and legislation

Definition and scope of PES in watersheds

Payment schemes for Environmental Services (PES) are flexible mechanisms, which can be adapted to different conditions. They consist of a payment or direct compensation by the users of the service for the maintenance or provision of an environmental service to the providers of the same. PES in watersheds usually relate to water supply, availability and/or quality.

PES schemes are instruments which have been designed to improve the allocation of natural resources at a watershed level. The successful application of PES depends on various factors such as the proper identification of suppliers and users, as well as the relation between land use and service supply. Therefore, not every resource management problem at the watershed level can be solved with the application of a PES scheme. Local PES systems have a greater impact in the attainment of short term goals than schemes with a national or global scope.

PES can be sustainable in the long term if they are funded by local resources to solve specific problems of the population. However, there is a risk of PES exacerbating economic dependence when based on external resources. PES can contribute to conflict solving processes by providing platforms for negotiations. One of the most important limitations of PES is high transaction cost during design and implementation, e.g. biophysical studies, assessment and system installation.

Design of PES schemes

In order to evaluate the feasibility of a payment scheme for environmental services, **studies regarding supply and demand for environmental services** must be carried out, as well as economic assessments of the technological changes needed in order to provide environmental services. Several environmental services have been identified in watersheds and these require significantly different assessment methods. There is global demand for some of the services while others correspond to local demand. The demand for water services is of a local nature.

A **global cost and benefits analysis** of the system is essential to assess the economic, social and environmental costs and benefits, including transaction costs. Economic appraisal of environmental resources must be carried out with the inclusion of the different actors involved at the watershed.

The value of the service must be calculated taking into account the marginal changes in the externality by a given land use change. Although the usual methods express service value in monetary terms, appraisal does not necessarily imply a quantification of the service in monetary terms.

Reliable **baseline information** is essential to PES design and the right indicators must be identified to measure the impacts of system application. There must be consensus between actors with respect to services and activities proposed, as well as a monitoring system in order to avoid breaches and to assure that agreed goals are met. **Methods and entities for monitoring and supervision** must be defined in the design of the PES. For a proper functioning it is vital to ensure that funds collected by the scheme will be invested only in activities previously agreed and within the watershed where the funds are generated.

As for **design of incentives**, PES does not necessarily involve cash payments; these can be fiscal incentives, credits or others. Incentives provided by a payment for environmental services scheme may be individual or collective. In order to encourage service providers to conserve natural resources, the incentives offered should match the current income of the service providers from productive activities.

In terms of **land use promoted by PES**, forestry systems are generally favoured, with special recognition of the services provided by trees, especially native species. However, agro-forestry, forestry-grazing and conservation agriculture systems are recognized as appropriate for the provision of environmental services in watersheds as well as the provision of production options for rural communities.

The **implementing institution of the PES** should be a multi-actor organization like a watershed authority or a micro-watershed management committee including representatives from the government, private institutions and NGOs, with procedures that guarantee transparency and impartiality. In some countries, government agencies act as managers of PES schemes. In these cases it is important to ensure that government institutions comply with the requisites of impartiality and transparency. If these requisites are not met, due to either bureaucratic structures or cases of corruption, means should be sought to impede government institutions from directly using or managing these resources, or investing these in their own organizations.

The **role of the government** may be that of a facilitator between private actors, establishing a legal framework so that PES can be properly regulated, and establishing the amounts to be paid based on technical studies and agreements between relevant actors. In addition, the regulatory role of governments is needed in order to avoid unregulated management of environmental financial resources by market forces. Local and regional governments may also act as agents to facilitate PES schemes. Thus, PES can be a tool for the consolidation of decentralization processes since these consolidate and strengthen local institutions, among other benefits.

Implementation of PES schemes

Two experiences with **monitoring and supervision systems** in the application of PES schemes were discussed during the Forum: the Pimampiro Municipality case in Ecuador, and the National Forestry Financing Fund (FONAFIFO) case in Costa Rica.

As for experiences with **payment mechanisms, incentives and standards** in PES schemes, seven cases were discussed:

- *Ecuador*: Pimampiro Municipality
- *Central America*: Programme for Sustainable Agriculture on Hillsides in Central America (PASOLAC)
- *Brazil*: Water use payment in order to finance activities to improve water quality at the watershed
- *Brazil*: Private Reserves of Natural Heritage (RPPN)
- *Chile*: Decree DL 701/1974 tax exemptions for forestry activities
- *Costa Rica*: Forestry Law 7575 as a baseline for PES
- *Colombia*: Farm tax exemptions

As for **changes in land use** promoted by PES schemes, the systems in the region are not solely focused on forest conservation but also on conservation practices in agriculture and the application of green manures with a view of providing services as well as improving the quality of life of the producers.

Impacts of PES schemes

The general objective of PES is to ensure the flow of environmental services. However, they may have **positive impacts on the livelihood of poor people** in areas of implementation. There are too few studies in the region, however, to be able to quantify these impacts. Experience has shown mixed results. PES impacts on poverty depend on system design and the social organization of small-scale producers in the area of application.

The most noteworthy **environmental impacts** of PES schemes have been the reduction of illegal felling and conversion of forest to agricultural and grazing lands, as well as the conservation and recovery of forest cover. The decrease of forest fires and enhanced environmental conscience of the population participating in PES schemes are also worthy of mention. However, additional studies are needed in order to specifically determine these impacts and compare the same to the implementation costs, especially with respect to improving water quality and quantity. A limiting factor in PES

environmental impact studies is the long period of time in which changes in environmental variables become manifest.

Although the empirical evidence in terms of **impacts on food security** of PES schemes in the area of application is small, the systems may have an indirect positive effect to the extent that these increase purchasing power of participating producers. Another indirect positive effect may be created if the PES slows down environmental deterioration and speeds up environmental recovery in the area, which may help to preserve the productive capacity of the local population.

PES schemes open spaces for negotiation and allow for compensation between providers and users of environmental services. Therefore, the schemes may serve as **conflict resolution platforms** between these actors. In areas of conflicts between actors, the success of PES applications depends to a great extent on the smooth functioning of the institutional framework.

PES, sensitization and awareness raising

PES systems may act as **instruments to raise environmental awareness**, by allocating tangible economic values to services or externalities which generally have no price assigned to them. Sensitization of users of environmental services is essential for these to recognize the cost of producing environmental services and to increase their willingness to pay for these services. As for service providers, education programmes may improve the adoption of techniques contributing to the production of environmental services. However, awareness-raising is not always a prerequisite to PES functioning. If the incentives provided by PES are adequate, producers will change their land use practices, with or without education.

