

All that glitters...

Further case study analysis of markets for watershed services in developing countries since *Silver Bullet or Fools' Gold*.

Table of contents

1	INTRODUCTION	3
1.1	WHY ARE WE REVISITING EXPERIENCES?	3
1.2	KEY OBJECTIVES, QUESTIONS AND METHODOLOGY.....	3
1.3	CONSTRAINTS AND INFORMATION GAPS.....	5
2	SETTING UP A DEFINITION FOR MARKETS FOR WATERSHED SERVICES	6
2.1	IS PARTICIPATION VOLUNTARY?	6
2.2	THERE IS AT LEAST ONE (DIFFERENT) BUYER AND SELLER	7
2.3	PAYMENTS ARE CONDITIONAL ON DELIVERY.....	8
2.4	ARE THE SOURCES OF MONEY NEW ?.....	8
2.5	LEVEL OF COMPETITION	9
2.6	SUMMARY.....	10
3	BRIEF OVERVIEW: GENERAL TRENDS SINCE <i>SILVER BULLET OR FOOLS' GOLD</i>?	11
3.1	STATUS: MANY NEW CASES BUT MAJOR SETBACKS	11
3.2	REGIONAL BREAKDOWN OF INITIATIVES	12
3.3	GEOGRAPHICAL EXTEND OF MARKETS: GROWING SUPPORT FROM LARGER PROGRAMMES.....	13
4	WHAT IS DRIVING MARKET DEVELOPMENT?	18
5	WHAT FORMS DO MARKETS TAKE?	23
5.1	WHAT ARE THE SERVICES AND COMMODITIES MARKETED?	23
5.2	CHARACTERISTICS OF THE PARTICIPANTS.....	30
5.2.1	<i>Providers of watershed services are mostly private</i>	31
5.2.2	<i>Demand for watershed services is largely public</i>	32
5.2.3	<i>Facilitating groups play a key role</i>	35
5.3	PAYMENT MECHANISMS	36
5.3.1	<i>Where does the money for payments come from?</i>	38
5.3.2	<i>How are payment levels determined?</i>	44
5.3.3	<i>Mechanisms for transferring and managing funds</i>	46
5.3.4	<i>Unit and timing of payments</i>	50
5.3.5	<i>Summary and conclusions</i>	53
5.4	LEGISLATION.....	55
6	IMPACTS OF THE INITIATIVES	56
6.1	SOCIAL AND ECONOMIC COSTS AND BENEFITS.....	56
6.2	ENVIRONMENTAL COSTS AND BENEFITS	56
7	CONCLUSIONS, LESSONS AND RECOMMENDATIONS	57

7.1	THE NEGOTIATION PROCESS	57
7.1.1	<i>Understanding the providers.....</i>	57
7.1.2	<i>Understanding the business of the users</i>	59
7.1.3	<i>Determining payment levels and strategies</i>	61
7.2	FACILITATING THE NEGOTIATIONS	62
7.2.1	<i>Forming strategic alliances</i>	62
7.2.2	<i>A clear scientific background helps to build the business case</i>	64
7.2.3	<i>Management of schemes.....</i>	66
7.3	THE OVERALL INSTITUTIONAL FRAMEWORK	67
7.3.1	<i>Legislative framework.....</i>	67
7.3.2	<i>Property rights over land.....</i>	68
7.3.3	<i>Property rights over watershed services.....</i>	68
7.4	DEALING WITH TRADE-OFFS.....	69
7.4.1	<i>Targeting the payments increases efficiency and effectiveness</i>	69
7.4.2	<i>Inclusive, pro-poor schemes raise transaction costs</i>	69
7.4.3	<i>Conflicts over final objectives of the schemes.....</i>	70
8	ANNEXES.....	72
8.1	CASE PROFILE	72
8.2	LIST OF CASES REVIEWED	75
8.3	GLOSSARY OF TERMS	78
9	BIBLIOGRAPHY	81

LIST OF BOXES

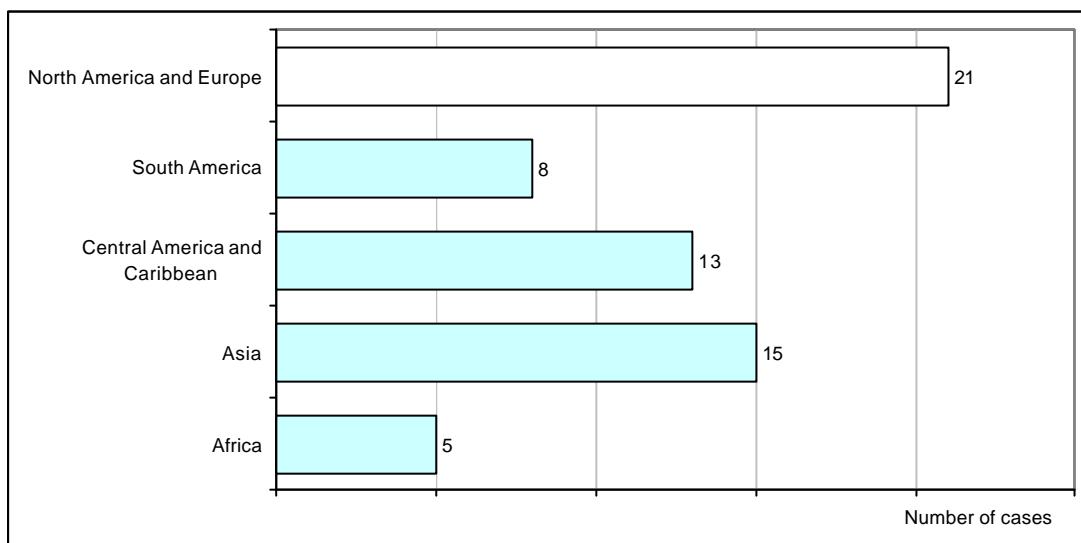
1 Introduction

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1.1 Why are we revisiting experiences?

In 2002 Landell-Mills and Porras reported approximately 60 cases of market-based mechanisms for watershed protection, with over 65% of them located in developing countries (see Figure 1).

Figure 1. Regional breakdown of watershed protection markets in 2002



Note: The total number of cases includes those reported originally as 'bundled'. Source: Landell-Mills and Porras (2002)

1.2 Key objectives, questions and methodology

This review undertook the task of revisiting each initiative reported by Landell-Mills and Porras in 2002. The main objectives of the review are:

1. Prepare a comprehensive review of all existing initiatives of markets for watershed services in developing countries.
2. Prepare a case profile (see section 8.1) format for the analysis and collection of information that guides the central questions of the review:
 - a. What are the drivers behind market evolution?
 - b. Who are the key players in evolving markets?
 - c. How are the markets structured in terms of payment mechanisms, fundraising, timing and level of payments?
 - d. How effective are existing markets in reaching environmental targets?
 - e. What does market development mean for human welfare?
 - f. Are existing markets efficient in economic terms?
3. Assess what has happened in emerging markets for watershed services after four years from the publication of *Silver Bullet or Fools' Gold*. This review has

classified schemes according to their development status as ‘ongoing’, proposals, borderline schemes, abandoned, or uncertain:

- a. *Ongoing schemes.* These are initiatives in which payments are being made from the users (direct and indirect), suppliers, or both.
 - b. *Proposals.* Only relatively advanced proposals have been included in this review. This includes those with advanced baseline studies, stakeholders coming together in negotiation meetings, etc, but no payments are actually taking place yet. Some of these proposals take years to mature into ongoing projects, and this highlights the difficult nature of setting up payments for watershed services.
 - c. *Borderline schemes.* These are schemes where their market component is not clear. For example, it is difficult to distinguish the buyer from the seller in intra-village arrangements. Some of these schemes were included in Silver Bullet. However, this new review puts them in a separate category highlighting their significance as examples of fair deals but with no clear market connection.
 - d. *Abandoned schemes.* These schemes have been abandoned, either as a whole, or the environmental service component has been dropped for lack of support or leadership.
 - e. *Uncertain schemes.* It was not possible to obtain sufficient information proving that the scheme had been abandoned or was still ongoing. Some schemes may have evolved into another local or national programme (such as the Chinese regional schemes reported in 2002), but we have not been able to confirm this.
4. Draw out the most important lessons for constraints and promotion of markets for watershed services.
 5. Make all the information collected available as a searchable engine on the Internet (www.watershedmarkets.org).

The analysis is based on a global review conducted during 2005 and the beginning of 2006. Collection of information is based on:

- Desk study of initiatives based on published and unpublished material, Internet searches, etc.
- When possible, direct contact with project organisers to fill-in gaps and provide detail of the particular schemes.

Each reference is annotated using Reference Manager. Each case profile is individually prepared as a .pdf document which can be downloaded from the website. Original profiles are in English. In the future the profiles will be available in Spanish and Chinese¹.

¹ Translations into Chinese are being prepared by the Department of Nature and Ecological Conservation, the State Environmental Protection Administration (SEPA) of China.

1.3 Constraints and information gaps

2 Setting up a definition for markets for watershed services

Conceptual issues

What sort of initiatives are we talking about – what we are including and why the MES/MMES/PES spectrum – highlighting differences (if any) from definitions/concepts used in the Silver Bullet report

Markets are defined as voluntary transactions between buyers and sellers, where the price is set on the basis of supply and demand. Even a first attempt at using this standard definition will nearly exclude all schemes in developing countries, especially when it comes to competitive price-discovery. This condition will be easier to track in auction systems (for example, salinity markets in Australia). Exceptions in developing countries will be land acquisitions to secure an environmental service, which in this review are considered more “borderline” market-mechanism schemes.

Taking into account previous definitions of markets and payments for environmental services (Pagiola (which one?), Robertson and Wunder, 2005), this study identifies market-based initiatives for watershed environmental services are those that are:

1. Voluntary transactions on the providers side (*note – otherwise it will be regulation*)
2. Between (a minimum) of one buyer and one-seller (that are distinguishable);
3. Conditional on previously agreed land use that is expected to provide an environmental service;

Additional desired conditions include:

4. Private sector pays for the provision of (previously considered) public goods;
5. Represent new sources of funding for watershed conservation; (*note: includes government re-allocation towards engaging with private farmers*)
6. Scheme provides some level of competition, which determines the extent to which individual stakeholders can influence prices (Landell-Mills and Porras, 2002). Competitiveness is associated with the number of participants. When there is fewer participants (i.e. monopolies or monopsonies) individuals will have more power and the market is less competitive. Effective participation is measured by the existence of barriers to participation.

2.1 Is participation voluntary?

Markets are defined as voluntary transactions. Although in the practice many schemes of watershed markets are indeed voluntary, there are examples where the condition does not hold. The voluntary component can be different for buyers or sellers.

In most cases, participation upstream is voluntary and the decision to engage in a scheme is determined by other factors (see CHAPTER ?? FOR DISCUSSION ON ENGAGING). Exceptions to this include:

- Government-imposed programme. For example, China's Sloping Land Conversion – although voluntary in principle, the selection of areas is done by the local government unit.
- Social pressure in intra-village agreements (ie. ICO in Bolivia).
- Hidden pressure of expropriation of private lands located in buffer zones of public parks (Campamento in Honduras, Social Forestry Programme in Indonesia)
- Hidden higher risk of eviction from public reserves: people living illegally in declared reserves face a stronger risk of eviction if they do not engage in best-management practices (examples in Philippines).

Participation from downstream users is mostly voluntary. Most of the funding until now comes from government budget allocations, grants from international agencies and in less degree (but growing) payments from the private sector. In the case of user-fees, water utilities make the decision after consultation with end-users (either directly through an open meeting for small schemes, or through willingness to pay feasibility and consultation studies, such as the case of the ESPH in Costa Rica).

An authority, usually the government, could also decide payments. In these cases, the end-user has little input in the decision. Examples include:

- Re-allocation of existing water charges and revenues (irrigation fees in Mexico, CPCJ Brazil, Plan Verde Colombia);
- Creation of new compulsory water charges for watershed conservation (Watershed Conservation Fund in the Philippines; new Canon de Agua in Costa Rica)
- Re-allocation of general or local budget government (fuel tax in Costa Rica)

2.2 There is at least one (different) buyer and seller

An important characteristic in a market situation is the existence of at least one buyer and one seller that are different from each other. The main exceptions to this include:

- Intra-village arrangements where it is difficult to differentiate buyers and sellers, as the project mostly concentrates on on-site services. Externalities might occur elsewhere, but downstream users are not included in the transaction. Examples of these include Arvari and Myrada in India; ICO in Bolivia.
- Internal-trading within the same organisation. For example, Desarrollos Hoteleros in Costa Rica purchased Certificates for Environmental Services from the Government to invest in their own private reserve.
- Land acquisitions by downstream users. These examples represent land-market transactions, and not environmental services deals. Once the downstream user (or donor) purchases the land, they become the user and the provider. ICO in Bolivia and Campoalegre in Colombia.

This differentiation means that several examples previously included in Landell-Mills and Porras (2002) are here considered as ‘borderline’ examples of watershed service deals. These examples are presented as interesting deals in watershed management, but they are not included in the general statistics for the analysis.

2.3 Payments are conditional on delivery

Conditionality assumes that payments are made for land use activities that will deliver an environmental service. Most projects aim at some degree of conditionality. However, in the practice, this conditionality is potentially restricted when:

- Payments are diverted to other activities not related to the environmental service provision. Examples include:
 - Most funding from the Watershed Conservation Fund in Philippines is diverted to short-term projects such as health and water supply and has a weak link with the provision of the environmental service.
 - Payments diverted to poverty alleviation in Maasin (Philippines) where people consider them as “something due to them”.
- One-off transactions that result in immediate benefits that cannot be withdrawn or discontinued in case of non-compliance. At the moment, because most initiatives are quite new, it is difficult to assess if this risk is a real one in the long-term.
 - Social forestry in Indonesia. The main payment is tenure for 25 years that cannot be retracted. However, there is an initial 5-year conditional period as a trial period.
- One-off, short-term payments given to support transitional periods, where after payments stop the only guarantee to continue BMP is the expected on-site benefits to the farmer.
 - Payments for reforestation during first 5-years in Costa Rica (compliance expected for at least 20 years);
 - Switch to organic farming in Bhoj, India.
 - Orange orchards in Meijiang, China.
 - Shade-coffee in Sierra de las Minas, Guatemala; and Campamento, Honduras;
 - Silvopastoral projects in Colombia, Costa Rica and Nicaragua;
 - Cuencas-Andinas project in Fuquene, Colombia and Ambato, Ecuador.

Most initiatives are still at an early stage, and it is difficult to know if they will comply with the system. In all the cases, monitoring checks for compliance through visual changes in land use, rather than effects on water quantity or quality. Section **Error! Reference source not found.** will look in more detail at monitoring.

2.4 Are the sources of money new?

A ‘promise’ or expectation from markets for environmental services is that they mean access to new sources of money. Current sources of money include:

- a) Re-allocation of (national and local) government general budget. For example, the Mexico National PSAH, which relocates money from irrigation to forest conservation; both China national projects; part of the funding for the Plan Verde in Colombia; and the Working-for Water in South Africa.
- b) New local sources, including:
 - b.1) Private investment (hydroelectric projects in CR, brewery), including contributions from parastatal groups.
 - b.2) Additional user-fees (environmental fees in Heredia, CR, Juntas de agua in Central America), including user associations charges (Cauca Valle in Colombia)
 - b.3) Stricter existing or new regulation for environmental services.
- c) External sources, in the form of international grants (GEF, GTZ, SDC, IFAD, etc) and loans (World Bank)

2.5 Level of competition

The level of competition determines the extent by which individual players can affect price discovery. In general, it is possible to identify two basic types of mechanisms used for price discovery:

- a) Administratively determined (non-negotiable) payments.
- b) Negotiable deals through direct negotiation between sellers and buyers, negotiations through intermediary and trading systems (including auctions).

Section 5.3.2 looks in detail at the importance and use of these mechanisms in emerging markets.

2.6 Summary

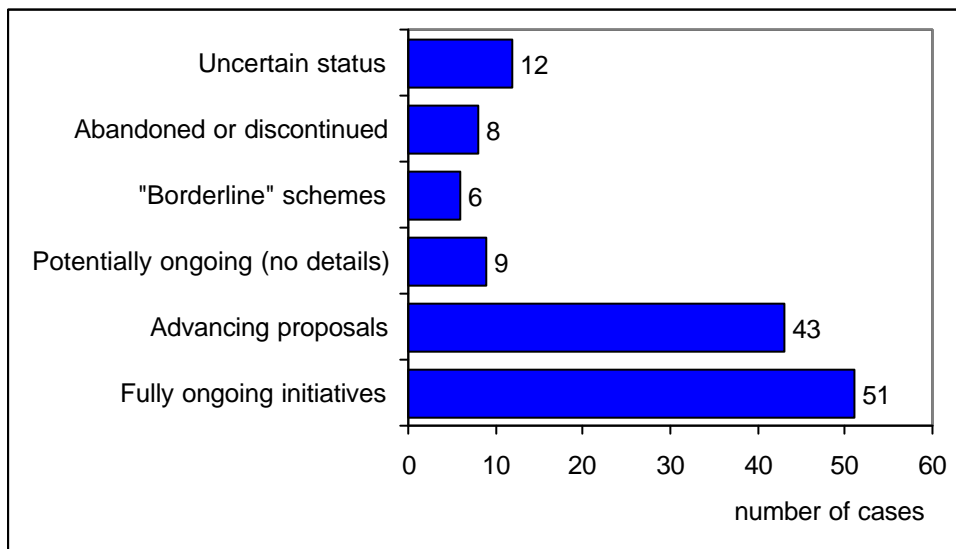
It is very difficult to find examples that fulfil the previous criteria.