PES and legislation

In general terms, a **specific legal framework** for PES is not a requisite for the implementation of local PES schemes in watersheds. Trust between users and providers, as well as the existence of a good intermediary is considered more important than a legal framework. The recognition of PES as an instrument in current legislation may facilitate dissemination and implementation of such systems. In the creation of a legal framework for PES, it is important that regulations be based on concrete experiences which have shown to be successful in the country itself.

Recommendations

The Forum has drawn up 39 recommendations to different actors in the Payment for Environmental Services area, in particular:

- Decision-makers in local and national governments
- Local organizations
- Academic Institutions and Research Centres
- Environmentalists and Ecologists
- Organizations Cooperating and Executing Programmes and Projects
- FAO
- Institutions which were represented at the Forum

INTRODUCTION

The concept of Payment for Environmental Services (PES) has received much attention in several Latin American countries over the last few years as an innovative tool to finance investments in sustainable land management. At a watershed level, hydrological services are particularly relevant. Upstream watershed producers can receive important incentives via compensations for taking care of water quality and quantity for downstream users. Other services include biodiversity protection, carbon storage and preserving the beauty of the natural landscape. However, there are important challenges to be met, such as service monitoring and appraisal, as well as the sustainability of payment mechanisms.

The Food and Agriculture Organization of the United Nations (FAO) and the Latin American Network for Technical Cooperation in Watershed Management (REDLACH) have promoted discussion and experience interchange regarding the issue, organized by the Regional Forum on Payment Schemes for Environmental Services at the Third Latin American Watershed Management Congress held in Arequipa, Peru in June 2003. The Forum identified general lessons learned regarding PES systems in watersheds as well as the advantages and limitations of these systems.

The current E-Forum was organized as a follow-up to the Arequipa Forum with the following principal objectives: (i) to validate the conclusions and recommendations and (ii) to identify experiences in the design, implementation and evaluation of PES systems in watersheds throughout Latin America and the Caribbean.

The E-Forum was held from 12 April to 21 May 2004. During the six weeks of discussion, 215 presentations were made by 118 professionals in 26 countries with experience in PES in watersheds throughout the region. The participants represented governmental organizations, non-governmental organizations, universities, the private sector and international organizations.

The discussions focused on six major issues:

1. Definition and scope of PES schemes in watersheds
2. Design of PES schemes
3. Implementation of PES schemes
4. Impacts of PES schemes
5. PES, sensitization and awareness-raising
6. PES and legislation

This report summarizes the contribution of participants with respect to the central issues discussed at the Forum. In addition, it highlights recommendations of the Forum to different groups of PES-related actors and presents a list of concrete experiences with PES presented at the Forum.

1. DEFINITION AND SCOPE OF PES SCHEMES IN WATERSHEDS

Payment schemes for environmental services (PES) are flexible mechanisms which can be adapted to different conditions. They aim to provide payment or direct compensation for the maintenance or provision of a specific environmental service by users to providers of the services. PES schemes in watersheds normally include the implementation of market mechanisms to compensate upstream land holders in order to maintain or modify a particular soil use which affects the availability and/or quality of the water resource downstream. The compensation usually comes from downstream water users.

PES schemes compensate providers for increasing the quality and quantity of environmental services, and do not constitute a payment for environmental resources in itself.

Payment for environmental services is a way for society to accept responsibility for the sustainable management of ecosystems and to eliminate perverse incentives for agricultural production systems. These payments are direct support, and not subsidies, providing incentives to communities for the conservation of natural resources. PES essentially aims to encourage landowners to implement practices which conserve certain natural resources.

As a mechanism designed for the conservation of certain natural resources, PES is not an instrument to achieve an integral environmental restoration. Although environmental restoration is obviously important, this often surpasses PES capacities and may make proposals over-ambitious and the effectiveness of the scheme difficult to prove.

PES is an instrument created to achieve more efficient natural resource allotment at a watershed level. Its applicability depends on certain conditions, such as clear identification of users and providers, identification of causal links between land use change and service provision, etc. Therefore, not all resource management problems at the watershed level can be solved with PES application. PES must be included in wider-ranging proposals in order to help to reduce poverty, improve environmental conditions, increase food safety and resolve conflicts in watersheds. As an example of complementary or alternate activities, community agreements may require less transaction costs due to monitoring and evaluation or external regulations than PES. Another option could be exploring collective action arrangements in the management of natural resources whose distribution is subject to rights such as water.

Local level PES systems have a greater impact on meeting short-term objectives than schemes with national or global scope. However, in order to tap the overall potential of PES for the financing of sustainable development processes, PES aimed at worldwide users as carbon markets and biodiversity preservation must be considered in addition to the development of local watershed systems.

Finally, PES must be flexible in order to adapt to different seasonal and spatial, cultural and legal, technical and economic situations in order to meet conservation and development objectives.

2. DESIGN OF PES SCHEMES IN WATERSHEDS

Box 1 An example of the basic steps of a PES process

- Biophysical diagnosis and drawing up of a management plan
- Analysis of water quality
- Economic appraisal of water assets and environmental services
- Estimate the corporate or beneficiary population's willingness to pay
- Socioeconomic diagnosis of the actors involved, including organizational capacities and identification of characteristics which may affect PES functioning
- Elaborate proposal for PES mechanism proposal
- Promotion and dissemination of the scheme and training of service users and providers
- Draw up a regulatory framework, identify funding sources, creation and management of an Environmental Services Fund
- Signing of medium-term bilateral agreements or contracts with environmental service providers in the watershed
- Establishment of a collection system for payments
- Execution of the management plan
- Establishment of a certification, monitoring and evaluation system for environmental services
- Documentation and analysis of the PES experience

2.1 Environmental service demand appraisal

Several relevant environmental services can be identified in watersheds, and these require significantly different appraisal methods. Firstly, demand must be scoped and quantified or estimated. There is global demand for some services whereas others have only local demand. Water services in particular are of a local nature.

Payments for environmental services require studies on the supply and demand for environmental services, as well as economic appraisals of the technological changes necessary for the provision of environmental services in watersheds.

In general terms, some of the issues which must be taken into consideration when appraising the demand for environmental services highlighted by the Forum are the following:

- Different types of service uses must be considered:
 - ✓ Consumptive uses (drinking water, agriculture and industrial uses)
 - ✓ Non-consumptive uses (electricity generation)
 - ✓ Cultural services (recreation, tourism).
- The economic appraisal of environmental services must be carried out with the involvement of the different actors involved in the watershed.
- Opportunity costs must be calculated taking into consideration environmental, economic and social aspects. This implies that payment may not be the same for all actors due to socioeconomic and biophysical asymmetries within the watershed. For instance, an upstream producer may not receive the same payment as a

downstream producer, since he does not affect externalities to the same extent. Once this ex ante evaluation has been carried out, the result will be considered as the opportunity cost which must be paid for a change in land usage in priority areas which shall be the basis for negotiating with parties benefiting from environmental services. Within this process it must be pointed out that:

- ✓ Service cost must be calculated in relation to the marginal change in externalities (i.e. How much are users willing to pay to avoid one ton soil lost due to erosion?)
 - ✓ In order to calculate the service's opportunity cost, shadow prices must be used considering environmental, economic and social factors.
- An overall cost and benefits analysis is essential considering economic, social and environmental costs and benefits, including transaction costs. In some cases, such as small communities in which economic study transaction costs are too high for projects and where providers and users may establish agreements of trust; it would not be necessary to appraise user willingness to pay or compensation required by providers. A fee could simply be established in accordance with a soil use categorization. These rates must be high enough to offer an incentive to preserve the upland watershed.

Some considerations regarding appraisal methodologies for environmental services proposed by the Forum were:

- Different methods of appraisal must be used for different types of uses. The contingent valuation method has been applied for domestic use. In the case of irrigation, changes in crop productivity with and without irrigation can be assessed. For hydro-energy, the opportunity cost method can determine if it is more profitable to produce energy using water or oil (the substitute goods method). In the case of water uses for tourism, the classic trip cost method has been used. For fishing purposes economic losses can be estimated. A direct method is estimating the reduction of fish population due to negative impacts.
- Valuation of water resource can be carried out by means of a fluvimetric and limnimetric study showing the change in water flow and sedimentation before and after the project in order to understand land opportunity cost as well as risk adoption strategies for communities or families with respect to their production activities, as well as monetary and non-monetary incomes. Especially in rural communities, a change in land usage may pose drastic changes in their way of life. The evaluation of socioeconomic and environmental impacts is vital.
- There are some methodologies to initiate a water resource "valuation" process which does not necessarily imply monetary quantification of the value, but rather a process in which the actors involved collectively perform an analysis of the watershed status including water uses, users, threats, impacts, strategies and lines of work. This process may be as complex or as simple as the group determines, but the final objective is that the actors in the watershed understand that the health and biodiversity of the watershed depends on them, that they are co-participants in the process, can share common viewpoints and understand the benefits of PES.

2.2 Information and Monitoring

Previous to the design and implementation of a monitoring system a baseline must be established in order to identify achievement indicators for three aspects considered essential to PES:

- Technical – hydrological regime and quality of the water resource and the execution of conservation and/or reforestation programmes, among others.
- Economic – impacts on the economic status of actors at the watershed where the PES scheme is applied, capacity of the actors to comply with the agreements signed, among others.
- Social – the number of participants directly involved in PES (providers) and the population sensitized in conservation of water resources.

Box // In the regional project “Integrated Silvopastoral Approaches to Ecosystem Management” in Nicaragua, Costa Rica and Colombia, financed by the World Bank (WB), the Global Environmental Facility (GEF) and FAO, a wide-ranging platform of technical, economical and biological studies has been carried out to assess the effect of certain soil uses on biodiversity and carbon storage. In addition, water quality monitoring is currently carried out in line with the following methodology:

- 28 soil uses were defined, for each of these an index was calculated combining “carbon and biodiversity”,
- Work started from a baseline which included an exhaustive inventory of soil uses at each of the participating farms
- An inventory was made up for each kind of use and area occupied
- Biodiversity is evaluated by means of an inventory of birds and butterflies in the area. Each farm has a map and locations inside the same are determined using a hand-held GIS
- The use multiplied by the a priori determined index represents a farm’s baseline
- Over the next years changes introduced by the farm owner are monitored and once again gauged to calculate the farm’s overall score
- The difference between the score calculated in year 1 minus the rating of year 0 allows the project to determine the system’s additional ratio and farm environmental service is paid based on this difference.
- Payment of 75 dollars per point was recently approved

Reliable baseline information and identification of the right indicators used for PES design are essential elements to measure implementation impact of the scheme. In order for a PES to be effective, both the users and actors involved must be “convinced” of the benefits of the mechanism. There must be consensus regarding services and activities in order to achieve the same, as well as a monitoring system to avoid contract breaches and to settle disagreements.

2.3 Oversight mechanisms

Regulations to monitor and oversee the PES scheme must be established in the design of the scheme. Instruments may be included in the regulatory framework and should be designed and validated with the participation of the actors involved in the scheme.

Also, organisations or authorities responsible for overseeing the operation of the scheme must be defined in the PES design, with the exception of those institutions already established by law (i.e.: the forestry authority). Legislation which integrates PES should be based on successful PES in the country; since legislation must conform to reality and not vice versa.

2.4 Proposed payment mechanisms

It is essential that the PES design guarantees that funds collected under the scheme will be invested into actions planned and in the watershed where the funds have been raised.

The modalities of the compensation and the payment mechanisms must be discussed prior to implementation with the relevant actors, especially by those people directly affected by the scheme.

Compensation means for environmental providers or protectors include:

- Direct payment to producers
- Direct payment to producer associations
- Technical support for the legalisation of land-ownership titles
- Provision of social services and infrastructure
- Investment financing to improve property or farm management
- Product surcharges: Certificates and special product seals
- Technical assistance, training and marketing support
- Support to rural tourism and ecotourism community strategies
- Expansion of access or use rights to natural resources

PES schemes do not necessarily involve cash payments, but may consist of fiscal incentives, credits, or others. For example, permits for tourism-related activities such as the sale of food and/or handicrafts may be used as compensation for families who work in conservation of grazing lands. Cash payments may become unsustainable if they are not well conceived and managed. Incentives provided by a payment for environmental services system may be individual or collective.

In order to encourage a farmer providing services to conserve the natural resources on his or her farm, the incentive offered by the PES scheme must correspond to the profit the farmer can make using conventional means of production on the farm.