We consider that the main criteria in these evolving market-based mechanisms are that buyers and sellers should be different. This means that several examples reviewed are hereby classified as ‘borderline’ and not included in the analysis of statistics. They are however included as ‘interesting’ examples of deals in watershed services.

Projects that have uncertain status, or those that have been discontinued or abandoned are not included in the analysis of evolution. From the advancing proposals (and potentially ongoing cases) there are seven examples well underway, and likely to become operational in the near future, and are therefore included in the analysis.

Statistics for the analysis in the following sections are therefore drawn from 51 ongoing cases and 7 advancing proposals.

Figure 2. Ongoing schemes of markets for watershed services in developing countries



3 Brief overview: general trends since *Silver Bullet or Fools' Gold?*

3.1 Status: many new cases but major setbacks

The interest in market-based mechanisms for watershed protection in developing countries has changed significantly in four years since the publication of *Silver Bullet* in 2002.

Development of schemes has not been easy (see Table 1). Out of the 16 proposals reported in 2002, only 4 of them are currently ongoing. Four years after 3 are still proposals, and 9 of them have been either abandoned, become something else, or it has not been possible to obtain further information about their current state. The same applies for reported emerging initiatives. Out of the initial 25 cases only 14 have survived and are reported as currently ongoing.

Some explanations for this poor performance include:

- Proposals (9 cases). Some of the proposals reported in *Silver Bullet* were at a very early stage did not evolve. For example, the international Bermejo-scheme alongside Bolivia and Argentina proved too complicated and instead several national schemes are happening in Bolivia. Some reported proposals were vague, like the Watershed Fund in San José in Costa Rica or Chagres in Panama (reported by Johnson, 2000), and did not materialise as formal proposals. In the case of Chile, the proposal for the PES- forestry component in water rights trading did not have support at the time, although water trading is happening. Major political instability has also halted efforts, such as the case of Integrated Catchment Management in Dryland areas in Zimbabwe.
- Emerging cases (11 cases). Some of the emerging schemes reported in 2002 referred to national-level programmes with a specific MES-related component that has not taken off. For example, the Stream-Flow Reduction Licences scheme in South Africa is still ongoing, but their marketable component reported in *Silver Bullet* has not evolved (as in the case of Chile). In other examples it has not been possible to obtain further information, such as the water boards in Malawi. Five cases reported for China (provinces of Jiangxi, Shiangxi, Hebei, and Northwest) have probably evolved into the national Sloping Land Conversion Programme.

Table 1. An evolving picture: what has happened since 2002

	2002	What happened to them?	New cases reviewed in 2006	Total cases reviewed
Proposals (including potentially ongoing)	16	<ul style="list-style-type: none"> ▪ 9 abandoned or uncertain status ▪ 3 are still proposals ▪ 4 are ongoing 	49	52 (49 + 3)
Emerging ⁽¹⁾	25	<ul style="list-style-type: none"> ▪ 11 abandoned or uncertain status ▪ 14 are still ongoing 	39	57 (39 + 14 + 4)

Total	41		88	129⁽²⁾
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Notes: ⁽¹⁾ Emerging cases in this table include 'borderline' schemes, to facilitate comparison with the 2002 review. They will be later excluded from analysis of market-based initiatives. ⁽²⁾ This figure includes the 20 cases reviewed that are abandoned or uncertain since 2002.

Despite the evidence for struggle, many new proposals and initiatives are emerging all over the developing world. This review was able to identify 39 new ongoing initiatives, which combined with those schemes reported in 2002 that are still happening (18 in total) brings a total of 57 ongoing initiatives.

Although the objective of the review was to look in detail at ongoing initiatives, it is impossible to ignore the large number of proposals in which the market component for environmental services is present. The review identifies 49 relatively advanced proposals. Some of these proposals are quite complete, with baseline studies developed and stakeholders already sitting at the negotiation table, but no payments have yet taken place and therefore have not been classified as "ongoing". Whenever possible detailed information about the proposals was collected, although such information was difficult to obtain in many circumstances.

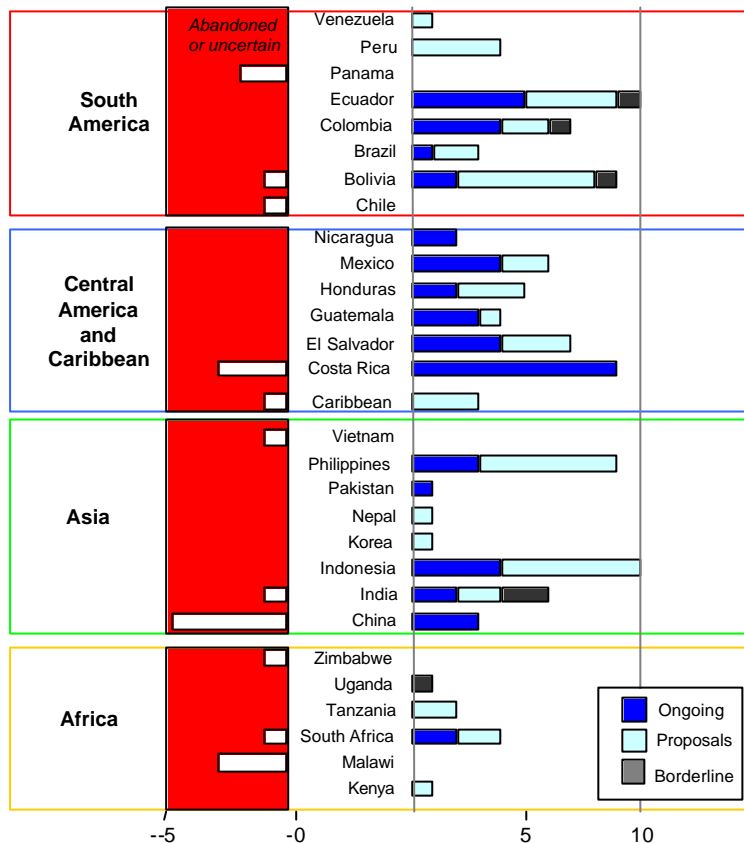
EXPLAIN ABOUT FIRST/SECOND GENERATION HERE.

"First generation" schemes	Initial round of market for watershed services schemes. Most of them are local and relatively isolated pilot schemes characterised by a "learning by doing" approach". Most of the schemes reported in the initial Silver Bullet publication fall in this category.
"Second Generation" schemes	Schemes are slowly beginning to take into account existing experiences and lessons from other projects. Stronger emphasis is placed on the design of baseline studies, monitoring and information sharing. Many of these schemes are subsidised by donors and tend to be part of larger regional projects such as Cuencas Andinas or the Silvopastoral Project.

3.2 Regional breakdown of initiatives

Figure 3 shows the regional breakdown of markets for watershed service by region and country. Most of the schemes (pilot and ongoing) are located in Latin America, with significant interest in Ecuador, Colombia, Bolivia, and almost all the countries in Central America (except Belize). A large number of these proposals are donor-led, with significant involvement from the German and Swiss cooperation and the World Bank. Latin America has long history of strong organisational capacities, which facilitates the inception of local-based projects. (put this line somewhere else?)

There have been a lot of baseline work in Asia, especially in Indonesia and Philippines steered by RUPES, and major international groups like WWF, CARE and IIED are supporting initiatives in the area. This figure does not show the geographical extend of the initiatives, and therefore fails to show the extent of large national programmes in China, which could probably overshadow all the other schemes put together.

Figure 3. A snapshot of PES by country and status

Although there has been interest in carbon and biodiversity services, Africa has been lagging behind in terms of markets for watershed services. Only two cases in South Africa are properly ongoing (Working for Water and Working for Wetlands). There has been important work in other sites in South Africa, and the World Bank has recently approved a loan for XX millions to work in Lake Victoria in Kenya. Cooperation and exchange of interest and information is growing in the region. Recently Katoomba Africa was formed and information about environmental services for the region is posted in their website (www.katoombagroup.org/africa/pes.htm).

3.3 Geographical extend of markets: growing support from larger programmes

The scale of the projects vary, from the very local to large, national programmes. Most ongoing schemes are local and set at watershed level, although there is a marked emergence in national-level programmes and regionally coordinated programmes (see Figure 4).

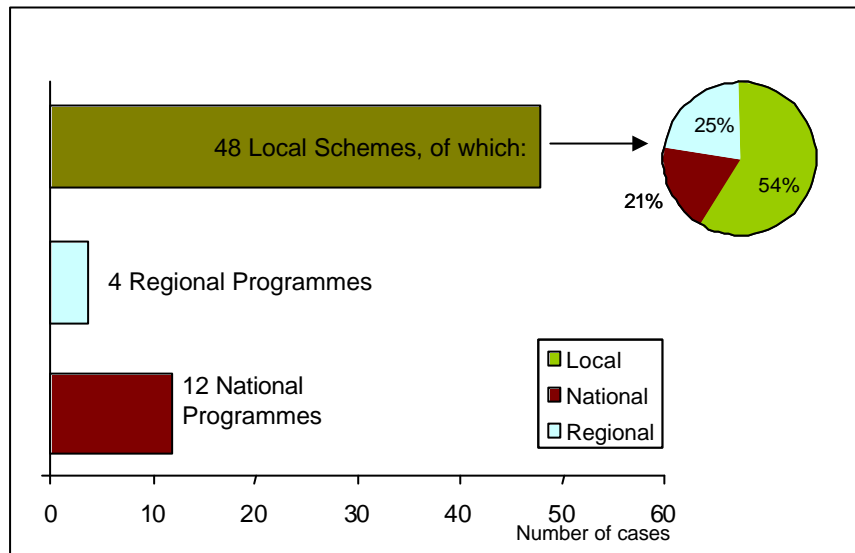
Almost half of the local schemes reviewed are part of a regional project (25%) or are developing alongside national-level programmes (21%). In all these cases, the local initiative receives financial and/or technical assistance in establishing negotiations among stakeholders, preparation of baseline studies, and design of mechanisms for collecting and allocating payments and general management of the scheme.

In some cases, such as Valle de Bravo in Mexico, funding from the national Payments for Hydrological Environmental Services programme came to boost the existing voluntary contributions to an environmental Fund created in 2000. In other cases, small local schemes such as those coordinated by PASOLAC in Nicaragua, El Salvador and

Honduras help create the momentum and base knowledge in order to upscale and create national-level programmes. Local schemes also emerge as part of national level programmes. For example, Coatepeque and Jaltepeque-Jiquilisco in El Salvador are pilot sites where the new national programme Ecoservicios is being piloted. In Costa Rica, the existence of the national-level PSA programme has provided the framework and institutional capacity to spur local-level agreements with several hydroelectric companies.

At the same time, over 50% of local schemes are emerging independently of a regional or national programme. Most of these schemes remain highly local, **XXX continue**

Figure 4. Geographical extend of markets for watershed protection



Regional programmes are not cross-boundary schemes. Instead, they are donor-led programmes that focus on particular areas (geographical and of interest). In general, these programmes aim at supporting “[second generation](#)” market schemes, in which proponents are beginning to take into account existing experiences and lessons from other projects and stronger emphasis is placed on the design of baseline studies, monitoring and information sharing.

International donors, such as GTZ, the World Bank, FAO, ICRAF and SDC, play a key role funding regional projects. The emphasis varies with the donor. For example, the Cuencas Andinas project, set in the Andean Region in South America, uses the following criteria for selecting participating watersheds: a) ecological-economic representativeness; b) presence of externalities, and c) possibility of strategic alliances with existing institutions.

The Silvopastoral project is interested in improving the performance and reducing environmental impact of small and medium cattle farming by improving management practices. Payments for environmental services are used during a transition time to cover implementation costs and it is expected that improved productivity will sustain the land changes in the future. This project has a strong component of development of methodologies for technology adoption, identification of barriers to environmental-friendly systems, use and management of payments for environmental services schemes, as well as indicators and monitoring.

In the case of RUPES, in South East Asia, the emphasis is on poverty alleviation and they focus on marginalized communities in hilly and mountain areas. Active since 2003, the

project has been documenting experiences on reward transfers, transferring and sharing information and promoting capacity building and baseline studies.

Figure 5. Cuencas Andinas Project Location

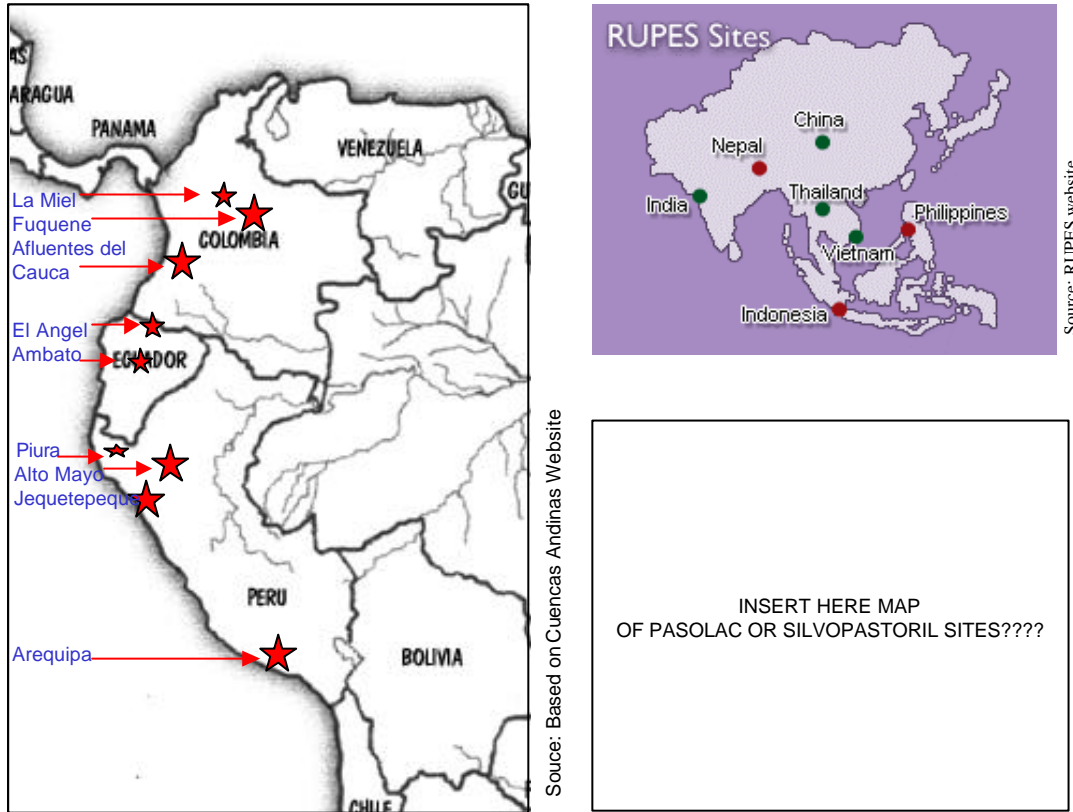


Table 2. Regional programmes in markets for watershed services

Programme Name	Countries	Description
Cuencas Andinas	Peru, Ecuador, Colombia	A GTZ funded project aiming at the promotion of sustainable land use in 15 watersheds in the Andean region of Colombia, Ecuador and Peru, through the creation of PES schemes among other management initiatives. The objective of the project is to implement innovative methods that can capture the potential for sustainable development, within these watersheds. The project will run for 8 years, and for the first stage (2003-2006), the objectives are to improve water management plans and implement PES schemes as a new institutional arrangement to manage the watersheds. The target groups are the technical and managing staff of the municipalities, local projects and NGOs, and the local communities.
PASOLAC (COSUDE)	Central America- El Salvador, Honduras y Nicaragua	PASOLAC, a branch of COSUDE (funded by SDC), is piloting 10 initiatives in Honduras, Nicaragua and El Salvador through local municipalities. The important lessons for PASOLAC are the evolution of relations between stakeholders and the way in which Soil and Water Conservation technologies are introduced based on

Programme Name	Countries	Description
		contractual obligations between private farmers and water institutions. PES is a useful instrument to promote discussions among stakeholders and find solutions based on contracts and agreements.
RUPES (Indonesia, Philippines, Nepal)	Indonesia, Philippines and Nepal	RUPES (Rewarding the Upland Poor in Asia for the Environmental Services they Provide) is testing environmental service reward mechanisms in 6 sites: Philippines (Kalahan Reserve & Ancestral Domain and Bakun), Nepal (Kulekhani) and Indonesia (Bungo, Sumberjaya and Singkarak). In addition there are other "associate sites" where there is shared learning with partners but limited financial involvement from RUPES. RUPES is mostly funded by IFAD and they work alongside a consortium of international institutions.
Silvopastoral	Colombia, CR, Nicaragua	Funded by GEF and the World Bank, it aims at: i) evaluating the potential of silvopastoral land uses as providers of environmental services and socio-economic benefits for the communities; ii) developing incentives and mechanisms for payments for environmental services that would result in benefits for farmers and communities; and iii) providing policy recommendations about sustainable intensification livestock activities and PES.

The number of **national-level programmes** for environmental services has increased significantly since 2002, when the main projects reported were the Costa Rican PSA, Plan Verde in Colombia and South African Stream-Flow reduction Licensing Systems. At the moment there are 12 ongoing national-level programmes, ranging from the very large scale of the Chinese Sloping Land Conversion and Forest Ecological Compensation Programmes, to the relatively smaller Ecoservicios in El Salvador (see Table 3).