Box III In an Inter-American Development Bank (IDB) project in Costa Rica, farmers are benefited when they carry out conservation and/or organic farming. The project pays 30% of the investment costs to the farmer to change to the conservation modalities. This 30% represents a payment for the environmental benefits created by the producer. The remaining 70% of the investment are a credit to the producer from the National State Bank at the usual interest rate.

2.5 Changes in land use encouraged by the PES system

Forestry systems are generally favoured over others by PES schemes, in recognition of the services provided by trees, particularly native species. Also, agro-forestry and silvopastoral systems are valued for their effect in reducing pressure on natural forests and providing other production options for upland watershed communities. However, conservation agriculture systems are also recognized as appropriate for the provision of environmental services in watersheds in some schemes.

Box IV The regional project in Nicaragua (see figure II), promotes the use of diverse silvopastoral practices which range from the use of trees with pasture for grazing to the use of foraging banks of grasses or trees. One of the project's assumptions is that: when silvopastoral practices are improved on part of the farms, farmers will free areas for the natural regeneration of forest patches and that in themselves, silvopastoral systems increase the use of trees on farms.

2.6 Institutional structure for PES implementation

The institution to manage the PES scheme should ideally be a multi-actor organisation, for instance, a watershed authority or a watershed committee including government representatives, private institutions and NGOs with procedures that ensure transparency and impartiality. If possible, existing organisations at the watershed level should be in charge of system implementation. In Brazil, for example, each watershed has a watershed authority which prepares a management plan for the same and decides where and how the funds collected will be invested. The committee is made up by users, representatives from municipal governments in the watershed and NGO representatives. Greater coordination must be sought between competent organizations at different jurisdictions to create democratic and representative authorities with sufficiently clear standards favouring PES.

Box V In Mexico, the Mexican Forestry is a PES mechanism promoted by the federal government. The Fund has been created as an instrument to promote PES which facilitates access to financial services in the market. Payments are provided for water services only. Other concepts such as carbon sequestration, biodiversity, among others have not yet been considered.

The PES scheme may be managed by user councils, with the participation of State, local and national organisations. Based on local demands, members of the user council should choose to implement activities and projects under the PES scheme, focusing on:

- a. Improving quality of life for inhabitants in remote areas of the watershed which are generally the most poor and underdeveloped,
- b. Strengthening of appropriation and governance initiatives,
- c. Capacity building and awareness raising in communities.

The institutional mechanisms must correspond to the organisational capacity of the group providing the environmental service and to the respective legislation. The users paying for environmental services must be guaranteed that the funds collected will be used in the same watershed.

In some countries the government acts as the manager of PES schemes. In these cases, it is important to ensure that government institutions comply with the requisites of impartiality and transparency. If they do not meet these requisites, be it due to bureaucratic structures or cases of corruption, government institutions should not be allowed to use or manage resources under the PES scheme directly or to invest the same for the benefit of their own organisations.

The government may take on the role of facilitator between private actors, providing an adequate legal framework for the proper PES regulation, establishing amounts to be paid based on technical studies and agreements between relevant actors. In addition, the government's role as regulator is necessary in order to avoid the free market management of environmental resources. This may be the role of a central institution under the Ministry of Sustainable Development, such as in the case of Bolivia, or a National Environmental Council (CONAM) or National Institute of Natural Resources (INRENA) as in the case of Peru.

Box VI Peru – The roles of public institutions in PES facilitation.

In terms of PES in watersheds, INRENA is the facilitator as it has authority over water and forestry resources and it has representation at all watersheds. CONAM is facilitating carbon sequestration initiatives as a negotiator. However, to date there have not been any concrete projects of this kind in Peru.

Decentralized organizations may also act as facilitators in the establishment of PES schemes. In cases with local applications, the mechanism may be coordinated by a municipality. Thus, PES can be a tool for the consolidation of decentralisation processes since it consolidates and strengthens local institutions among other functions.

2.7 Comparative advantages and disadvantages of PES as opposed to other alternatives

Sustainability: The benefits of PES are provided more directly and therefore may be more efficient than in other alternatives. A PES system can be a sustainable long-term mechanism if it is created based on local resources, starting with the resolution of a concrete problem for the population. However, there is a risk of PES leading to economic dependence if they are based on external resources. PES will be effective to the extent that these generate funds from local service users and depend less on external resources. Thus, PES schemes can avoid 'assistentialism', promoting direct participation of service providers.

Conflict management: PES can serve as a negotiating platform to help resolve conflicts over natural resources in a watershed. If PES is seen as market transactions and if more energy is focused on negotiation instruments between parties, greater effects could be generated.

Transaction costs: One of the most important limitations for the implementation of a PES system is the high cost of biophysical studies, appraisal, and system installation; as well as the absence of low-cost methodologies for carrying out studies of this kind at the field level. The need for these studies as a starting point for the development of PES actions

limits local initiatives. Thus, PES activities in most cases are subject to support by central government, donor-financed programmes, or cooperation agency initiatives. There are few cases in Latin America in which governments have created a PES development fund.

3. IMPLEMENTATION OF PES SCHEMES IN WATERSHEDS

3.1 Application of oversight and monitoring systems

Ecuador: In the case of Pimampiro, PES is being implemented based on farm surveys (farm-use maps as a baseline determined by means of a geographical information system and farm by farm inspection). Every quarter there is a randomly-determined farm inspection. In the case of PES violations reported by Association members, specific inspections may be carried out. Payments to anyone who is not complying with the agreement are immediately suspended and if this person does not appeal to the oversight committee, he or she must return the money paid to date together with interest rates determined by the committee. Payments are to be reviewed annually in order to determine total collection and PES payment rates for which payment records are available, as well as payment authorization based on a technical report. The system has two important flaws: 1) the committee has a very high degree of flexibility and often does not consider PES objectives, 2) the technician who draws up the report generally does not perform inspections necessary for each farm every quarter, although this has been defined in the PES agreement.

Costa Rica: In the National Forestry Finance Fund (FONAFIFO), the current Control and Evaluation System for the Payment for Environmental Services Programme includes an Integral Project Management System (IPMS), a Geographical Information System (GIS), as well as technical and financial audits. GIS is mainly used to control and locate properties with PES contracts, but has also helped to produce baseline information used to draw up new financing proposals and to produce forestry cover maps.

3.2 Application of payment mechanisms and regulating frameworks

Ecuador: In the case of Pimampiro, negotiation is carried out on the basis of a monthly payment by the municipality to the owners of forest and grassland (*páramo*). The payment is calculated by month of protection and by hectare protected, but is paid quarterly in order to facilitate the payment process, and avoid breaches of the agreement on part of the service providers.

Central America: The Programme for Sustainable Agriculture on Hillsides of Central America (PASOLAC) has accompanied water-related PES schemes in micro-watersheds characterised by substantial land degradation. In most cases biophysical studies and economic appraisal studies have been carried out. Economic appraisal studies have shown that over 80 per cent of the consumers are willing to pay for water services, but of this 80% no more than 25% are able to pay in cash, while the other 75% is able to pay in labour. This is a powerful resource for the completion of physical works in terms of soil and water conservation at farms in micro-watersheds. In some cases the contribution of the water-related PES scheme was seen as the only possibility to finance

the soil and water conservation activities profitably. However, this is neither possible nor fair, even if 100% of all consumers were able to pay in cash. It has been observed that:

- The users of water environmental services are willing to pay for the service when they are shown a proposal to improve this service.
- Farm owners in watersheds are willing to participate in plans to implement soil and water conservation activities which include their farms.
- The financial and economic evaluations of these plans have been shown to be profitable, considering PES as one of the resource flows among others.
- A water PES at micro-watersheds requires initial financing in order to begin operations.
- PES at watersheds will be profitable and sustainable if it is seen as part of an overall agro-economic development plan for the watershed or micro-watershed.

Brazil 1: Brazilian legislation foresees charging a rate for the use of water in order to finance activities destined to improve water quality for the watershed. This rate is set at a Public Unitary Price (PUP) which varies in each watershed according to the most relevant uses, the water availability at the watershed, the investment volume needed to improve water at the watershed, among others. Rates are set based on a formula which includes (i) water use, (ii) the water volume used and (iii) the PUP, which varies according to use (agriculture, domestic or industrial use, etc).

Brazil 2: Private Natural Heritage Reserves (PNHR) offer a series of incentives to land owners to declare their property a private reserve. PNHRs may be established in ecologically relevant areas. Incentives include (i) rural property tax cuts, (ii) preferential access to rural credit; (iii) priority in terms of assistance from public authorities in terms of protection against fire, poaching and illegal cutting; (iv) priority consideration for concessions from the National Environment Fund. Once a reserve has been declared this decision is irrevocable. Within the reserve, only scientific, cultural, educational and recreational activities are allowed. There are presently over 300 PNHRs throughout the country.

Chile: According to Chilean legislation, decree DL 701/1974 can be interpreted as a PES in terms of tax benefits. The owners of natural and cultivated forests are exempt from the payment of territorial tax, a tax which applies to the possession or holding of real estate. In the case of the aforementioned forest owners an overall tax exemption is considered from this point of view as well as that of personal ownership. This implies a transfer of funds from the State to private parties which own these resources, since this tax is not charged and consequently these transfers constitute PES. In addition, reforestation is encouraged by providing State economic benefits for private parties through payment of an economic bonus to parties carrying out reforestation programmes. The establishment and execution of forestry and soil-recovery activities in degraded areas of the country, principally in regions adjacent to watersheds, is benefited by the payment of the bonus. However, other participants state that this regulation does not constitute a good example of PES, since the decree was created for a different purpose (encourage investment in commercial forestry plantations) and has created adverse effects in terms of the provision of environmental services in some natural ecosystems.

Costa Rica: Since 1979 a series of incentives have been provided tending to promote forestry cover renewal activities, and reforestation. These economic incentives provided by the State are known as Forest Investment Certificates (CAF) and benefit all people

and legal entities who by means of a request, demonstrated via a public document, that they were owners and responsible for a forest management plan on their property.

Costa Rica's Forestry Law 7575 from 1996 created a concept regarding environmental service which refers to the benefits 'provided by forests and cultivated forests which positively affect the protection and improvement of the environment'. Payments are based on the premise of compensating private forest owners to preserve their forestry ecosystems for a given time period since these provide a series of environmental services for Costa Rican society. These environmental services are recognized as:

- Reduction of greenhouse effect gases (reduction, absorption and storage of carbon)
- Protection of water for urban and rural use
- Biodiversity protection
- Scenic beauty

The PES scheme currently includes four environmental services and there is no individual appraisal for each environmental service. PES is presently assigned to the reforestation and conservation of native forests. The idea is that each forest owner is providing a service which must be compensated. The bulk of the funds for the scheme stems from revenues from a consumption tax on hydrocarbons so that in effect the Costa Rican society in general is paying forest owners for these services.

Colombia: This country provides property tax exemptions for owners which preserve natural forests on their property. However, this is far from being a PES mechanism as such (from a market perspective), since this mechanism does not constitute the provision of an interchange between environmental service producers and beneficiaries in order to pay the former for the environmental benefits received by the latter.

3.3 Use of funds collected under the PES scheme

Funds collected at a watershed must be used at the same watershed for the purposes already established. Benefits derived from PES must be limited to incentives for activities which guarantee the provision of the service and cannot be used to address the full range of community needs. As an example, the funds may be used by local governments for the execution of sewage water and solid waste treatment projects.

Box VII: In Colombia there is a law which requires that 6% of the value of water produced at a watershed be returned into the watershed of origin. This law states that 90% of the money collected must be allocated to investment and 10% to administrative expenses. In practice this law is not observed and approximately 50% is used for administrative expenses and previous studies. If more detailed studies would be carried out, which would be necessary to clearly identify a causal relationship between land use and water-related service, these administration/studies cost would increase even more and very little would be left for effective investment. A wider-ranging PES scheme could bring these administrative expenses down and create more social and long-lasting ties.

Box VIII In the case of the Heredia Public Services Company, the proper use of resources collected under the PES scheme is ensured as follows: the money collected is deposited into an exclusive PES fund managed by the company and regulated by State-owned organizations (such as the General Comptroller of the Republic, and the Public Services Regulating Authority, among others). The above assures that these resources do not end up in a state account and are distributed into other government interests.

3.4 Changes in land use achieved by the PES implementation

Generally speaking, PES schemes in the region are not solely focused on forest conservation, but also on improving quality of life for producers who inhabit areas where the most negative external impacts are produced which could be positively modified by changes in land use and management. These new alternatives are not necessarily forestry cover, since other covers or land management conditions (such as minimum tillage, green manure, etc.) correct negative externalities and increase producer income at the same time.

In Costa Rica, for example, agro-forestry systems have been recognized in PES systems, and the aim is to recognize a wide range of techniques especially in terms of soil and water management by the producer. As for physical structures for erosion control, techniques which avoid erosion are favoured as opposed to works which reduce water flow speed, but not soil erosion in itself.