National-level programmes have advantages over small, scattered schemes. While they require significant levels of funding, they can also tap into government general budgets and access international funding in the form of donations or loans. National programmes have the (albeit changing) political backing required to make changes in the law that might facilitate collection of payments (see Section 5.4 for a discussion on legislation). The main drawbacks of national programmes are transaction costs and the lack of targeting. The time required to make such a transition could be very long and difficult, but the key remains in high-level political support.

Table 3. National Programmes for Environmental Services

Country	Programme Name	Description
China	Forest Ecological Compensation	INSERT DESCRIPTION HERE
	Sloping Lands Conversion Programme	Farmers must set aside erosion prone farmland within critical areas of the watershed of the two largest rivers in China: the Yagtze and Yellow river (sometimes called Huanghe river). Compensation is given in cash and in kind. Total investment is US\$ 4.3 million a year.

Country	Programme Name	Description
Colombia	Plan Verde	National governmental forestry plan aiming at recovering forest cover while protecting micro-watersheds, regenerating areas affected by forest fires and degraded mangroves. Driven by the government's recognition of the need to protect the ecosystems that influence hydroelectricity production, drinking water supply and irrigation.
Costa Rica:	Payments for Environmental Services (PSA) Programme (conservation and reforestation)	Government led national scheme, ongoing since 1997 that rewards forest owners for protection of water, carbon sequestration, biodiversity protection and landscape beauty from forests. Most of the funding still relies in state funds derived from a fuel tax, with increasing participation from the private sector (especially hydroelectric projects). The programme will get significant new funding from the newly approved water tax, to be applied to all water users in the country. The National Forestry Fund (FONAFIFO) manages the programme.
	Certificates for Environmental Services (CSA).	A recently created mechanism designed by FONAFIFO to facilitate business' participation in the PSA scheme and capture funding beyond the already over-subscribed PES scheme. Each certificate represents one hectare of forest for conservation. The first stage of the CES is focusing on protection and regeneration of 7000 ha of forests in the Guanacaste area. Current buyers range from these local industries, to private individuals or foreign ethical investment companies.
El Salvador	Ecoservicios	This is a comprehensive World Bank/GEF funded project that aims at creating a national system of PES as a sustainable funding mechanism for conservation by i) establishing a functioning environmental services fund - FONASA (National Environmental Services Fund); and ii) designing a program of payments for environmental services, and providing technical assistance and monitoring contract compliance by the environmental service providers.
Guatemala	Direct Forestry Assistance Pilot Programme	The Ministry of Agriculture, Ranching and Food (MAGA) investing approximately US\$0.5 million/year for protection of forest located in strategic water areas in Central and Western Altiplano.
Mexico	Payments for hydrological environmental services (PSAH) programme	Mexican country-wide scheme that targets areas of well preserved natural forest for protection of their hydrological function in critical watersheds and over-exploited aquifers and proximity to water sources that supply settlements of more than 5000 inhabitants, which might in the future take over the payment through their own local government and/or water utilities.
Philippines	Watershed Rehabilitation Fund.	Reforestation, Watershed Management, Health and/or Environment Enhancement Fund being managed by the Department of Energy (DOE) to <i>compensate</i> communities hosting energy projects. This is a government-imposed "social responsibility" compensation from electricity generation companies to host communities of such generation facility. Ongoing

Country	Programme Name	Description
		since mid 1990s.
South Africa	Working for Water and Working for Wetlands. Potential future projects include Working for Woodlands and Working for Fire (Christo Marais, personal communication 2006).	Working for Water: the Department of Water Affairs and Forestry includes a water resource management fee in the price of water charged to consumers. This includes a charge for clearing alien invasive plants and for activities such as planning and implementation, pollution control, demand management, water allocation and water use control. Charges for clearing of alien invasive plants are levied in 13 of the country's 19 Water Management Areas. Working for Wetlands: Restoration of wetlands through government and industry subsidies.

key points

- A clearer definition of Markets for Watershed Services is presented (based on experiences);
- Not many are largely based on private investment;
- Initiatives with potentially more capacity of mobilizing funds are not voluntary on the buyer side (for example Mexico, Watershed Conservation Fund in the Philippines, Costa Rica –fuel tax and *canon de agua*);
- While potentially interesting as watershed management deals, intra-village arrangements, internal-trading and land acquisitions do not count as market-based initiatives for watershed services and they are not included in the statistics;
- Most projects aim at conditionality. Some projects have higher risk of non-conditionality, like those involving one-off payments (cash or in-kind) at the beginning of the project. Because most initiatives are relatively recent, it is difficult to establish if this is a real risk.

4 What is driving market development?

Without detailed information about the emergence of each scheme, it is difficult to pinpoint exactly what triggers the emergence of markets for watershed services. In general, the common factor in all schemes is related to inappropriate land management upstream, which is perceived affects the level of watershed services required downstream. The link could be real, backed by scientific studies, or based on common perceptions not necessarily backed by theory.

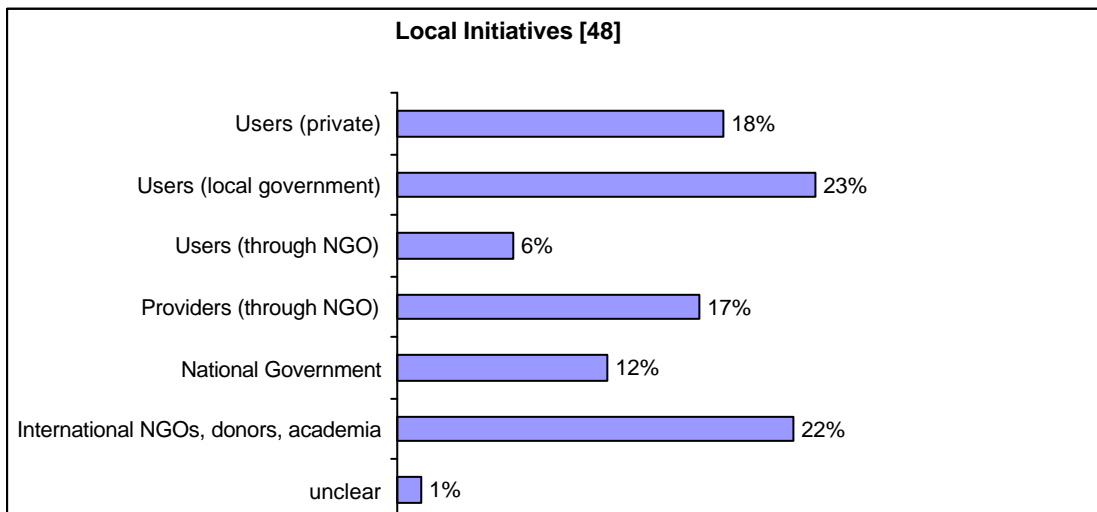
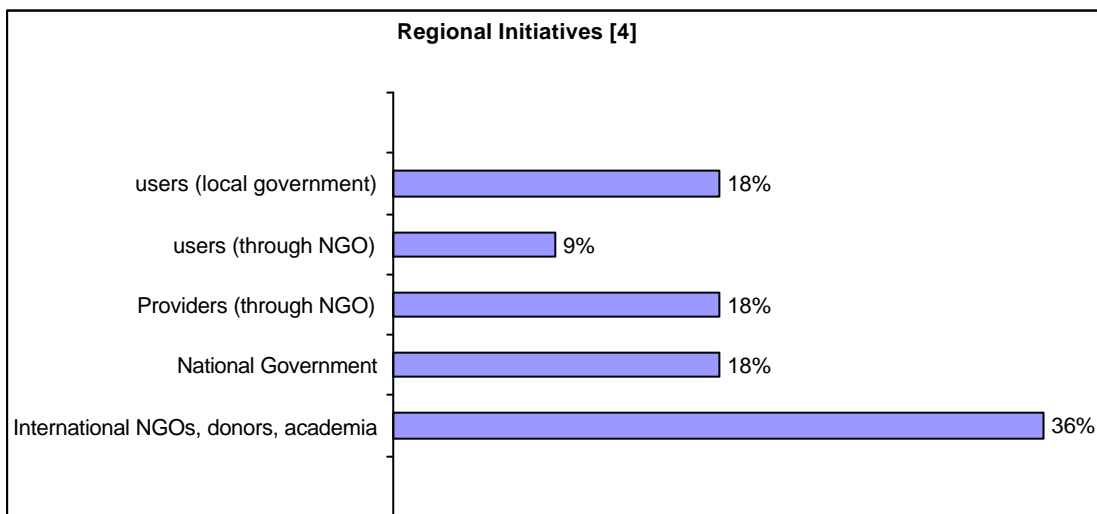
In this way, it is possible to identify two initial situations:

- There is a clear problem downstream with water services, and it is perceived that it is related to bad upstream resource practices (*demand led*).
- There is inappropriate land management upstream (threats to conservation, degradation of resources) and a need to find funding to improve resource management. MES are perceived as possible sources of money (*supply led*).

It is very difficult to categorise all the schemes reviewed under one group or the other without falling in subjective grounds. In some cases, supply led projects are presented in a way that aims at convincing downstream users that they have (or could potentially have) a problem with the watershed service.

There are four potential proponents of market-based alternatives to address the problem. These include:

- User or provider driven initiatives (includes public and private groups)
- Government (national or local) drivers;
- Independent groups (NGOs, consultant groups, etc);
- Cooperation agencies (donors, banks, regional projects)



Situation 1: There is a clear problem downstream with water services, and it is perceived that it is related to bad upstream resource practices.

(deforestation, declining water quality, etc), which prompts downstream users/government/ to take action.

Proponents of MES

Case	Water user (public and private)	Government- national and local	Independent group (NGO, consultancy group)	Cooperation agencies (donors, banks, regional projects)	Status
Brazil (CPCJ)	X				On-going
Colombia (Cauca Valley)	X				On-going
Colombia (Fuquene)	X			X	On-going
CR (Energia Global, CNFL, Platanar)	X	X	X		On-going
CR (

Situation 2: There is inappropriate land management upstream (threats to conservation, degradation of resources) and a need to find funding to improve resource management. MES are perceived as possible sources of money.

Case	Provider (public and private)	Government- national and local	Independent group (NGO, consultancy group)	Cooperation agencies (donors, banks, regional projects)	Status
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Bolivia (Tarija)			X		Upstream implemented but no upstream paying
Bolivia (Los Negros)			X		On-going but no substantial downstream payments yet
Costa Rica (PSA)		X	X	X	On-going
Guatemala (Sierra de las Minas)			X		Negotiations
RUPES (Regional project)				X	Negotiations but no payments from users

5 What forms do markets take?

Driver

Service and Commodity

Sellers – size of landholdings, tenure, importance of agriculture/forest to livelihoods, extent of information given

Buyers – public or private, rich/poor, extent of information given

Payment mechanism

- how price level determined
- how funds transferred
- Payment terms – financial/non-financial, timing, conditionality

Role of intermediary

Role of ancillary service providers

Monitoring and enforcement /sanctions

Enabling legislation (not sure where this fits best)

Need something also on how they relate to other policy tools – are they used in combination with other water resource management and forest resource management tools and how?

5.1 What are the services and commodities marketed?

A key ingredient in a market is the commodity that is sold and bought. In markets for watershed services, this commodity is intrinsically linked to land use activities.

Adequate upstream watershed conservation (including forest protection) has spatially identified functions. Some of these are perceived on the same field or plot, but there could also be important downstream benefits including soil conservation benefits (such as reducing suspended sediment yield), and water related benefits, such as the contribution to total water yield or reduction of flood damage in small events. The effects, positive or negative, can in turn have economic consequences for downstream water users. While available rainfall is an external variable determined by climatic conditions, Van Noordwijk (2003) suggests three main watershed services based on “hydrological outcomes” that can be influenced by land use:

- Changes in quantity or total water yield;
- Evenness of flow. This implies higher flows during the dry season, and reduction of peak flows during the wet season. However, the degree of ‘buffering’ that can be attributed to land use decisions (rather than climatic events) needs to be clearly established. Effects also depend on the location of the ‘observer’ or user within the watershed. Effects from land use changes will be evident up to a 100km², but after that the effects tend to be diluted. Also, riparian vegetation plays an important role by filtering soil erosion and man-made pollutants, regulating the water temperature and oxygen concentration, reducing channel bank erosion and by serving as biological corridors. On the other hand, trees and debris from riparian vegetation may cause local flooding by creating blockages during storms.
- Changes in the quality of the water. This has direct results over domestic water uses (such as drinking water), industrial use, irrigation, and as habitats for biodiversity.

The relative importance of the watershed service depends on the on-site conditions, the direction of a land use change, the type of water users and where are they located along the watershed. There might be cases of conflicts of interests, but also potential for collaborative work. For example, some users might be more interested in reduced

sedimentation, or higher dry season flows. Table 4 presents some examples of the type of services demanded by water users.

Table 4. Description of hydrological service by end user

Water user	Service Demanded	Quality
	Quantity	
Hydroelectric projects		
Annual and Intra-annual reservoirs	Maximum water supply throughout the year (seasonality not so important). The impact on total water yield may be small unless the areas with improved land use are large.	Reduced sedimentation - the importance of which depends on the reservoir capacity to accommodate sediments.
Daily reservoirs projects	Maximum daily supply, especially during dry seasons when rainfall is limited	
Run-of-river	Maximum water retention in the watershed to provide constant flow throughout the day. Changes from soil quick flow (saturated forest soils) to overland flows will have some effects on buffering river flows and hydroelectric operation.	Reduced sediments and waste that can affect the turbines.
Population centres:		
Urban and rural residential water consumers (<i>through municipal and private water utilities</i>)	Constant water supply throughout the year for drinking (i.e. 150lt/day/pc); Reduced flood risks in the wet season and water shortages in dry season.	Improved water quality especially in catchment areas that reduces treatment costs.
Disaster relief agencies	Reduced risk of floods	
Industrial Water Users		
<i>Agricultural sector:</i> Irrigation projects, farmers, agricultural markets	Constant flow of water - especially in dry season - for agriculture. Reduced risk of floods	Water quality in terms of toxics, salinization, etc.
<i>"Wet" industry</i>		
Distilleries, film processors, microship manufactures, food processors, Commercial fisheries, sport fisheries, fishery management agencies, etc	Constant flow of water throughout year	Reduced contamination of water Reduced contamination of water. Reduced aquatic productivity and destruction of coral.
<i>General industry</i>		
Transportation	Constant flows throughout year	Reduced siltation of harbours, rivers and waterways
Tourism	Water available throughout year, especially dry (tourist) season	Improved water quality, reduced degradation of tourism sites
Insurance companies	Reduced risk of floods	
Ecological flows (i.e. wetlands)	Availability of water flows especially in dry seasons.	Reduced siltation, sedimentation, suspended toxins from agriculture etc

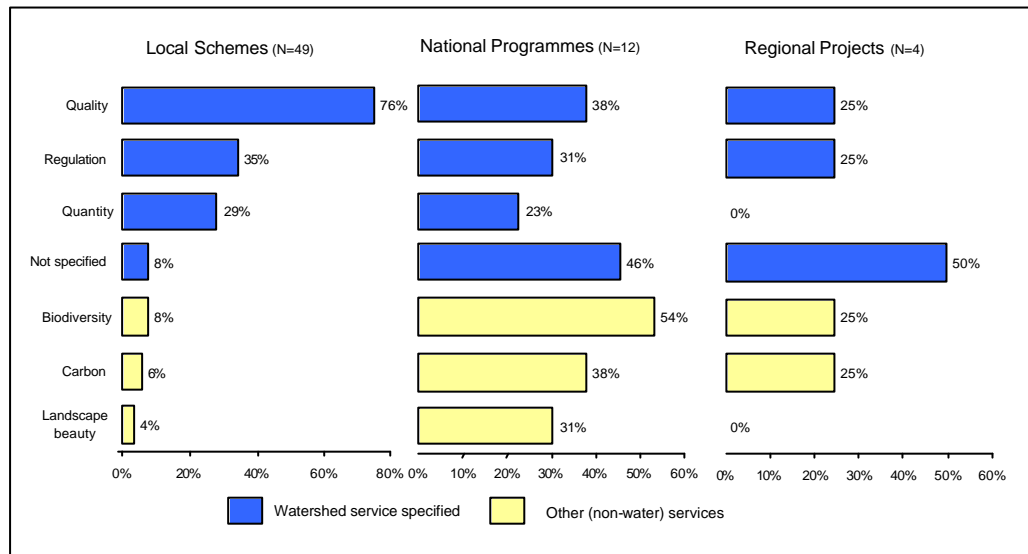
Source: based on The Conservation Finance Alliance (2002), Landell-Mills and Porras (2002), and Van Noordwijk (2005).

The linkages between land use and watershed services are not straightforward, and in many schemes are based more on perceptions than scientific rigour. Chapter **Error! Reference source not found.** presents a discussion on the water impacts of land-based

projects and how emerging watershed markets might result in better provision of environmental services, and Box 1 presents a ‘check-list’ of land-water relationships.

Water quality is top priority for the majority of ongoing local schemes (see Figure 6). Regulation of flows, such as droughts and flood control, is expected in 35% of the cases, and almost 30% of schemes claim or expect that land-use activities will increase water quantity. There is a noticeable practice of targeting specific watershed services, rather than being vague in the delivery of the watershed service (as it is the case of national programmes or regional projects). The reason is simple. Downstream users will pay if the scheme is clearly specifying that the service they demand will be provided. Whether this happens or not is discussed in Chapter **Error! Reference source not found.**

Figure 6. Summary of watershed services demanded



Note. The statistics shown in the graphics represent the environmental services specified in project documents. The selection of each service is not mutually exclusive, and each scheme might try to pursue several environmental services at the same time.