The Consortium for the Sustainable Development of the Andean Eco-Region (CONDESAN) is trying to determine whether the environmental externality (valued at shadow price of additional resources produced) generated by a change in land use is enough to modify the profitability of new land use options which would never be used with their traditional analysis of economic efficiency. This system has produced better results for the following reasons:

- It is very difficult to find a direct relationship between a service provider and the corresponding user. Therefore it is difficult to establish a fair payment of the service and research is generally too expensive to attain well-defined causal relationships. This leads to payments much below the true cost to the service providers as has been observed with the price users pay for water in Ecuador, Peru and Colombia.
- The problem to modify land use is to have enough start-up capital to produce a change in an area large enough to produce a measurable impact. When payment is individual, the overall investment volume is generally much too low and therefore is not enough to produce measurable impacts from the land use changes achieved under the scheme. When PES is applied in the framework of a regional development mechanism so that PES resources can be combined with funds from other sources, this can possibly produce a much greater impact than what would be generated by a scheme where only direct users contribute.
- Specific soil use practices can be more economical and effective in terms of producing changes in environmental externalities; especially those for which the willingness-to-pay is relatively high. These include increasing water volume in dry periods and reduction of erosion. Infiltration ditches, vegetative sediment barriers, contour bounds, among other structures may be the most effective. The PES scheme should evaluate the profitability of current uses, modified by such practices,

and ensure that social externalities such as employment generation are not reduced with changes in land cover.

4. IMPACTS OF PES SCHEMES IN WATERSHEDS

4.1 PES impacts on poverty

The general objective of PES systems is to ensure the flow of environmental services, not to alleviate poverty or to improve income distribution in the area of implementation. However, a PES scheme may have positive impacts on those living in poverty. Activities implemented under the scheme may generate employment, for example at community-owned forestry nurseries, if the PES includes reforestation.

There are few studies in the region to quantify poverty-related impacts of PES schemes in implementation areas. Experience shows mixed results. In Pimampiro, Ecuador, the PES scheme has helped to reduce some hardships in families of producers since the compensation paid under the scheme has been used to cover some healthcare, education or food expenses, thus helping to improve the living conditions for those benefited by payments to some extent. On the other hand, a study in Costa Rica found that most of the people who have access to the PES programme are mid- or large-scale producers whose livelihood does not depend on PES income. This is due to two main reasons: (i) PES was not conceived as an only alternative, but rather as a complementary support for producers. Therefore it is not a feasible option for people who own small acreages of one to two hectares. (ii) Transaction costs are very high.

PES impacts on poverty depend on system design (incentives, qualification requirements, institutional framework) and the social organization of small-scale producers at the area of application. In Costa Rica, a consultation about the access of small-scale producers to PES schemes in areas with high and low degrees of organization showed that the level of effective access is much greater in areas where there is social organization and strong NGO support. In certain situations, the implementation of a PES system may lead to the strengthening of local organizations and self-management capacities of the people involved in the scheme, as shown in the case of Cuenca, Ecuador.

4.2 Environmental impacts of PES schemes

The most noticeable environmental impacts of PES have been the reduction of illegal felling and conversion of forests into agricultural and grazing lands, as well as the conservation and recovery of forestry cover. A reduction of forest fires and a higher environmental consciousness among the population participating in PES have also been noted.

However, more studies specifically determining the environmental impacts and comparing these with investment costs of the PES schemes are needed, particularly with respect to improving water quality and quantity, since this is the most important service within the watershed context. Methodologies are being developed to determine the impact of different land uses on water availability and quality at watersheds based on hydrological models and the prioritization of intervention areas in order to maximize impacts on the lower area of the watershed. A limiting factor of these environmental

impact studies are the extended time periods in which changes in environmental variables due to a change in land use, such as water availability in dry seasons, or sediment reduction, become manifest.

Box IX: Watershed analysis for the implementation of environmental service payments
CONDESAN and “Gesellschaft für Technische Zusammenarbeit” (GTZ) are working in watersheds in the Andean region of Colombia, Peru and Ecuador. In the initial stages the project is evaluating the ex-ante impact of changes in land use of management practices which generate a positive change in externalities related to water quality and quantity, principally regarding sedimentation processes of lakes and reservoirs. Once these impacts are determined, the areas with the greatest potential for change are prioritized. In these areas, the economic impact of the alternatives on the local population is then evaluated.
For further information see: <http://www.rlc.fao.org/prior/recnat/foro/estrada.pdf>

4.3 Impacts of PES schemes on food security

Although the empirical basis about impacts of PES schemes on food security in areas of application is scarce, these systems may have an indirect positive impact to the extent that these increase food buying power and output of participating producers. This can be observed, for example, in the case of Pimampiro, Ecuador. Another indirect positive impact can be generated if the PES system slows down environmental deterioration in the area, which may help to maintain the productive base of the local population. However, it must be pointed out that PES schemes are not primarily instruments to improve the food security of the local population, but rather instruments for environmental management.

4.4 PES contribution to conflict resolution in watersheds

PES schemes open spaces for negotiation and enable compensation between producers and consumers of environmental services. Therefore, these can act as platforms for the resolution of conflicts among these actors. The success of a PES as a mechanism for conflict resolution very much depends on how well the institutional framework works. In Costa Rica the programme has been successful in areas with steady participation of NGOs and government institutions. Another key point is good social organization and sensitization as well as training programmes for the actors involved.

5. PES, SENSITIZATION AND AWARENESS RAISING

PES schemes may serve as instruments to raise environmental awareness among the actors, by assigning tangible economic values to the services or externalities which typically have no price associated to them. Service providers realize that there is added value if their land is used under a conservationist system which allows them to produce and ensure conservation of the resources at the same time. Service users realise the true value of the environmental services they enjoy, such as the availability of good quality water, and the fact that they depend on the proper management of watershed natural resources for their continued supply.

In order to ensure the proper functioning of PES schemes, these must be tied to environmental sensitization programmes. The sensitization of direct users in terms of environmental services is necessary for these to recognize the cost of environmental service production and increase their willingness to pay for services. For service providers, formal and informal education programmes may offer recommendations for the adoption of techniques contributing to the production of environmental services.

However, some participants sustain that increased environmental awareness on the part of service providers is not a prerequisite to the functioning of the PES scheme. If the incentives under the scheme are adequate, producers will change their land usage practices, with or without education.