National programmes, on the other hand, tend to have a more spread-out approach to environmental services. Most of these programmes aim at producing or protecting multiple environmental services, and this reflects their intention to tap into multiple sources of funding (for example, from carbon sales or biodiversity groups). The danger of some national programmes is precisely their lack of targeting specific watershed services, and could run the risk of not responding to local demand. Regional programmes tend to be more vague, although the level of clarity increased as the programme gets local through specific schemes.

Box 1. ‘Check-list’ of land-water relationships

A key challenge to the development of market-mechanisms is the ‘packaging’ of the environmental service. This is necessary to make the service ‘tangible’, both for users and providers. A solid scientific base is very important, but so are the perceptions that stakeholders have of the impacts of their land use decisions (see Porrás and Miranda, 2005, for more on perceptions). This is especially applicable to service providers, as complicated commodities (such as credits) will have limited applicability in areas with

problems with information flows and limited general capacity. At the same time, the choice of the commodity and the marketing mechanism will be ultimately affected by the local administration capacity, and it must reflect a careful balance between definition and management costs. The use of complex commodities, such as credits and transferable licences is mostly used in developed countries such as USA and Australia.

Because it is easier to track and manage, projects in developing countries follow a land-based strategy, which implicitly assumes that a particular type of land use will provide a set of environmental services. There are other practical advantages. Land-based units are easily understandable by farmers, policy-makers and water users. Table 5 presents several examples of schemes, environmental problem, environmental service pursued and their associated commodities.

The definition of the commodity is linked to previous experiences. It is easier to build upon existing capacities rather than introducing completely new concepts, as most countries have previous experience in soil and water conservation projects. This 'legacy' can be positive; taking advantage of created knowledge through learning-by-doing, but could also carry on 'old baggage' from dominating policy groups. For example, strong support for reforestation for commercial purposes comes from forestry lobbies that do not necessarily have to do with water provision.

The main commodities for commercialising watershed environmental services in developing countries are:

(1) Best-Management Practices:

These practices are being proposed by project planners as ways to generate medium to long-term on-site returns to the farmer. The payment for environmental service might come in the form of initial funds, technical capacity, seedlings, etc, to help the transition and initial conversion costs. The long-term incentive is presented as higher yields from crops, or access to niche markets in the form of environmental-friendly products through certification schemes. Some of the practices used include:

- Improved agricultural practices (alternatives to slash-and-burn, soil conservation land techniques, organic farming or low pesticides; integrated pesticide management);
- Agro-forestry (shade coffee);
- Improved ranching management (including silvopastoral);
- Sustainable forest management. As opposed to the previous practices, SFM might not result in higher profits in the medium and long-term, as they face management restrictions. The incentive comes in the form of access to a resource that would otherwise be totally restricted (in places where legislation prohibits forest conversion or in public lands), or access to niche markets through certification such as FSC.

Examples include concessions from public forestland, sustainable management of existing private forests, etc.

(2) Reforestation for commercial plantations

While this could be considered as sub-category of best-management practices, forest plantations tend to include monoculture or use exotic plantations that might not be necessarily considered best-management practices from a water service point of view.

Plantations could have negative effects in terms of reduced water flows and biodiversity (if monoculture).

(3) Conservation and protection of existing ecosystems

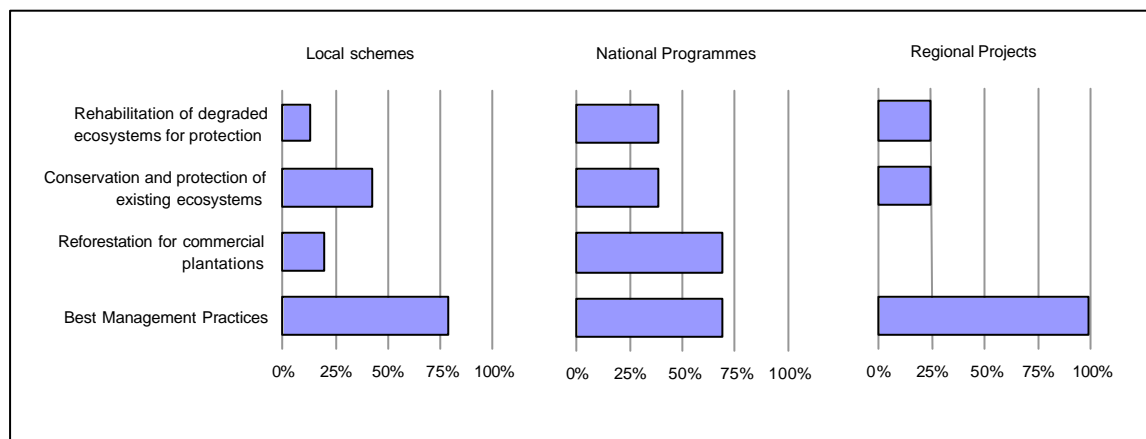
This category refers to the prohibitions or restrictions of use of existing ecosystems. For example, avoiding conversion of forest conversion to other land uses, protection of riparian areas; and protection of strategic water recharge areas.

(4) Rehabilitation of degraded ecosystems for protection

The promotion of activities leading to recovery or rehabilitation of degraded ecosystems that will provide environmental services. It is assumed that these recovered areas will be protected afterwards. Incentives are given to support restoration costs. In some cases there can be a flow of payments for protection afterwards. In other cases they can be given to comply with legislation requirements (for example, where initial conversion was illegal).

Figure 7 presents a distribution of the commodities promoted in ongoing markets for watershed services. Best-management practices are by far the most popular commodity promoted in ongoing initiatives regardless of their scale. They were reported in 80% of local schemes, 70% of national programmes and in all the regional projects. Best-management contracts are regarded more appropriate towards long-term sustainability by avoiding ‘exclusion’ activities (such as protection), supporting livelihood activities in more appropriate ways, and by making the new activity attractive enough so that the farmer will continue indefinitely. Best-management contracts are usually linked to fixed-period payments, either in cash or in-kind as technical assistance, aimed at ‘tipping the balance’ between current and desired land uses (Pagiola *et al*, 2004).

Figure 7. Commodities in markets for watershed services



Note: Some projects present a combination of practices.

‘Exclusion’ activities, such as conservation and protection of existing ecosystems (usually forests) are reported in over 40% of local schemes and national programmes. Many of these activities aim at protecting remaining patches of forests, perceived as key elements in the provision of downstream water services. For example, all watershed projects in Costa Rica (hydroelectric projects [CNFL](#), [Platanar](#), [Energía Global](#), [ICE](#), and [La Esperanza](#), and water-based companies [ESPH](#) and [La Florida](#)) aim at increasing or

protecting forest cover as means to reduce potential sedimentation and reduce flash floods.

Water quantity is not explicitly written in any of these cases, as regular precipitation is usually high. There are however many cases where it is expected that protection of existing ecosystems will result in water security. For example, two communities in El Salvador are paying through user fees for “water provision and quality” provided by [El Imposible](#) National Park (Rosa, Kandel and Dimas, 2003). In the local scheme of [Los Negros](#), in Bolivia, downstream farmers perceive that water flows have reduced by more than 50% in the last two years as a consequence of deforestation of the cloud forest (Natura, 2004), and they expect the situation to stop by encouraging the protection of the remaining forests. National programmes like the [PSAH in Mexico](#) and the [PSA in Costa Rica](#) specifically target conservation of forests as means to deliver watershed services alongside other services such as biodiversity protection and landscape beauty. In the case of Costa Rica, the high emphasis on conservation also arises from the farmers, as conservation implies lower initial investment than other activities such as reforestation or agro forestry.

Table 5. Examples of watershed services and associated commodities

Identified problem	Service proposed	Commodity	Place
Deforestation causing erosion and siltation into Brantas River	Improved water quality	Rehabilitation of degraded areas through tree planting at pilot sites	Brantas, Indonesia (LPT3-IIED)
High levels of agro-chemicals in Bhoj wetlands and Lake	Improved water quality	Best management practices through switch to organic agriculture	Bhoj Wetlands, India
Soil erosion and siltation of proposed dam, low dry-season flows	Improved water quality and quantity	Best management practices through soil conservation and zoning	Bhodi-Suan, India
Sedimentation in lake providing water for downstream town	Reduction of sediments in Lake	Best management practices through soil conservation techniques, use restriction through reduced grazing intensity and tradable water rights.	Sukhomajri, India
Deforestation of cloud forest reduces water quantity	Improved water quantity and reduced sedimentation	Protection of existing forests	Los Negros, Bolivia
Loss of biodiversity and critical ecosystems. Poor water management, problems with dry-seasons and floodings, landslides, declining water quality.	Biodiversity protection, carbon sequestration, regulation of water flows and quality, reduction of environmental vulnerability to landslides, scenic beauty	Protection and restoration of existing forests	National programme EcoServicios, El Salvador
	Regulation of water flows and quality, reduction of landslide risk, scenic beauty, carbon sequestration, biodiversity protection	Best management practices through combining trees with agricultural production (agroforestry, silvopastoral practices, shade coffee, live fences)	

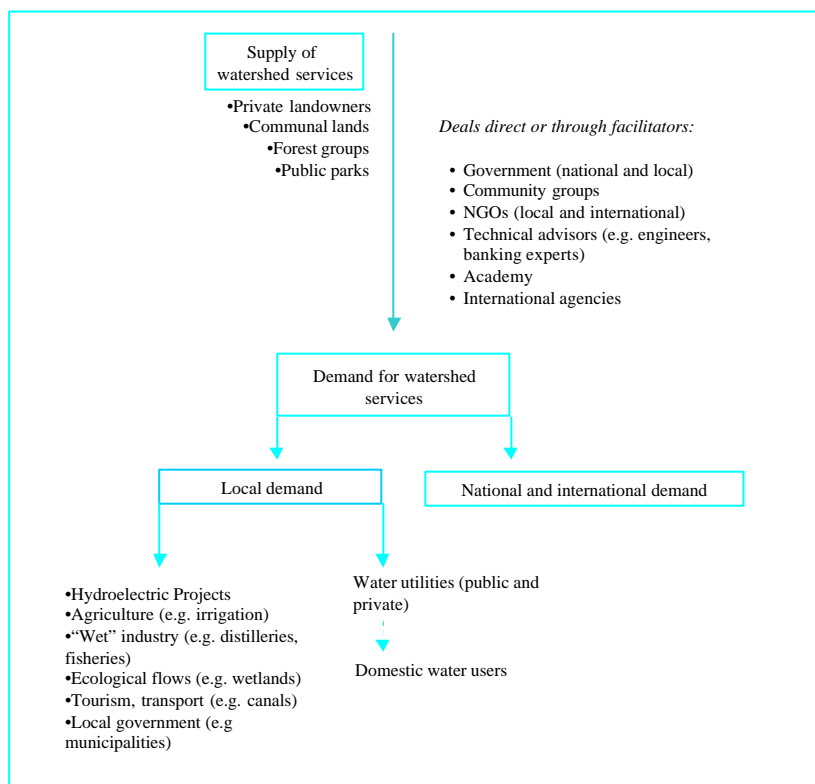
	Regulation of water flows and quality, reduction of landslide risks.	Best management practices in agricultural land (mulching, low tillage, live barriers, conservation works)	
Degradation resulting in compaction of soils and decline in infiltration leading to low dry season flows.	Protection, conservation and management of strategic water sources.	Best management practices mostly through soil and water conservation techniques in small watersheds (no slash-and-burn, management of crop residues, natural regeneration of forest through selective logging, management of coffee farms, conservation of forest, use of wind-barriers and life fences, and use of coffee waste for compost	PASOLAC, 10 initiatives in small watersheds in Central America
Deforestation and loss of ecosystems	Improved water quantity and quality	Conservation of existing forests and reforestation	Mexico (national programme)
Deforestation and loss of ecosystems	Improved water quantity and regulation	Mostly conservation of paramo and natural forests, but also some improved agriculture measures.	Pimampiro, Ecuador
Deforestation threatening water supplies and siltation of reservoir	Reduction of sediments and improved water regulation	Mostly conservation of existing forests and prevention to conversion.	Platanar, Costa Rica

5.2 Characteristics of the participants

The potential key players in markets for watershed services are presented in Figure 8. The main groups involved in emerging markets are:

1. Those providing the service;
2. Those demanding the service;
3. Facilitating individuals or groups that help bridge the gap between supply and demand, and support the design of the deals.

Figure 8. Who are the key players?



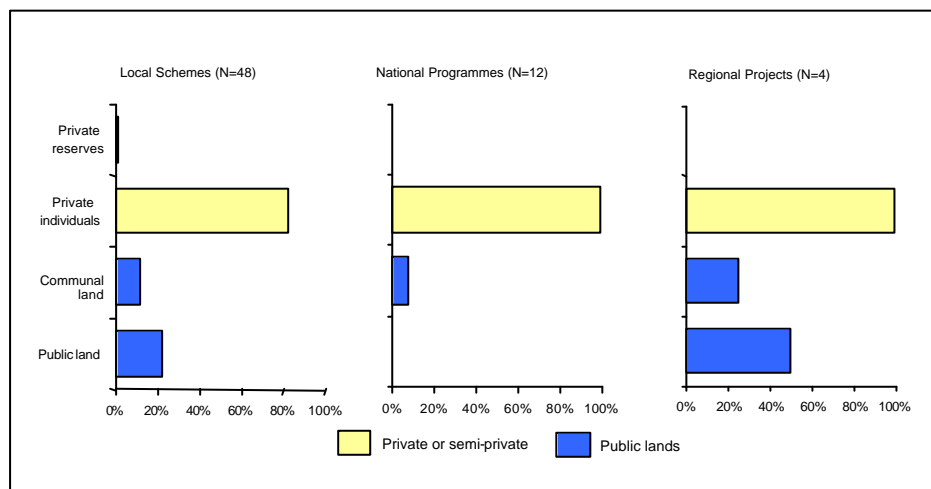
5.2.1 Providers of watershed services are mostly private

Service providers are those stakeholders with a contractual relationship with those groups who demand watershed services, who commit themselves to implement previously agreed land conservation practices in their landholdings (specifically in the water recharge area). Potential service providers are those with land in the target areas but without any contractual relationship with users or intermediaries (Kosoy, *et al.*, 2005).

This review identifies four main categories of suppliers:

- Private landowners: They have clear ownership of their land, with either land titles or undisputed possession rights.
- Public lands: This group represents farmers living in public land (usually declared as national parks or protected areas, sometimes called “paper parks”). Farmers usually do not have possession rights.
- Communal land: Farmers living or drawing their livelihoods from communal land. This includes the *ejidos* in Mexico.
- Private reserves: private landowners (individuals or groups) registered as reserves and committed to conservation of specific ecosystems.

Figure 9. Participants in markets for watershed services: SUPPLY



Note. “N” represents the population of schemes with sufficient information for this field.

Watershed markets mostly target private landowners as their main suppliers (see Figure 9). Because of their ability to respond to local conditions, local schemes can be more flexible about land tenure, and while private property is still the main group, other forms of tenure are present, such as farmers living in public lands (23%), or communal lands (13%). The same applies for national programmes. The only exception is the [Mexico National PSAH](#) programme, where communal land ownership (*ejidos*) is the main form of land tenure (see Box 2). Although these programmes have been severely criticized for this policy, (see Box 3), the complications arising from monitoring at national-level monitoring would escalate if property rights are unclear and a level of trust in delivery cannot be achieved.

Box 2. Dealing with common property in Mexico**Box 3. Property rights and market for watershed services**

The reliance on private property tends to leave out poorer groups that depend on communal land for their livelihoods. These groups are now being specially targeted by regional projects, such as [Cuencas Andinas](#) in South America and [RUPES](#) in South East Asia, which experiment on the conditions under which market structures could overlap with social land tenure.

Property sizes vary depending on the country, and the concept of small, medium or large ownership is extremely relative. For example, the project of [Los Negros](#) in Bolivia works with 13 private landholders, holding property sizes that range between 3-390 hectares, and so far covering 1100 hectares of cloud forest (the aim is to have 2500 hectares under compensation and 500 hectares as community water conservation reserves). In [Pimampiro](#), Ecuador, approximately 20 families receive payments for environmental services for 638 hectares of forests and shrub lands.

Central America is characterised by small-sized properties, which increases the challenge of achieving a threshold to deliver the environmental service. By 2004 the local pilot scheme in [Jesus de Otoro](#), Honduras was working with 18 farmers, covering almost 80 hectares in a 3180 hectares watershed. In three small pilot schemes in [El Salvador](#) (Yamabal, Tacuba and Chalatenango), working with the regional NGO PASOLAC, farmers have an average property size of 2.5 hectares. In the national [PSA in Costa Rica](#) minimum and maximum property size to participate in the programme is 2-300 hectares (600 hectares for indigenous reserves) for forest conservation, and as small as 1 hectare for reforestation. The eligibility requirements vary from geographical and physical (location with respect to protected areas or biological corridors and land suitability for forestry activities, to social and institutional (areas with low Social Development Index are prioritised, and international donors can choose their target areas).

Projects working in communal lands and public areas tend to include larger numbers of participants. For example, the [Tarija](#) project in Bolivia targets farmers living inside the Sama Biological Reserve. The status of the reserve permits human habitation and exploitation of the resources, and includes 25 communities with a total of 4000 inhabitants. It is perceived that the continuation of the current land use, involving further deforestation through uncontrolled burning and degradation of natural grassland and shrub lands will have adverse effects on dry-season flows (Robertson and Wunder, 2005). In

5.2.2 Demand for watershed services is largely public

Demand for watershed services comes from local, national and international sources.

Local sources of demand are mostly service users. It includes individuals or groups either consuming watershed services as a final product (i.e. domestic water users), using them as inputs for their production process (i.e. hydroelectric, irrigation, beverages, mining, pulp, etc), or depending on certain levels of services for environmental purposes (wetlands or

conservation groups). In the case of domestic water user, end-users are represented by a water utility (private or public).

National and international demand for watershed service is another important group. It provides funding from government and international agencies. Most of these groups are interested in a wider range of environmental services, such as biodiversity. International agencies can play a key role in providing conservation or development grants to pilot schemes until downstream groups adopt payments. Alternatively, national government may wish to pool service buyers in the public interest for strategic watershed services that cannot be realistically financed by downstream demand. The [Costa Rican PSA](#) programme, the South African [Working for Water](#) programme and the Chinese [Sloping Land Conversion Programmes](#) are examples of upstream payments being wholly or partly funded nationally for improved or protected public goods' provision.

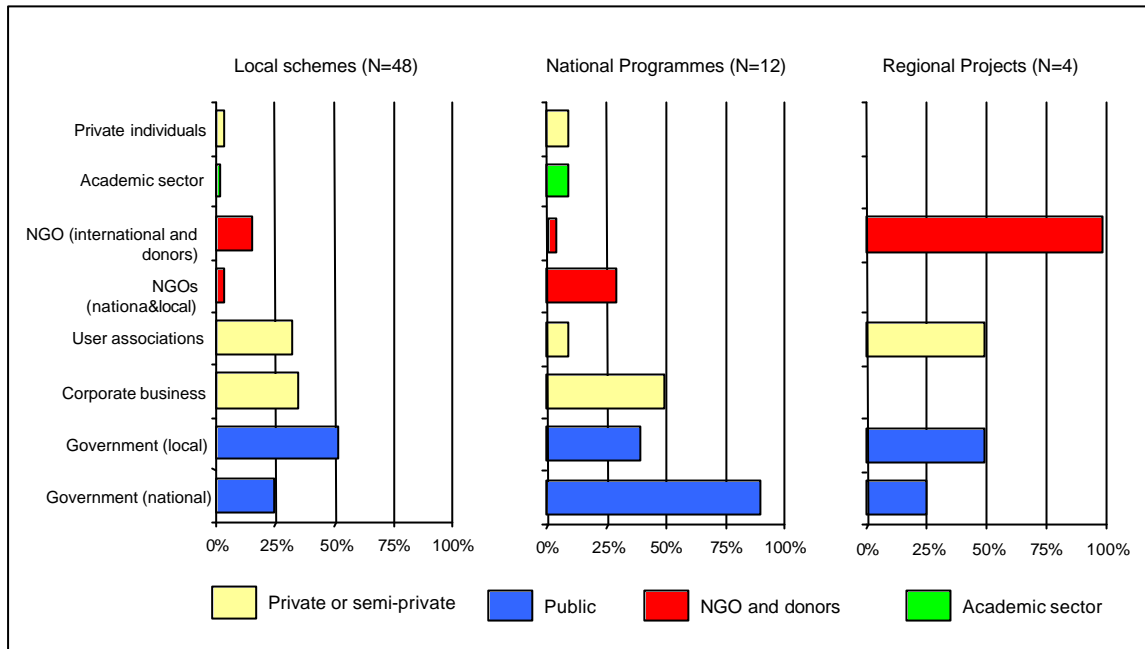
The importance of national and international contributions increases when:

- The link between service demand and service supply is not locally defined. For example, potential benefits have a different scale such as groundwater recharge or biodiversity conservation;
- Downstream demand and/or ability to pay is low, and the upstream areas are of particular national interest or importance;
- Downstream users are already heavily taxed and the Government agrees to allocate some of these funds to watershed payments;

Figure 10 shows the character of the demand in watershed markets. While supply of watershed services remains mostly a private deal, demand for services relies heavily on the public sector. Participation of the private sector has fallen behind initial expectations. Although private water users indicate a perception of the links between deterioration of upstream natural resources and downstream water impacts, securing their monetary support has been challenging.

Local schemes are actively targeting local users for funding. Half of the cases reviewed focus on one large user as source of funding (25% corporate business or user associations, and 25% local governments or municipalities), although most of them are negotiating payment terms with other groups. Only two cases rely completely on national sources of funding, and the remaining schemes presents a combination of private, public and international sources of funding.

Figure 10. Participants in markets for watershed services: demand



All national programmes (with the exception of the certificates for environmental services, [CSA](#), in Costa Rica, which targets the private sector) are funded from national government budget. Funds come from specifically created taxes on water users (such as new user fees in the [ESPH](#) in Costa Rica, [Pimampiro](#) in Ecuador, and [Fideicoagua](#) in Mexico, diverting funds from existing water-related charges (for example, the [Watershed Rehabilitation Fund](#) in the Philippines and the [Mexican PSAH](#), which redistributes funds from irrigation charges), or from general government budget (for example, the Chinese [Sloping Land Conversion Programme](#) and the national programmes or the Costa Rican [PSA](#) programme²).

Box 4. Pooling demand for watershed services: an example from Costa Rica

International NGOs, groups and donors play a key role in demand discovery. All regional projects are funded by international sources, although the local schemes they support look for local sources of funding for long-term payment systems. At national-level, international funds are sometimes combined to target specific regions or other environmental services of interest for the donor. For example, funds from KfW targeting a specific biodiversity-rich area in Costa Rica are combined with national funds to enlarge the target area and provide a larger volume of several environmental services, including water protection. International funding usually comes in the form of grants or loans. The World Bank, for example, has been making loans to several countries to develop their national payments for environmental service programmes (see Table 6).

The low level of participation of international donors depicted at local level in Figure 10 could be misleading. International donors are a very important source of funding, but in most cases their contributions are channelled towards design or management of the

² The Costa Rican PSA programme received for several years earmarked funding equivalent to 3.5% of fuel tax collections. Commitments from the government change with each new administration, and current funds come from general national budget.

scheme, rather than direct payments as this figure shows. Often, international donors tend to see their contributions as temporary, supporting nascent and emerging schemes until they are able to secure local sources of funding (Hartmann and Petersen, 2004).

5.2.3 Facilitating groups play a key role

Negotiations between providers and users can be direct or with assistance from facilitating groups.

Direct deals account for almost 20% of local schemes, and usually happen when there are few stakeholders with enough power to negotiate with (usually few) upstream landowners. For example, [La Esperanza](#) in Costa Rica is a small initiative where a hydroelectric company entered a contract with a private reserve protecting cloud forest upstream. In this deal, the hydroelectric company was keen to strike the deal as means to secure land access to build a small dam. In other cases, a water utility will negotiate with upstream farmers on behalf of their final end-users. Usually, the utility has the power to make decisions, sometimes following some kind of consultation. Examples include the [ESPH](#) in Costa Rica, the [CPCJ](#) scheme in Brazil, where two municipalities are paying to establish nurseries and for restoration of forests along riverbanks and other critical areas. In some cases the water utility charges additional fees to their final users, in others they allocate existing funds. Section 0 looks in detail at the sources of funding.

There are different types of facilitators helping to broker deals. In some cases the tasks can overlap, and one group can do several tasks (for example, dialogue brokers and administration facilitators). Some facilitators can also have a transitory character, for example, assisting during the initial stages of the schemes (facilitating dialogue or information) but fading away as the scheme gathers strength and other institutions or groups take ownership. The main types of facilitators identified are:

- **Dialogue brokers** are those groups that help create the spaces to encourage dialogue between farmers and downstream users. Their participation could be transitory. The dialogue will help to identify the environmental services expected by downstream users.
- **Technical advisors** are in charge of programme design. They are in charge of developing management plans and establishing monitoring systems to ensure the delivery of watershed services. This group requires biophysical, legal and social scientists, as well as technical experts for the design of maps, computer programmes, GIS-based systems, etc. One of their jobs is to maximise downstream service buyers' demand by identifying sellers who will deliver the greatest improvement in services at the lowest cost.
- **Technical advisors rural extension** experts support farmers and helps create the technical, social and institutional capacities to actually implement the plans. Design and implementation are closely related, and methods to allow feedback should be in place.
- **Financial facilitators** are those groups provide funds to initiate negotiations and develop baseline studies. Some of the major international funding agencies include the World Bank, the Global Environmental Facility ([GEF](#)) and IFAD.
- **Administrative facilitators** are those individuals or groups in charge of the actual administration of the scheme. They will collect and allocate funds, coordinate

overall monitoring and technical capacity. They define contractual terms and manage financial exchanges to reduce transaction costs, increase trust and transparency and fill any institutional gap. Some national programmes also use trust funds, usually required by international donors in order to administer specific grants. Trust funds are increasingly used in South America, especially in Ecuador, where significant capacity building has been created with the experience of FONAG in Quito (see Section 5.3 for a discussion on mechanisms to administer funds). Regional projects are administered by local or international NGOs, but the local schemes they support have strong connections with the local governments.

- **“Wholesale” managers.** In these cases, **a facilitator will take the risk** of the intermediation process by buying the environmental services (usually bundled) from landowners. They will try to sell these services to different users by pooling demand from local and international sources. This type of intermediary in the practice becomes a ‘first-stage’ demand for environmental services. This is the approach done by FONAFIFO, in Costa Rica, which administers the national PSA programme (see Box 4).
- **Information facilitators.** These are groups at national and international level that support and facilitate the flow of information, lessons, materials and contacts. It includes international research institutes and groups and universities. Examples include the advisory role played by [IIED](#), the Katoomba Group [Ecosystems Marketplace](#), [RUPES](#), [IUCN](#), [GTZ](#), FAO, etc.

Intermediaries are generally effective in reducing transaction costs and risks. Their capacity will directly affect the degree of sophistication of the mechanism for transferring funds to choose. For example, setting up trust funds requires long-term commitment and careful legal and financial considerations. It is also the responsibility of the intermediary to guarantee service delivery. This is usually done through targets, monitoring, and the provision of technical support. The intermediary either has the capacity to do all this, or they contract out services from other groups.

Box 5. Allocating roles and responsibilities

5.3 Payment Mechanisms

This section presents a review of the main issues related to payment mechanisms in incipient markets for watershed services. It focuses on four main areas:

1. Where does the money for payments come from?
2. How are payment levels determined?
3. How are payments transferred from buyers to sellers?
4. What is the unit (cash or in-kind) and timing (one-off, ongoing) of payments?

The Heredia PES project in Costa Rica used a combination of opportunity cost to estimate ‘capture values’, and substitutes costs to estimate the cost of protection and recovery of forest. These values suggested an upward revision of 7.59 colones/m³ as a water fee (tarifa hídrica). The national regulating body authorised an increase of 3.8 colones/m³.

A 2003 survey in Los Negros, Bolivia, showed that 70% of downstream farmers would be willing to pay approximately US\$12500-US\$19700 per year, equivalent to 2% of average household income (Robertson and Wunder, 2005). It took some time to overcome mistrust and by 2006 it is expected that the municipality and downstream users will be paying approximately 60% of the project costs (Vargas, personal communication, 2005).

Useful valuation exercises will provide an initial reference point, or range of values to help guide the negotiation process. These values should be cross-examined and strengthened with other information (such as local narratives, policy changes, livelihood analysis). This information might help stakeholders and policy-makers arrive to a negotiation table with their own defensible views about market and non-market values. More effective decisions could be then achieved from a well-informed bargaining process. However, economic valuation in general, and particularly for watershed services, can be limited by the following problems: (Porras, *forthcoming*).

- *It is very difficult to establish the biophysical linkages of land use and hydrological services.* Long-term, local data is usually not available, and site-studies could be prohibitively expensive for small projects. Additionally, problems with deep leakage could result in water flowing underground from one basin to the other, rendering it impossible to establish upstream-downstream relationships with certainty.
- *Incomplete biophysical information.* A) The relation of forest-water is based on myths or popular perceptions: i.e. forests produce rainfall, forests increase dry-season flows. Some of these myths result in assuming benefits when they could in fact be costs. For example, large reforestation could result in significant reductions in runoff. B) There are studies that will point out the benefits of reforestation (i.e. decreased sedimentation), but completely ignore the possible negative effects (i.e. reduced flows). C) Local hydrological studies using "black-box" approach that simplifies major land-water relations. Risk of "garbage in- garbage out" problem. D) Proper hydrological studies are expensive and need a lot of data. The solution seems to be to use this as an excuse and ignore them.
- *Incomplete markets.* There are no markets (or very few) where ecosystem services are traded. Even if they did exist, they tend to be immature, with few players and current prices tend not to represent the actual value of a service. In many places ecosystem services are used for subsistence production that does not reach the markets, making it more difficult to estimate quantities of production;
- *Shadow prices.* Government subsidies distort market prices and make it difficult to obtain a real value of the ecosystem service used in its production;
- *Extrapolation issues:* "Inflation" of the magnitude of local problems by using figures extrapolated from other sites. This is done in many cases in order to inflate project figures when local demand is low, or inexistent, to justify the initiative. It is not unusual for valuation studies to use figures from other places (i.e. contingent valuation results), and using big global figures always adds the sparkle that many people are after. The problem with this is that it can generate unreal expectations for local stakeholders.
- *Use of total flows - as opposed to marginal values:* A common problem in some cases is the confusion of "total flows" (gross effects) as opposed to "marginal flows" (net effects). Markets for watershed services look at the additional, marginal effects of alternative land uses on watershed services. For example a MWS should look at the additional units of water from improved water use, and not the total water flowing from a watershed. The basic premise here is that water flows would have come down *anyway*. It is necessary to look at how much more or less water comes down with or without project, or how much cleaner it is. For example, a study by Barrantes (2003), suggests that the hydrological importance

of forest is determined by the amount of water ‘produced’ in those areas. The author makes no attempt at considering the difference in water flows that alternative land uses would provide and the valuation results in overestimation of the true contribution of forests to water.

- There is a tendency to exaggerate possible effects of land use change (the typical “*deforestation will lead to desertification*” cry-wolf). The provision of watershed services might change after conversion of local land use, but very rarely it will stop altogether unless global weather patterns changed.
- *Figures do not reflect true values:* A) The opportunity cost many times does not include the best (or cheapest) alternative option. Many valuations do not include "with project" and "without project" scenarios. B) Assumption that water scarcity is a land use problem, when perhaps the best alternative would be water administration. The danger of this is that funds could be diverted to reforestation upstream, when they could be better used improving the pipe systems, reducing water waste, or improving water fees collection. C) Estimation of the environmental value of the service as the opportunity cost of land, instead of the value of the service as production input. This however is a contentious argument, as the final value of the service will result from a bargaining of the actual (or perceived) value of the service as input, but the ability to pay downstream, and the willingness to accept upstream.
- Another typical error is to ignore the possible costs of a land use change towards conservation. Conservation of forests might have positive values for biodiversity and downstream water users, but it will have direct on-site effects in terms of reduced access to local livelihoods (i.e. reduced collection of timber and non-timber forest products).
- *The timing of the flow of costs and benefits.* It is important to note the distribution of cost and benefits over the time horizon as well as differentiating between cumulative, punctual and sustained impacts. One should also consider that the impact of a land use could change over time; for example deforestation might increase runoff, but the magnitude of the effect will decrease over time as the new vegetation takes over. Timing is also very important when estimating opportunity costs, especially if they are seasonal-related.
- *Time scale, discount rates and inter-temporal valuation.* It remains an issue whether or not it is possible, or it makes sense, to measure the long-term value of a resource taking inter-generational aspects into account.
- *Ethical issues.* Most valuation methods (i.e. Cost Benefit analysis) are still based on an utilitarian and anthropocentric approach that does not include aesthetic or moral considerations (Echavarría, 2000).
- *Information gaps.* About the behaviour, role, and resilience of physical and ecological processes in watersheds. Ecological processes are very geographical and site-specific, and many times, despite having information available, decision makers fail to take it into account and follow prevailing myths about land use.

5.3.1 Where does the money for payments come from?

In theory, payments from water users downstream should be determined by the value of the environmental service in the production function. In reality, payment levels are being

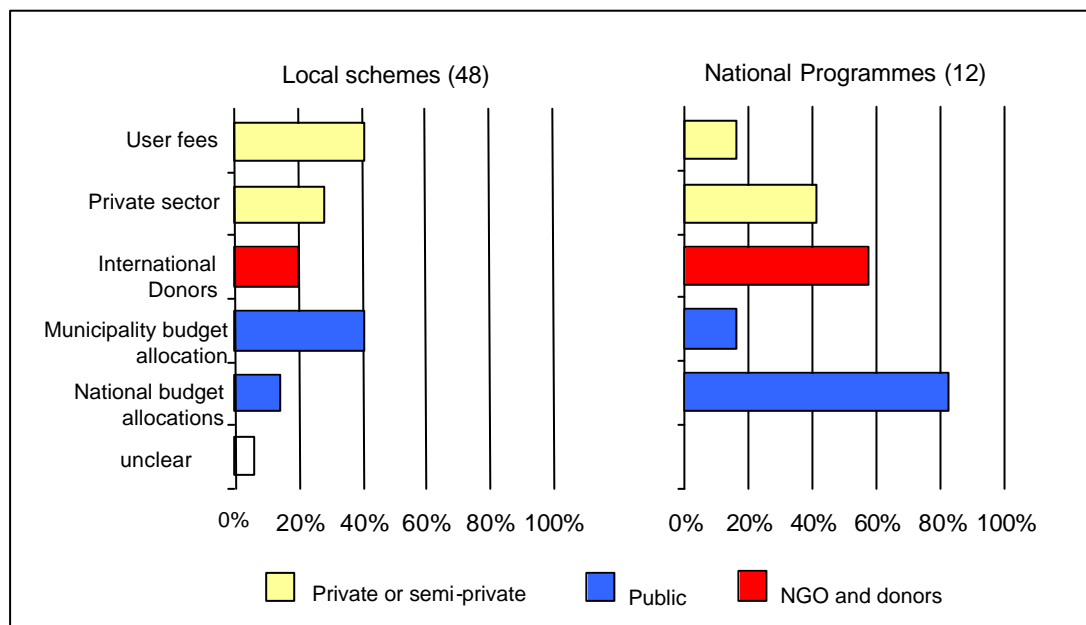
determined by regulation, government budgets, international cooperation, or through voluntary contributions from the private sector.