6. PES AND LEGISLATION

It is generally agreed that a specific legal framework for PES is not a requisite for the implementation of local PES schemes in watersheds. Agreements and strategic alliances between environmental service producers, beneficiaries and environmental authorities are often enough to implement these economic mechanisms. Trust between users and providers as well as the existence of a good intermediary are considered more important than a legal framework.

However, it has been pointed out that several countries in the region lack specific watershed management legislation. The recognition of PES as an instrument by current legislation, such as water legislation, may facilitate the dissemination and implementation of these systems. In the construction of a legal framework for PES, it is important that the regulations be based on concrete experiences which have proved successful in the country itself, instead of directing these towards other situations which could lead to rules with limited applicability.

Box X: The new water law in Venezuela

In Venezuela, a new water law project is presently being discussed in the National Assembly. It proposes the payment for environmental services as an administrative tool under the concept of the “polluter pays principle”, the drawing up of plans and programmes for hydrographical regions, watersheds and sub-watersheds. If this legislation is passed, the establishment of a methodology for PES application and execution will become necessary.

7. RECOMMENDATIONS

This section presents the recommendations of the Forum to different groups of actors. Some recommendations are directed to several groups, but have only been included once to avoid duplication.

To decision makers in local and national governments:

- Take into account that funds collected from the use of natural resources must be reinvested in areas where these originate, be it directly in the areas where the resources are generated or into indirect activities which promote sustainable use of resources
- Establish regulatory frameworks and facilitate processes which include PES as an alternative for financing the sustainable management of natural resources at a watershed level
- Include PES as a tool in revisions of current environmental policies, to reform policies with paternalistic approaches, uncontrolled free markets, and the exclusion of users and providers of environmental services
- Reduce or eliminate bureaucratic structures which do not favour local participation processes, slow response to environmental functions, and foster corruption in the use of natural resources
- Include a PES perspective in policies related to forestry, energy, water, ecotourism, genetic resources, disaster control, handicrafts, etc.

To local organizations

- Contribute to the implementation of PES projects, since these are an opportunity to require participation at all levels of the environmental management process.
- Demand more adequate training on the subject and on the different environmental services, since this cannot be the exclusive privilege of professionals or technicians.
- Require compliance to agreements, covenants or legal standards which favour fair integration of PES systems.
- Require payment from all direct and indirect users of environmental services in a well-organized fashion, as well as compensation corresponding to the rural population, especially indigenous people and country dwellers which contribute to the existence and functioning of ecosystems.

To Academic Institutions and Research Centres:

- Further scientific research in order to strengthen and disseminate methodologies to quantify positive and negative externalities created by a change in land use or land cover.
- Further the study and validation of hypotheses which justify PES schemes in their contribution to the maintenance/conservation of ecosystems and natural resources as well as the impact of the schemes on rural poverty.

- Carry out comparative studies of the transaction costs of the different PES schemes in the region, and compare the costs to the revenues generated by the schemes for each project stage, in order to differentiate between economic and financial benefits.
- Integrate social, cultural, legal and institutional policies into research and education on PES.
- University and environmental, forestry and agricultural scientific organizations must promote PES options in their programmes (fora, fairs, meetings, tours, workshops, etc.)
- Further research regarding impacts of PES schemes as well as payment mechanisms.

To Environmentalists and Ecologists:

- Study PES systems as an option for environmental management and protection, avoiding ideological or political biases and prejudices.
- Become involved in PES initiatives as co-executors or through monitoring of environmental processes, ensuring follow-up and transparency.
- Forge alliances with local organisations, NGOs, natural resource-related educational centres and companies to promote PES systems at a watershed level.

To Organisations of Technical Cooperation and Executors of Programmes and Projects:

- Finance biophysical and socioeconomic studies which enable actors to identify the best alternatives to implement PES schemes.
- Standardise methodologies at a global level in order to calculate the monetary value of ecosystems for each environmental service and for each type of forest, in order to provide a practical tool for calculating taxes and corresponding payment schemes.
- Reorient traditional environmental and development approaches from a sectoral perspective to approaches based on ecosystem functioning and their tangible benefits.
- Place greater emphasis on the creation of local PES skills (training, education, research and technology transfer).
- Finance and promote local structures, including those with a gender focus and assist them to develop their own PES models (water management, ecotourism, disaster prevention, biodiversity, cultural contributions, handicrafts, hydro-energy, etc).
- Encourage the creation of local, district, regional and national Environmental Service Funds with conservation funds provided by public companies, large-scale producers and private companies which benefit from the environment and natural resources
- Support the creation and implementation of monitoring and certification mechanisms for environmental services.
- Organize national or regional PES workshops.

To FAO:

- Catalogue and research different experiences with PES schemes in watersheds in the region, and publish results which will help to enhance knowledge of these systems.
- Collaborate with competent organisations in countries of the region in order to promote the development of PES schemes.
- Translate information on PES available in the region into other languages and disseminate it to people involved in PES in other parts of the world.
- To create a network of actors to enable the sharing of achievements and difficulties in PES application. Keep a distribution list of colleagues interested in continuing collaboration.
- Keep participants informed as to new FAO projects and publications and keep an up-to-date file of PES events and financing sources.
- Carry out environmental service appraisal research.
- Prepare pamphlets or an electronic newsletter to allow publishing on new PES initiatives, documents, experiences, etc.
- Prepare a project portfolio for the implementation of PES schemes in countries which do not have PES schemes.
- Carry out a follow-up forum at a later date which will allow to share experiences regarding ongoing projects as well as the creation of new projects, perhaps a year later, and review the results from the forum one or two years later to see if it was useful in practice
- Collaborate with other United Nations institutions in order to organize joint activities. These may be the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP), the Economic Commission for Latin America (ECLAC), the World Bank and the IDB, among others who are working along similar lines.
- Disseminate conclusions and recommendations on PES schemes to governments, providing details about opportunities, risks and possible tools for success.
- Organise a face-to-face workshop to identify ideas and evaluate successful experiences from a closer perspective.

To all institutions represented at the Forum

- Send experiences and report advances to the coordination committee of this Forum.