The most common sources of funding in markets for watershed services, discussed in Section 2.4, are:

- a) Re-allocation of (national and local) government general budget. For example, the Mexico National PSAH, which relocates money from irrigation to forest conservation; both China national projects; part of the funding for the Plan Verde in Colombia; and the Working-for Water in South Africa.
- b) New local sources, including:
 - b.1) Private investment (hydroelectric projects in CR, brewery), including contributions from parastatal groups.
 - b.2) Additional user-fees (environmental fees in Heredia, CR, Juntas de agua in Central America), including user associations charges (Cauca Valle in Colombia)
 - b.3) Stricter regulation or collection of penalties for environmental services (existing or new).
- c) External sources, in the form of international grants (GEF, GTZ, SDC, IFAD, etc) and loans (World Bank)

More than 60% of local schemes reviewed are receiving funds from the private sector. Fundraising from additional (environmental) user fees is used in 40% of the cases, and it has the advantage of being relatively easy to collect when water charges already exist, and being small enough to be acceptable by the end users. International sources are important sources of money, especially in national-level programmes where seven out of 12 of them are using grants and loans (especially in Central America) to set the programmes going (Figure 11).

Figure 11. Sources of funding in local schemes and national programmes



Unfortunately, the relative importance of the contributions from each sector is not shown in this figure, and not enough information was obtained to specifically compare their weight within projects. However, in most cases where information existed, the private contributions were relatively small compared to the other sources of funding such as donors or public resources. Nevertheless, these contributions provide an idea of the relative sustainability of the initiatives, as most external funding is seen as ‘transitional’ rather than open-ended (Hartmann and Petersen, 2004).

a) Re-allocation of (national or local) government budgets

Reallocation from central government is the main source of income in all the national programmes (except for the Philippines watershed fund and Ecoservicios in El Salvador, which theoretically rely on raising funds from the private sector). National level projects, like the PSA in Costa Rica or the PHSA in Mexico, have annual government budgets allocated for payments for environmental services. In Costa Rica the main source is the 3.5% of collections from a 15% tax on fuels. In Mexico it is approximately US\$20-30 million per year.

Local municipalities have also taken an active role in these markets and can become a key player demanding watershed services in representation of the community. They are regular sources of money in 41% local schemes and 17% of national programmes. In many of these cases, funding comes from general annual budgets and it is the product of strong negotiation and leadership. In Brazil, for example, the municipalities in the watersheds of the rivers Piracicaba, Capivari and Jundiá (PCJ) formed an Inter-Municipal Basin Committee to manage a watershed protection fund, formed by contributions from the company's profits and not an extra charge on water users. In other cases, the municipality raises funds through user-fees, transferring the cost to the final users.

National programmes often support existing local schemes. For example, the Coatepec Municipality in Veracruz launched a Water Trust ([Fideicoagua](#)) in 2002, and purchased 107 hectares of land in strategic riparian areas for conservation and study. Funds from the national PSAH have allowed them to launch a reforestation campaign of 6,500 ha in the cloud forest area. In [Valle de Bravo, Mexico](#), a private NGO (Pro-Cuenca Valle de Bravo) began in 2000 to gather voluntary contributions to finance projects aiming at conservation of the forests and rivers of the region, and also access funds from the national PSAH. In most of these cases, however, the bulk of the funding comes from national budget allocation, raising doubts about their long-term sustainability once national funds stop.

b) New sources through private investment

The response from the private sector has been slow in terms of actual commitment of significant funds. There is however growing interest in demonstrating the ‘business-case’ behind investments in land-use improvements upstream, and it is hoped that this will result in higher levels of commitments. So far, the contributions from the private sector (including parastatal groups) come in the form of voluntary contributions or expected premium-based strategies, although it is expected that stricter regulation enforcement (from existing and new laws) can result in increased downstream funding.

Probably the most common way for companies to decide their payment levels is an internal, [voluntary decision](#) based on their own willingness to pay. Almost one third of

local schemes receive funding from private and parastatal companies, and 40% of national programmes have entered agreements for co-funding with these groups. In most of these cases, funding comes from the company's profits rather than transferring the cost to the final consumers, and is usually registered as 'donation' (many tax-free) in their annual budgets.

In the Philippines, the [Kanla-on](#) Spring Water Plant (KSWP) draws spring water whose headwaters can be traced to the innermost strict protection zone of the park. Their business depends on the maintenance of the water quality in the watershed. The company fears that continual degradation of the forest is resulting in losses, and is investing in reforestation and local training. In all the hydroelectric projects in Costa Rica, funding for payments comes from the general company's budget, since prices of energy are externally determined and cannot be passed unto final consumers unless the (external).

There are also expectations that [retail-based trading](#) will increase downstream availability of funds by tapping into consumer's willingness to pay for environmental-friendly products. In the case of watersheds, payments for watershed protection are attached to existing consumer purchases. This mechanism usually requires certification and labelling from a trusted (independent) group to generate consumer recognition and encourage willingness to pay. A proposal for organic agriculture in Bhoj, India, depends on the possibilities of farmers entering niche organic that will either guarantee a higher price or at least a special market for their produce. There are no ongoing examples of watershed services in developing countries relying on retail-based trading for funding.

Although retail-based trading might not necessarily result in higher prices, it can be a strategy to expand market share. Even if this is not being explored in developing countries, it still represents a potential source of revenues that tap's into consumer's willingness to pay for a good cause (for example, a retail strategy from the brewery [La Florida](#) in Costa Rica promotion of "the environmental beer of Costa Rica").

Watershed services are frequently offered at a standard rate for different beneficiaries through [user fees](#), thereby transferring the cost of environmental protection to the final user. This is a common system used by 40% of local schemes and 17% of national programmes.

User fees can be determined as a percent of the final water bill (for example, 20% of water in [Pimampiro](#), Ecuador, or 5% in [Cuenca](#), Quito), or a flat rate per cubic meter (1.90 colones/m³ in the [ESPH](#) in Heredia, Costa Rica). In [Zapalinamé](#), Mexico, water users can select the payment level they want, with contributions varying from 1-1000 Mexican pesos per month. The majority of users (88%) pay less than 6 pesos/month. Once the amount is chosen, the extra fee appears in the monthly water bill.

Some user fees are introduced after consultation with local population to establish willingness to pay, but their final amount is more a reflection of the policies of the water utility and the costs of watershed protection. In some cases they are ultimately determined by an independent regulating authority (such as the case of the ESPH in Heredia, Costa Rica), or are the product of intense negotiation of local stakeholders reaching a "politically-acceptable" level (for example, the municipality of [Jesus de Otoro](#) in Honduras).

Additional water fees will tend to work in situations where water charges already exist. This is important in order to avoid situations where water charges are seen as politically inappropriate (for example, water is considered a right), and an environmental fee is perceived as a "first step towards water charges" (Robertson and Wunder, 2005). A clear

example of this is in [Tarija](#), Ecuador, where despite evidence of downstream willingness to pay for watershed conservation, the authorities refuse to accept the creation of the users charge.

Box 6. Introducing user fees in Pimampiro, Ecuador

Some markets for watershed services are based in externally imposed [regulations](#) and requirements. Although this is mostly the case in developed countries where environmental regulations are stricter, the interest is growing in developing countries. Market-based strategies are used to help companies reach environmental targets while reducing costs of compliance. In developing countries, regulation is mostly used to determine downstream contributions. For example, a new law in Costa Rica (*Canon del Agua*, approved in February 2006, but not yet applied) will enforce compulsory payments for all water users (including irrigation and hydroelectricity). Current payments levels for water are very low and they do not even reflect delivery costs. Approximately 20% of new funds collected will be transferred to FONAFIFO to be channelled as payments for environmental services in the watersheds where they are originated. Similarly, in The Philippines, hydroelectric companies pay a fee for watershed protection. These funds are not earmarked and therefore the link user-provider is weaker.

c) Grants and loans from [international groups](#)

There are many initiatives of payments for watershed services that are prompted and supported by international donors. This review has identified 20% of local schemes and 60% of national programmes using donor funding either for payments or to develop payment mechanisms. In theory, in many cases funding is only used to provide a kick-start in the project and support the very high setting-up transaction costs. In the practice, it is questionable whether many of these initiatives will manage to raise enough local funds to be self-sustainable in the long-run. **BACK THIS UP WITH EVIDENCE.**

Donor funding comes in different forms. For example, the Costa Rica's [PSA](#) has received several substantial grants from international donors. These funds, rather than being treated as 'donations', are perceived as investments for conservation of biodiversity and target particular areas of interests identified by the donor. In [Pimampiro](#), an initial donation of US\$15,000 from international donors helped set up a trust fund for their payments for environmental services, and this money is kept as a "stock". Money flows to make payments comes from water-fee collections from the municipality. The [Los Negros](#) project in Bolivia has covered all their initial transaction costs and payments (in the form of beehives) to farmers from international donors. It is only recently that the local municipality has begun contributing to the ongoing costs of the project.

Table 6. Environmental Service schemes with support from the World Bank, GEF and German cooperation

Country and region	International cooperation contribution (US\$ millions) ⁽¹⁾	Description
Costa Rica (Ecomarkets)	World Bank: 32.6 GEF: 8	Effective 2001. Supports PES programme (German cooperation focusing on

Country and region	International cooperation contribution (US\$ millions) ⁽¹⁾	Description
	KfW: 12.7	reforestation in northern region)
Silvopastoral Ecosystem Project	GEF: 4.5	Effective 2002. Piloting PES to promote adoption of silvopastoral practices
South Africa: Cape Action Plan for the Environment	GEF: 9	Effective 2004. Uses PES to conserve the Cape Floristic Region.
Mexico: PSAH	World Bank: 45 GEF: 15	(Approved in March 2006) Will strengthen and increase efficiency of the country's PES system and develop new financing sources
Kenya: Agricultural productivity and sustainable land management project	World Bank: 4.1 GEF: 4.5	Will pilot use of PES to reverse land degradation, and promote income-generating activities for rural farmers and to contribute to improved rural water quality. ICRAF provides technical assistance.
Costa Rica: mainstreaming market-based mechanisms for environmental services	World Bank: 30 GEF: 10	(Under preparation) Will ensure long-term sustainability of the PSA programme by developing new financing sources and improve the programme's efficiency
Venezuela: Canaima National Park Project	GEF: 11	(Under preparation). Will use payments from HEP producers to support conservation of Canaima national park.
Panama: Rural poverty and Natural Resource Management II	GEF: 6	(Under preparation) Will use PES to improve biodiversity conservation and generate water services
Honduras, Biosphere Reserve Rio Platano	KfW and GTZ ⁽²⁾ : 11.5	Shade-grown coffee, improved cattle pastures. Other agencies: Corporación Hondureña de Desarrollo Forestal.
Colombia / Rio Magdalena Watershed	KfW ⁽²⁾ : 28.1	Reforestation, protection of existing forests, sustainable forest management. Working with Federación Nacional de Cafeteros de Colombia.
Ecuador / Cordillera Chongón-Colonche	KfW ⁽²⁾ : 9.6	Reforestation, enrichment planting, shade-grown coffee and cocoa, improved pastures and communal forest control. Together with Fundación Natura.
Ecuador / Biosphere Reserve Gran Sumaco	GTZ, KfW ⁽²⁾ : 9.6	Shade-grown coffee and naranjilla, improved pasture, reforestation. Together with Ministry of Environment.
Peru / Jaén – San Ignacio Bagua	GTZ, KfW ⁽²⁾ : 6.4	Shade-grown coffee and cocoa, reforestation. Together with Instituto Nacional de Desarrollo, and a local project in San Ignacio.
Paraguay / Central and Eastern Region	KfW, GTZ ⁽²⁾ : 9.6	Soil conservation, reforestation, natural forest regeneration.
Dominican Republic / Alto Rio Yaque del Norte Watershed	KfW, GTZ ⁽²⁾ : 8.9	Reforestation, shade-grown coffee. Together with the Ministry of Agriculture and DED.

Notes: ⁽¹⁾ World Bank financial assistance is in the form of loans and GEF and German cooperation through grants. ⁽²⁾ Except for the Costa Rica project, none of the projects supported by German cooperation are explicitly called "PES", although they refer to payments to change land uses. In these cases the PES-type component is integrated into a broader conservation or forestry programme. Sources: World Bank, Environmental Economics and Indicators Website and Hartmann and Petersen (2004).

5.3.2 How are payment levels determined?

Markets for watershed services involve two types of payments: those *paid* by stakeholders interested in the watershed service (direct users, municipalities, government, international donors, etc), and those *received* by the service providers (private landowners, public lands, etc).

Although there are several attempts at assessing the value of the environmental service for the end user, most contributions are voluntary and come from several sources and not necessarily direct users (see Figure 11). Payment levels for upstream landowners should reflect, at least in theory, the economic value of the environmental service. In the practice this is very difficult to measure, and the best alternative is to estimate farmers' opportunity cost of economic activities forgone (Pagiola, *et al*, 2004). For example, payments in the [Silvopastoral project](#) are set at slightly more than this opportunity cost. The basic premise is that if payments are lower than the opportunity costs of land, farmers will have an underlying incentive to break the contracts and switch to other activities. Many schemes use this as an implicit or explicit guide to the payment levels (Pagiola, *et al*, 2004). At the same time, if payments are too high there is a risk of encouraging activities otherwise not profitable, where farmers will engage while payments exist but revert to previous activities once payments stop.

In [Mexico](#), the government led programme has determined an annual payment of approximate US\$30/ha for rainforests, and ~US\$36/ha for cloud forests. These amounts have been determined by the government based on the opportunity cost of use of the land, assuming that earnings from corn production would be the alternative activity on the land. The higher payment on cloud forests reflects the perception on better and more water service from these types of forests. The opportunity costs vary across the country. In Sierra Gorda, for example, soil fertility is low and the payment more than pays for the opportunity cost of the reduction in grazing opportunities (Bayon, 2004).

The value of the compensation is not necessarily linked to the opportunity cost of the economic activity forgone. For example in [Los Negros](#), Bolivia, the rewards in the form of beehives (per hectare) correspond only to 2-10% of the opportunity cost for setting aside land (Robertson and Wunder, 2005). Reported net-income per hectare in the project [Jesus de Otoro](#), Honduras, are also much larger than actual payments (US\$4-16), and claim that a 'fair' compensation should be approximately US\$30/ha/yr. In both cases, the main reasons for joining the PES schemes were probably not only financial, but ways to secure land rights.

Some schemes decide their payments levels according to how much money they have and what is their target area. These projects experiment with an initial "*take it or leave it*" approach, and it is useful when funds are limited and opportunity costs of land or payment expectations are more or less known. For example, in [Pimampiro](#), Ecuador, the municipality raises approximately US\$500/month from user fees. The target area for protection is approximately 640 hectares of land (almost half is primary forest). Simple rules determined monthly payments levels of US\$1.00/ha for undisturbed páramo or primary forest, US\$0,75/ha for old secondary forest and 0,50/ha for new secondary forest.

Sometimes expected payments are determined by the existence to previous subsidies (for forestry or agriculture), and this becomes a starting-off bias point for future payment levels. For example, payments for environmental services from reforestation projects in Costa Rica are a continuation of previous forest subsidies. The amounts were justified on high expectations from future carbon markets (unmet until today), but in reality it was unlikely that anyone would engage for less than the previous subsidy. Also, determining

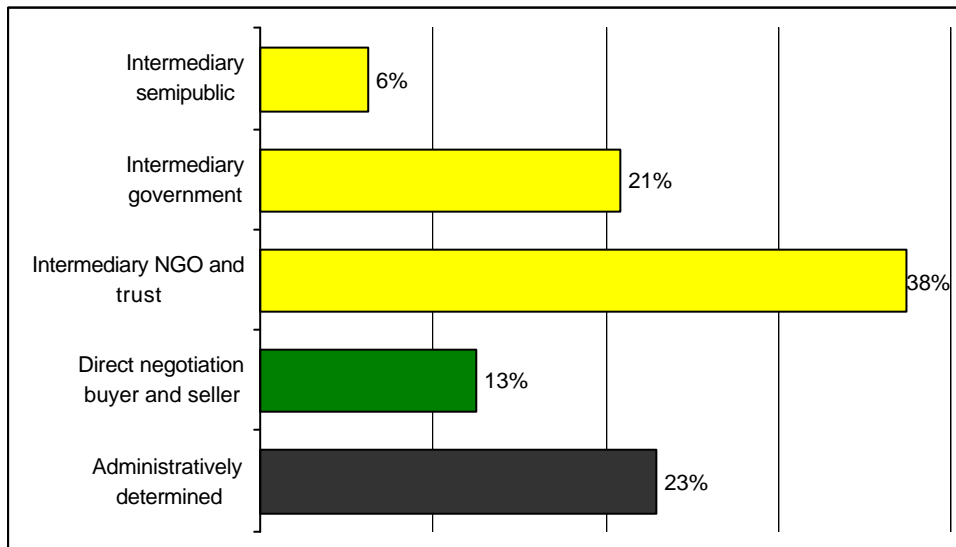
by Law a payment of approximately US\$50/ha/year for conservation has led to other projects using this as their initial reference point.