8. CONCRETE CASES

Project Name	Country	Institution	Contact Person(s) Related Documents
<i>ECONOMIC APPRAISAL OF ENVIRONMENTAL SERVICES IN WATERSHEDS</i>			
Environmental economy and its application in watershed management	Chile	CONAF	Samuel Francke, sfrancke@conaf.cl http://www.rlc.fao.org/foro/PES/pdf/ecoamb.pdf
Approximate economic appraisal of the Tucumano-Oranense jungle ecosystem for the provinces of Salta and Jujuy	Argentina	Forestry Department, Faculty of Agrarian Sciences, UNJu	Agr. Eng. Alcira Nélida Chocovar, anechocovar@arnet.com.ar Carlos G. Picchi, carlosgpicchi@arnet.com.ar http://www.rlc.fao.org/foro/PES/pdf/selva.pdf
Economic appraisal of the environmental water service in the Paso Los Caballos micro-watershed	Nicaragua		Eddy Aburto, edaburto@ibw.com.ni ; eaburto@cable.net.ni http://www.rlc.fao.org/foro/PES/pdf/estudio.pdf
Economic appraisal of water resources in order to determine payment of environmental services at the Rio Calan watershed Siquatepeque, Honduras	Honduras	National Forestry Sciences School	Eng. Fernando José Cruz ferjocruz@yahoo.com http://www.rlc.fao.org/foro/PES/pdf/honduras.pdf
Economic appraisal study of water supply and demand in the forest surrounding the source of Rio Chiquito	Nicaragua	CBM	Rado Barzev rbarzev@hotmail.com http://www.rlc.fao.org/foro/PES/pdf/acahuapa.pdf
Integral economic appraisal of environmental assets and services at the Rio Platano mankind and biosphere reserve	Honduras	CBM	Rado Barzev rbarzev@hotmail.com http://www.rlc.fao.org/foro/PES/pdf/platanos.pdf
Integral appraisal of biodiversity conservation Comunidad Foral De Navarra	Spain	Department of the Environment, Territorial Organisation and Housing Pamplona	J. I. Elorrieta, E. Castellano http://www.rlc.fao.org/foro/PES/pdf/biodiv.pdf
Economic appraisal of the water resources in the community of Frijolares, Güinope Honduras	Honduras		José Alejandro Dávila Rodríguez http://www.rlc.fao.org/foro/PES/pdf/tesis.pdf
<i>PES EXPERIENCES IN WATERSHEDS</i>			
Local and municipal participation in environmental services at Jesús de Otoro, Intibucá	Honduras	PASOLAC	Manuel A. Martínez http://www.rlc.fao.org/foro/PES/pdf/resu2003.pdf

FONAFIFO	Costa Rica	FONAFIFO	www.fonafifo.com http://www.rlc.fao.org/foro/PES/pdf/fonafifo.pdf
Payment for Environmental Services (PES) Experience of the Municipal Water Board, Campamento, Olancho municipality in Honduras	Honduras	PASOLAC	pasolac@cablecolor.hn http://www.rlc.fao.org/foro/PES/pdf/campapa.pdf
PROCUENCAS, micro-watershed protection and renewal for the supply of drinking water in the province of Heredia, Costa Rica	Costa Rica	Heredia Public Services Company (E.S.P.H.)	Luis Gámez Hernández, lgomez@esph-sa.com Juan D. Bolaños, jbolanos@esph-sa.com Doris Cordero, doriscor@hotmail.com http://www.rlc.fao.org/foro/PES/pdf/esph.pdf http://www.rlc.fao.org/foro/PES/pdf/procuen.pdf
Concession for Conservation	Peru	INRENA / ACCA	Bertha Alvarado Castro, balvarado@inrena.gob.pe
Territorial and Forestry Organisation Project	Ecuador	Ministry of the Environment / ITTO	Milton Arsiniegas, miltonar@ambiente.gov.ec http://www.rlc.fao.org/foro/PES/pdf/oi mt.pdf
PES for the upland watershed of the Virilla river	Costa Rica	National Electrical Company (CNFL)	Carlos Rosas Vargas, crosas@cnfl.go.cr Jorge Araya, jaraya@cnfl.go.cr
PES for watersheds of the Aranjuez, Balsa rivers and Cote Lake	Costa Rica	CNFL	Carlos Rosas Vargas, crosas@cnfl.go.cr Jorge Araya, jaraya@cnfl.go.cr
Regional PES Project in forestry-grazing areas	Colombia,, Costa Rica, Nicaragua	World Bank, FAO, GEF	Elias Ramírez, nitlactaf@ns.uca.edu.ni http://www.rlc.fao.org/foro/PES/pdf/gef.pdf
Territorial water management at the Huazuntlán- Texizapa micro-watershed in Sierra de Santa Marta, Veracruz State	Mexico	UNAM, CODESUVER, U Sussex	Luisa Paré, lpare@servidor.unam.mx ; carrobbles59@hotmail.com
Biodiversity conservation at the Calama watershed, Caranavi, Bolivia	Bolivia	MOJSA Foundation	Ing. Félix Gutiérrez Matta, gutierrez57@hotmail.com
Pimampiro Municipality and New America Association	Ecuador	CENDERENA	Silvia Ortega, sortega@macas.care.org.ec
Community management of renewable natural resources for the protection of water sources, Cuenca	Ecuador	ETAPA (Municipal Public Company)	Catalina Diaz, cdiaz@emp.etapa.com.ec

CONCEPTUAL STUDIES AND EXPERIENCE ANALYSIS AT A NATIONAL LEVEL			
How to incorporate natural resource depreciation into national accounts.	Colombia	CONDESAN – CIAT – GTZ	Rubén Dario Estrada, rdestrada@cgiar.org http://www.rlc.fao.org/foro/PES/pdf/areguipa.pdf
Guidelines for the incorporation of environmental costs into fees	Costa Rica	Ministry of the Environment and Energy	José Luis Salas Zúñiga http://www.rlc.fao.org/foro/PES/pdf/tarifas.pdf
Payment for Environmental Services and Rural Communities: Context, Experiences and Lessons Learned in Mexico	Mexico	PRISMA	http://www.rlc.fao.org/foro/PES/pdf/mexico.pdf
Local payment for environmental services management and participation: Case studies in Costa Rica	Costa Rica	International Political and Economic Centre for Sustainable Development (CINPE)	María Antonieta Camacho Soto cinpe@una.ac.cr http://www.rlc.fao.org/foro/PES/pdf/gestion.pdf
Environmental Goods and Services in Honduras- An alternative for Sustainable Development	Honduras	National Environmental Goods and Services Committee of Honduras (CONABISAH)	pasolac@cablecolor.hn http://www.rlc.fao.org/foro/PES/pdf/conabisah.pdf

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