In general, it is possible to identify two basic types of mechanisms used for price discovery:

- a) Administratively determined (non-negotiable) payments.
- b) Negotiable deals through direct negotiation between sellers and buyers, negotiations through intermediary and trading systems (including auctions).

It is not unusual for schemes to have a combination of price discovery mechanisms. For example, in the case of the national PSA programme in Costa Rica, although payment levels to providers are administratively set for the national programmes, payments from water users are the product of important negotiations with the intermediary. Many of these national-level intermediaries work alongside local facilitators, who help to bridge the final gap with local farmers and water users.

Figure 12. Mechanisms for price discovery in local schemes



a) Administratively determined (non-negotiable) payments

An authority, usually the government, can determine payment levels. In these cases, bargaining power by farmers or water users is limited. In the case of farmers, they can voice their willingness to accept by choosing not to join. This potentially can send signals back to the authority to adjust their payment levels. This type of payments is mostly used in national-level strategies.

There are 21% of local schemes where the payments, especially those to farmers, are [administratively determined](#) by an external authority, leaving little room for negotiation. For example, in [Pimampiro](#), Ecuador, the municipality and the local NGO designing the project determined payment levels. The formula was simple: available monthly funds collected from user fees divided by the total area they wanted to target. Payments were slightly adjusted by the degree of degradation. For example, primary forests and páramos get \$1 per hectare, while intervened landscapes receive less than that (Echavarría *et al*,

2003). Valuation studies done several years after the project was implemented provide more formal support for the use of those values (Ordóñez and Puglla, 2004).

All payment levels in national programmes are administratively determined. The only exception is in the pilot project [Ecoservicios](#) in El Salvador, where the government negotiates with local stakeholders. In most cases, the government decides payment levels. For example, all payments to farmers in Costa Rica are determined by FONAFIFO, although the contributions from downstream users are the product of negotiation with particular users.

b) Negotiable deals

‘Simple’ mechanisms like [direct negotiations](#) actually involve detailed contracts outlining land management practices in exchange of agreed amounts of money (cash or in-kind). There are relatively few cases of direct negotiation in local schemes (13%). They are mostly used in situations when there are few stakeholders involved and/or are capable watershed programme already exists, and presumes a certain degree of negotiation between sellers and buyers.

INCLUDE one box with example from either of these: Cauca Valley, Makiling, La Esperanza, Lake Toba, Bhodi-Suan Nala, San Pedro Norte (PASOLAC).

The majority of ongoing local schemes rely on negotiations through [intermediaries](#) (65%) for price discovery. NGOs and trusts are the most common category (38%), followed by government (21%) and a mix of private and -public entities (6%). As explained before, this category assumes some degree of negotiation between buyers and sellers when reaching consensus over prices. In [Los Negros](#), Bolivia, important negotiations were conducted through the NGO Natura with farmers and downstream users to establish the “exchange rate” of beehives for forest, finally agreeing on 10 hectares of primary forest, but also allowing for different amounts for intervened forests. MAYBE ANOTHER EXAMPLE HERE?

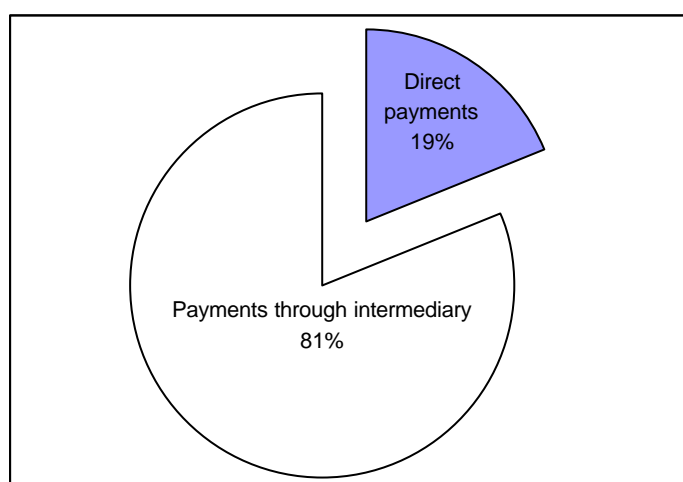
Most sophisticated methods for determining payment levels include auctions. More popular in developed countries such as USA or Australia where controls are stricter, they have not been used so far in developing countries. An auction system will ask farmers to bid for payments depending on their own opportunity cost, and will result in differentiated payment levels across the target area. The next section discusses auctions in more detail.

5.3.3 Mechanisms for transferring and managing funds

Once payment levels are agreed, it is important to establish the best way to manage and transfer funds among stakeholders. These mechanisms vary according to their degree of complexity. Simpler mechanisms are direct payments from buyer to seller and internal trading. Trust funds are increasingly used and quite popular in Latin America.

Mechanisms for transferring funds include:

- a) Direct payments from buyer to seller
- b) Payments through intermediaries (including trust funds)
- c) Trading systems: “Over-the-counter”, clearing-house, retail-based trading, trading platforms and auctions

Figure 13. Transferring funds from buyers to sellers**a) Direct payments from buyer to seller**

Service users can make direct payments to the providers. Usually the product of direct negotiations, direct payments take place when there is few participants, especially one main downstream user. In these cases, the user has the financial and technical capacity to administer payments. For example, the [ESPH](#) in Costa Rica, a private water utility, collects payments from end-users through an additional environmental charge in their water bills. Before they embarked in payments for environmental services, the company already had an environmental department in charge of monitoring and linking up with local communities. When the programme was established, it only required the creation of a separate fund to allocate earmarked revenues. Payments are subsequently transferred from the fund directly to the farmers either through a bank account.

b) Payments through intermediaries (including trust funds)

An intermediary is good for collecting payments from water users in [pooled transactions](#), when the existing water user does not have the financial ability to manage the payments, or they simply do not have the inclination of engaging in the activity. For example, the CNFL in Costa Rica has several hydroelectricity projects. They rely on the national intermediary FONAFIFO to allocate payments to farmers and manage the programme for them rather than engaging in activities that are not the objective of the company.

Trust funds are mechanisms used to receive and manage funds for a broad thematic purpose as opposed to a specific project. Trust Funds are separate accounting entities, with a designated trust fund manager, or Executive Coordinator. A trust fund can be used when payments come from different types of sources at different scales of time (for example, annual lump-sums, monthly payments from users, or one-off grants from donors), and for making payments to a range of watershed activities. It is also helpful to pool together funds for different types of environmental services (for example, water and biodiversity conservation). A Trust Fund provides long-term financing; and provides a useful transparent platform for public, private and international participation interested in environmental services. However, they require substantial up-front investment. In most on-going trust funds, this initial sum of capital comes from an international donor, although in the case of [Quito](#), Ecuador, the Fund was established by users payments and left to capitalise for several years and the revenues generated by interests are used to fund watershed conservation activities.

The fact that a Trust Fund is a legal unit, with separate status and bank accounts and potentially long-term viability, can be useful to improve trust among stakeholders. On the other hand, it is important to highlight that while highly attractive, establishing a trust fund could entail long and complicated legal issues, and the intermediary must either have the capacity to coordinate this effort, or should be able to hire the required experts to do so. Wunder and Alban (2005) warn that keeping funds in a Savings Account rather than a Trust Fund with legal restrictions could potentially be a threat for the long-term viability of the schemes (Pimampiro, Ecuador).

Several small payments for environmental services pilot schemes taking place in Honduras, El Salvador and Nicaragua, and coordinated under the PASOLAC regional programme, are creating Environmental Funds as their main intermediation mechanism (Fund for Environmental Services). Seed funding is provided by SDC (through their local offices CONDESAN) for capacity building, initial studies and negotiations among stakeholders. The Fund is supported by the creation of a Municipal Law (*ordenanza municipal*) made to specify changes to tariffs, additional fees, or fund allocation to the bank account. This Law establishes how the fund will grow, managed, how contracts are drawn and with whom, as well as administration of monitoring and sanctions. Downstream users, mostly municipalities or water boards, contribute to the Fund through additional water fees, or direct lump-sums of money into the bank account. Although PASOLAC is currently supporting approximately 12 of these initiatives, most of them are at a very early stage (Perez, 2004).

c) Trading mechanisms

Trading mechanisms include [over-the-counter](#) (OTC), [clearing-house](#), [retail-based trading](#), trading platforms and [auctions](#). In **OTC transactions** the service is "pre-packaged" as a commodity for sale (water quality credits, park entrance fees and carbon offsets). In developed countries, watershed services are frequently offered at a standard rate for different beneficiaries through user fees. This rate is normally not negotiable and imposed on all beneficiaries.

While most watershed service agreements will support cooperation among stakeholders as ways of reaching negotiation and ensuring minimum threshold, other mechanisms seek to introduce competition, for example, when funding is limited. This spectrum of mechanisms includes internal trading (taking place within an organisation or different government sectors); clearing-house transactions (offering a central platform for buyers and sellers to exchange a pre-packed commodity), and auctions (which move a step closer to a competitive market by allowing buyers and sellers to bid for the environmental service).

These systems take place mostly in developed countries. They are still largely immature, and require an existing respected authority to establish initial regulations and discharge targets (caps). For example, watershed-based trading emerged in the USA with the publication of a draft framework in 1996 (EPA, 1996). The framework builds on the Clean Water Act (1972), which determines the maximum pollutant loading capacity consistent with federal water quality standards which are then allocated within states between point and non-point source discharges (Landell-Mills and Porras, 2002). Trading schemes are designed to help states meet these targets in a cost-effective manner by allowing opportunities for offsetting point source pollution with non-point source

reductions, such as agricultural best management practices. Another example is the Environmental Service Investment Fund in New South Wales, Australia, which manages salinity credit trading through a clearing-house. The Fund supplies credits to buyers, and purchases credits from landowners. An auction format seeks to channel payments to the most-effective salinity reduction measures. Auctions require landowners to compete in terms of the number of credits they would offer for a given price. The Fund also provides an accreditation service to minimize risk for buyers (Landell-Mills and Porras, 2002).

Although the use of cap-and-trade has been rather limited in watershed services, there are many examples of this type of market mechanisms used for natural products such as fisheries (MacGregor, Karousakis and Groom, 2004) and auctions for wildlife products (see Box 7).

Box 7. Auctions for wildlife products

The main points from trading approaches are:

- For market-based trading approaches to work, there must be a history and acceptance of regulation prior to engaging in participative or voluntary approaches (Shelton, 2005).
- Heterogeneity: trading schemes must reflect differences in outcomes, management options, cost structures, goals, financial and farming structures, and preferences to realize gains from trade;
- A significant number of participants need to allow for price-discovery and prevent collusion;
- Overcoming opportunity costs issues. One of the main problems of establishing the price to pay for environmental service is the lack of information about opportunity costs. Opportunity costs vary in location, time, and the personal circumstances. Centrally-designed programmes, such as the PSA in Costa Rica, cannot take into account these variations and by using one single figure they might be overpaying farmers who would engage at a lower price, or they might not be creating enough incentive for farmers in strategically located areas. With an auction-based system, the government or authority sets a target, and landowners make decisions based on their own (real or perceived) opportunity cost when choosing their bidding levels;
- Asymmetric information. One of the main problems with auctions and trading schemes is asymmetric information. Farmers need to understand the trading game in order to maximise their potential gains, and they need to understand the land use activities necessary to deliver the service at the best price. This is a clear restriction in most developing countries. In the Wimmera case in Australia (Shelton, 2005), the auction system is unlikely to focus or benefit any disadvantage groups. The use of a flat rate is easier to administer and probably more fair in cases of asymmetric information. At the same time, when information is limited, it would be difficult to justify in a politically convincing way the existence of different payment levels.
- Bundling. Shelton (2005) suggests that in terms of project design, it is best to keep the ecosystem goals simple, as multiple goals will tend to require multiple actions

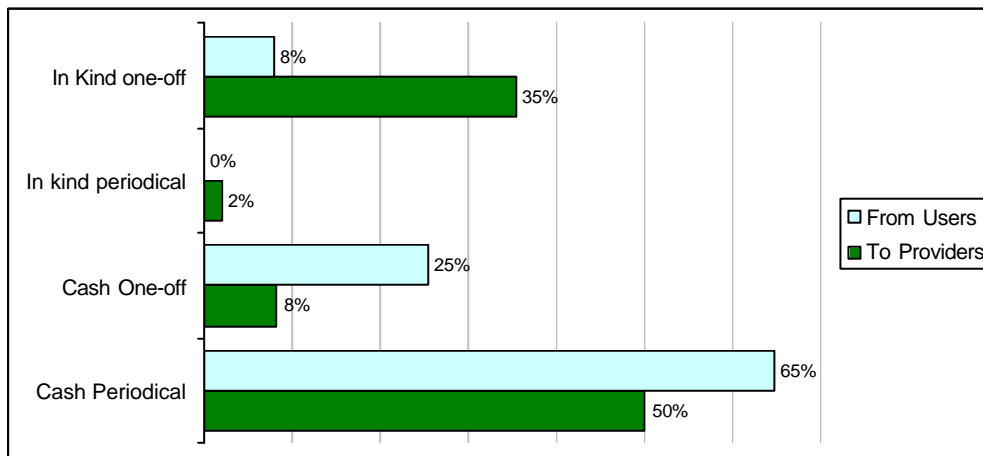
and this would complicate the system. The problem with this approach is that in many cases one service will not be sufficient to generate enough demand to pay for upstream investment.

- Trust. For the system to work there need to be a trustable authority behind the scheme, that provides the platform for exchange, channels payments from the service users to the different providers, monitors and administers sanctions in the long-term.
- Land tenure needs to be clear from the start, as well as tenure over the environmental service.

5.3.4 Unit and timing of payments

Payments can differ in unit (cash or in-kind) and timing (periodical or one-off) (see Figure 14). Almost 60% of ongoing local schemes make **cash payments**, most of them periodical³. The majority of periodical cash payments take place in Central America, and one case in Ecuador (Pimampiro). One-off cash payments were reported in only two cases in India (Kuhan catchment and Bhodi-Suan Nala), one in Indonesia (Brantas) and in the Maasin, Philippines. In the Maasin case organised communities were paid for the labour costs involved in reforestation. They were also given stewardship of land for 25 years (potentially renewable for another 25 years).

Figure 14. Types and timing of local schemes



Cash payments have several advantages. They provide an immediate, recognisable signal to the receiver, and the effect of non-compliance is easily understood and felt by the receiver (“*no service, no payment*”). A cash payment has the advantage of being easier to administer, and their potential economic gains are high by feeding directly into the family budget. The level of payment depends on the particular context. Ideally, payments should be determined by the real value of the environmental service. However, in most cases, payments are initially determined by how much funding is available, or by the

³ In theory ‘periodical’ refers to ‘open-ended’, ongoing payments. Although in the practice payments are established for the life of a contract, they are considered periodical if these contracts can be renewed if all parties are willing and able to do so.

opportunity cost of land, and then this figure is set up for negotiation with upstream stakeholders (see previous section).

Table 7. Examples of payment levels for watershed services (US\$/ha/yr)

Costa Rica		Ecuador	
La Esperanza HEP		Pimampiro	
During construction	\$3	Primary Paramo and Forest	\$12
Year 1 of operations	\$8	Intervened Paramo and forest	\$6
Year 2 of operations	\$9	Secondary Old Forest	\$9
Year 3 and 4 of operations	\$10	Secondary Young Forest	\$6
Year 5 and onwards based on formula 1			
Energia Global HEP	\$10		
CNFL	\$40		
Platanar HEP			
If property titles ²	\$15		
If no property titles	\$30		
Agreement CCR and ESPH			
Cerveceria CCR	\$45		
Heredia Water Utility (ESPH)	\$22		

1. $\$10 * (Gr/Gf) * (Tavg/Tbeg)$, where Gr: real energy generated during the time period, Gf is the forecasted energy production for the time period, Tavg is the average power tariff (US\$) paid through the time period, and Tbeg is the tariff (US\$) paid for the energy generated on the first day of the time period.

Table 7 presents some indication of payment levels in Costa Rica and Ecuador. Notice that in the Costa Rica case, the amount represents the money paid by the water user, not the final amount received by the landowner, who receives an average of \$40/ha for conservation. This amount includes payments for all the other environmental services. It is also important to note that while the payment levels for the Pimampiro initiative are significantly lower, the actual payment levels represent approximately 20% of the household budget for the families involved (Echavarría *et.al*, 2003). The structure of the payment is key. For activities like conservation, an even payment through time is fine. But activities like reforestation for salinity control will require large up-front investments and payments tend to reflect this situation. Monitoring from a trusted organisation, and the applications of sanctions, is key for investors as ways to minimise risk from their investments in these land use activities. In Australia, for example, the response effects are expected to be visible in 10-30 years.

Sometimes cash payments might not be enough to engage upstream landholders. For example, participation of private landowners in the PSA in Monteverde, Costa Rica, is rather limited. A study in the area (Porrás and Hope, 2005) indicates a rather inelastic response to payment levels fuelled, among other things, by suspiciousness of the government motives (see **Error! Reference source not found.**). In situations like this, **in-kind transactions** might be a good alternative.

In-kind transactions are being used 35% of ongoing schemes, and are primarily located in Bolivia, Ecuador, Indonesia, India and China.

Only in one case in-kind payments are periodical. The Los Negros scheme in Bolivia gives one artificial bee box (and apiculture training) per year to each Santa Rosa landowner who agrees to set aside 10 hectares of primary forest for conservation.

Contracts are renewable on an annual basis. In most of the cases, payments are one-off and in the form of support for watershed conservation projects upstream. Some examples of in-kind payments are:

- Bolivia ([Tarija](#)). Farmers living within the Sama Reserve are able to participate in conservation activities, like reforestation and fire control. About 25 communities live inside the reserve, with a total population of 4000 inhabitants.
- Brazil ([CPCJ](#)). Farmers living along riverbanks in targeted areas receive a reforestation plan (including approval of the relevant environmental authorities and technical assistance) and (native) tree seedlings; plantation and maintenance are responsibility of the landowner; there are no further incentives given after this initial phase;
- China ([Meijiang](#)): Orchard investors are able to lease land from small landowners through a village committee. The investors make significant profits in establishing the orchards, and they have obligations to conserve the hilly land and prevent soil erosion as a requirement to access the lease. The government can provide one-off subsidies to help with the soil and water conservation practices.
- Colombia ([Funegue](#)). The transition costs to organic agriculture incurred by small farmers are paid through loans from commercial banks. The 'PES-type' incentive to farmers is in the form of a Fund, which serves as guaranty (for 10% of the debt) for the loans.
- Ecuador. Payments to upstream farmers are made in the form of loans and technical advice to farmers on the middle part of the watershed to help them increase their water use efficiency ([Cuenca](#)), community projects ([Ambato](#)), and financial support for watershed conservation projects ([FONAG](#)).
- Guatemala ([Sierra de las Minas](#)). Best management practices and conservation projects with farmers in buffer areas of the Sierra de las Minas National Park are financed through training and capacity building. The project aims at providing cash payments at some stage if enough funding is raised.
- Honduras ([Campamento](#)). Technical assistance to farmers for improved agriculture methods (especially coffee), as well as community projects and installation of latrines to deal with human waste.
- India ([Sukhomajri](#)). Upstream villages refrain from allowing their animals to graze on the watershed hills (in order to maintain vegetation cover for soil protection). As compensation, villages receive access other pasture areas, construction of rain water collection dams that improved water supply to the village and attribution of water use rights to all households within the village.
- Indonesia ([Sumberjaya](#), see also Box 8). Best management practices through community agroforestry in exchange for land tenure for 25 years, with a trial period of 5 years; plus multipurpose tree seedlings provided by the Forestry Service. RUPES is also testing an additional direct financial payment and/or in-kind payment from management of hydropower company and domestic water users
- Pakistan ([Mangla Dam](#)): Farmers living above the Mangle Dam receive technical assistance and other inputs for the construction of soil and water conservation structures upstream from the dam reservoirs. Farmers contribute the equivalent to 30% of labour costs.
- Philippines ([Mt Kanla-on](#)). Agroforestry activities with farmers living within Mr Kanla-on Park aiming at stabilization of riverbanks and soil conservation measures to arrest soil erosion in the recharge area for a spring water plant. In-

kind payments made through tree-saplings, two nurseries and reforestation with 100,000 fruit and timber trees. Farmers also receive technical assistance to adopt sustainable agroforestry practices such as SALT (multi-storey, rock walling and use of organic fertilizers).

Situations in which in-kind transactions (as opposed to cash payments) might be useful include:

- There is strong opposition to the term "market", and cash is directly associated with it;
- Cash payments could be culturally unacceptable;
- There is fear that direct cash payments could cause frictions within the upstream communities;
- Upstream groups might be more interested in other benefits, such as improved roads;
- Cash is not the traditional exchange unit in the upstream communities;
- It is perceived that the land use improvements could be better achieved by targeting skills and efficiency rather than by making payments;

Box 8. Social Forestry in Indonesia – Kerr...

5.3.5 Summary and conclusions

Following a purely economic principle, environmental service programmes should try to maximise the amount of environmental benefits per dollar spent by carefully selecting payment levels to farmers. Paying for the value of the environmental services is a fairer but rather non-practical option, given the limited available information. In the practice, most schemes pay a flat rate per type of land use based on the opportunity cost of land (the PSA for conservation in Costa Rica pays the opportunity cost of renting out the land), or a proportion of the costs of engaging in a new land use activity (such as reforestation). Newer schemes are trying to introduce different levels of service provision in the price-determination (for example, the Silvopastoral project or Ecoservicios in El Salvador). Until now, no major efforts other than theoretical have been made to move to a more efficient method that includes risk of land changes or differentiated opportunity costs for farmers.

A key challenge for markets for watershed services is the identification of critical areas. This potentially means differentiated payments that reflect a) the risk of loss of watershed services; b) the geographical location of the provider (i.e. riparian areas are more sensitive for sediment discharge); c) the opportunity cost involved in switching activities. This will require the move from the “first-come, first-served” approach to a more science-based approach. Hydrological maps can be overlapped with risk-prone areas, and socio-economic studies can group farmers according to their location, willingness to engage, and required compensation levels (see Hope, *et al*, forthcoming).

When it comes to determination of payment levels, ongoing experience suggests that payments are not economically determined by the (theoretically) combination of supply

and demand. Instead, they are the results of negotiations. Kosoy *et al*, (2005) call these prices “tips, supports, or social recognitions” of the adoption of good practices by upstream landholders, who are anyway more or less socially (and morally) obliged to do so.

Making payments for environmental services tend to work either when the value of environmental service is high and the cost of provision is low (for example, there are limited threats to the critical areas upstream, which results in lower opportunity costs of land). However, according to the UNISFERA report (CITATION HERE), payments can also work when both value and cost is high, as long as the payment exceeds the cost of provision. In the practice this is more difficult for watershed services, where downstream contributions remain fairly modest and face potential problems when dealing with higher value activities that raise the opportunity cost of land, such as urbanisation (for example, the ESPH in Costa Rica).

Payments should in theory be open-ended and linked to a continuous provision of environmental services, subject to compliance (UNISFERA report). Half of the cases reviewed make cash, on-going payments to farmers, mostly in the case of conservation of existing ecosystems that do not produce alternative income to the landowner (i.e. PSA for conservation in Costa Rica and Mexico, and payments for protection of altiplano forests in Pimampiro, Ecuador). Payments can also be seen as transitional incentives to switch to improved land management practices that will result in better and sustained future incomes. This option is preferred by donor agencies, such as the German Cooperation (Hartmann and Petersen, 2004). Pagiola *et al* (2004), suggest making payments slightly higher than the opportunity cost of land, and lower than the total cost of investments in land practices. In this way, the farmer has an added incentive to keep up the investment in the longer term.

Most payments are allocated through intermediaries (80%). Direct trading mechanisms like over-the-counter transactions, clearing house and auctions are more sophisticated methods to allow price discovery in a more competitive way. Landell-Mills and Porras (2002) reported the use of these mechanisms in emerging schemes, almost all of them located in developed countries. These mechanisms are not being used in developing countries at the moment. The only exception is the Certificates for Environmental Services (CSA⁴) in Costa Rica, sold as an over-the-counter (OTC) commodity.

⁴ This new mechanism is the Environmental Services Certificate (CSA, in *Spanish*). Each certificate has a \$300 face value and is valid for five years. It guarantees the protection of one hectare of forest located in important water catchment areas (including forest fires prevention). FONAFIFO (2005), website.

5.4 Legislation

- ‘Stream-flow reduction’ in South Africa is a commodity easy to understand in a context of water scarcity. An added advantage is the strong scientific evidence backing the linkages between land use and water. However, legislation has not managed to accommodate the proposal and it is still not clear whether additional water rights can be sold or bought. **Maybe move this to mechanism.**

6 Impacts of the initiatives

(Address different types of impact: environmental, social, economic by looking at costs and benefits (financial and non-financial) for different groups)

valuation studies. Some of the schemes reported valuation studies to understand willingness to pay and accept. Given the limitations in data collection for this review, it is impossible to say with certainty in how many of the cases this valuation studies contributed to the determination of the final payments.

FONAFIFO has transaction costs of 7% of its annual budget. Intermediaries, such as FUNDECOR or CODEFORSA, charge between 12-18% of the payment to cover all their expenses (including technical support). The ESPH has managed to keep transaction costs down by incorporating the environmental service unit into their regular work. The key rule here is to build on existing capacities, and avoid unnecessary expenses (such as office supplies, cars, etc).

6.1 Social and economic costs and benefits

Maryanne.

6.2 Environmental costs and benefits

Ina

7 Conclusions, lessons and recommendations

Key lessons are drawn on:

- The negotiation process: understanding providers, and demand.
- Lessons on facilitators
- Insights on the overall legislative and institutional framework
- Trade-offs
- Science and perceptions

7.1 The negotiation process

7.1.1 Understanding the providers

1. Developing a social baseline

A clear description and basic understanding of the social baseline in the impact area will help develop the site-specific approaches that will result in higher participation and impacts (Maasin, Philippines). It is important to remember that social disparities in the groups involved can make the definition of uniform criteria a difficult task (Ambato, Ecuador). Stratified control groups, as the ones used in the Silvopastoral project, are useful to understand what changes can be attributed to the project.

2. Size and institutional capacity matter

It is easier to engage with few farmers (ICO, Bolivia), especially if they are well organised and more open to watershed conservation measures (Maasin and Makiling, Philippines). Pilot projects with small areas are useful to generate trust and as a learning process. However, small pilot projects will not likely manage to achieve threshold levels required to make a significant impact on watershed services (Jesus de Otoro, Honduras). However, specific punctual projects with successful results can become catalysts for regional development (Fidecoagua, Mexico; PASOLAC in Central America contributing to the shaping of national programmes in Honduras and Nicaragua).

3. Make the objectives of the project clear and easy to understand

It is important to clearly state the objectives of the deal, as they can be undermined by confusion regarding land regulation, privatisation or fear of expropriation for conservation (Los Negros, Bolivia; Cuencas Andinas, Sierra de las Minas in Guatemala). Cultural sensitivities about terms such as ‘payments’ or ‘markets’ need to be dealt from the beginning, avoiding changes mid-way. For example, changing the term from payment to ‘*improved management of hydrological resources*’ resulted in additional confusion, underscoring trust, and weakening the link between land management and environmental services (Los Negros, Bolivia). The weakening of this link can have negative impacts in ensuring participation. Farmers’ perceptions of payments ‘for poverty reduction’ can

tacitly result in lowering the importance of commitments to better land practices (Maasin, Philippines).

4. *Incentives to engage in better practices need to be clear, tangible, and cover opportunity costs*

Payments for environmental services represent a clearer incentive for better land practices (Hartmann and Petersen, 2004). These incentives need to be clear, and able to cover at least opportunity costs. Small pilot projects with limited funds may have a low impact on the income of providers, highlighting issues of fairness (Jesus de Otoro, Honduras), threatening with non-compliance once the scheme is up and running (Pimampiro, Ecuador), and overall creating a limited incentive to adhere to contracts in the medium and long term.

When payments cover the opportunity cost of land they result in reduced potential for conflict and increase participation (ICO, Bolivia; Sierra Gorda, Mexico). Critical recharge areas with high opportunity cost (such as urbanisation in the ESPH, Costa Rica) may need stricter regulation, such as zoning, accompanying payments for environmental services. In areas where natural resources are already degraded, payment levels have to compensate for potential losses in income from reduced-impact activities, as well as the cost of making improvements (Ecoservicios, El Salvador). However, in the practice the values for compensations are set arbitrarily, and not responding to economic valuation and demand analysis (Mayrand and Paquin, 2004).

A direct payment to the farmer provides quick benefits, instead of indirect impacts through the production function as a result of best management practices (Hartmann and Petersen, 2004). However, projects that promote this type of practices should pursue a benefit for the farmer beyond the payment for environmental service (i.e. Meijiang, China). Adaptation of the reforestation industry to fast-growing species (such as *melina*), and finding markets for small-diameter timber from forest thinning helps generate important income for small farmers (Costa Rica). Relative simple systems that produce recognisable, direct benefits can become catalysts for change in the longer term (Arvari, India). Investments in training and capacity building for farmers are useful to increase participation (Jesus de Otoro, Honduras).

Farmers can feel forced to participate in better practices through social pressure (especially in intra-community arrangements, such as ICO, Bolivia), or when there is a hidden risk of expropriation (Jesus de Otoro, Honduras). In both types of situations voluntarism is compromised, and the deals can be easily broken.

5. *Engaging with poor groups*

How watershed deals impacts poorer groups depends on several issues. In order to maximise the delivery of the service, projects need to target those areas that are more likely to have an effect. In some cases these areas are located closer to population centres, and are not necessarily inhabited by the poorer groups, who tend to be located in remote areas. Even if farmers live in these areas, they are usually scattered, and have significantly less access to information and capacity to administer a PES project. Their participation will be restricted, unless the project trades-off higher transaction costs to subsidise inclusion.

Payments for environmental services have limited effect where there is extreme poverty and lack of basic infrastructure (Fidecoagua, Mexico). But payments are also presented as

a potentially good tool for working with communities in sustainable forest and watershed conservation projects, helping them out of extreme poverty through direct cash inflows and improvement in social conditions to promote motivation (Fidecoagua, Mexico; *Ecological Compensations in China*; conservation payments in Osa, Costa Rica; Cauca Valley, Colombia).

It is difficult for small farmers to benefit. Small, less educated farmers tend to be excluded in national programmes, such as the PSA in Costa Rica (Zbinden and Lee, 2004). They might face additional limitations in the decisions over their land, such as mortgages or debts with informal lenders, even if they have property titles. Legal requirements, complex and expensive bureaucratic procedures reduce participation from small holders (PSA, Costa Rica). Conservation activities also require farmers to have 'spare' land to set aside. Reforestation activities demand a high level of initial investment beyond the level of the incentives, and the investment periods are long. Agro-forestry systems integrated in management of environmental services are a viable option for many small farmers (Rosa et al, 2003), as they provide short-term benefits in the form of crops and payments for environmental services, and long-term on-site benefits such as improved soil quality and timber.

6. *Gender issues*

Women are key decision-makers in the household, and are more willing to enter projects that will improve the chances of their children. They are however traditionally excluded from land ownership or capacity building processes, usually led by male facilitators (Fidecoagua, Mexico). Their participation in deals tends to be restricted, because culturally land ownership remains in the hands of the husband. In very local schemes, such as Pimampiro, Ecuador, an informal 'social monitoring' can take place making sure that the payment is assigned to the person living and managing the property, regardless of the title. Using this system project managers ensure that funds are allocated to the family household even in the case of divorce or separation.

7. *Political and civil unrest creates added instability*

It is difficult for farmers to engage in long-term initiatives in situations of civil unrest, although it is possible that they can co-exist, as it is the case of Colombia (Cauca Valley and Plan Verde). The schemes have survived through armed conflict, because it provided rural employment, involved local authorities, although it is possible that some of this money was extorted from communities (Cardenas and Rodriguez, DATE?).

7.1.2 **Understanding the business of the users**

1. *Institutional capacity of users*

Weak downstream organisation can slow down negotiations (i.e. irrigation groups in Los Negros, Bolivia, Ambato, Ecuador). The creation of user-associations is valuable investment in social capital and can be used for cooperation in other areas (Cauca Valley, Colombia).

In general, deals for watershed services are more likely to evolve faster when water charges already exist, as there is deep aversion to paying for water that is currently considered free, especially among irrigation groups (Los Negros, Bolivia).

Payments from end-users should be easily enforced and collected. One of the main reasons for success in the ESPH, Costa Rica, is that the scheme is easily enforced and monitored. End-users are well identified and metered, payments can be tracked on monthly basis; non-compliance of payments can be tackled through suspension of the service. In this way the company can identify a steady flow of funds (Luis Gámez, personal communication). Bad collection of funds is one of the main limitations of the Pimampiro scheme in Ecuador.

2. Water utilities play a very important role as representatives of end-users

Water utilities tend to be managed by local governments (municipalities), or as private (usually non-for-profit) enterprises. Publicly managed utilities depend on changing political will, which can easily change with different administrations threatening the long-term sustainability of the initiatives (Pimampiro, Ecuador).

In most cases, water utilities are able to create and collect additional charges for environmental services. Using additional funds from users, local municipalities are able to invest in protection of water sources, when traditionally they had to limit their role to treating water (Sierra de las Minas, Guatemala). The creation of these charges will be easier for water utilities already providing a good water service, with acceptable quality and distribution system (ESPH, Costa Rica). The participation of end-users can be active (Fideicomiso, Mexico), or restricted by limited consultation (El Imposible, El Salvador).

3. Conflict resolution can be a strong motivation to participation

Conflicts over water quantity can be particularly acute in dry areas, with extended dry season periods where local needs may clash with tourism places demanding larger amounts of water (hotels, swimming pools, golf courses, etc). Tourism companies might use 'payments' for watershed services as a way of dealing with 'fairness' towards water allocation (Conchal, CR), or to access water resources (such as building pipes in La Esperanza, Costa Rica).

Strong issues regarding declining water quality have been successfully dealt through payments for watershed services in Jesus de Otoro, Honduras, with downstream water users sitting down to discuss incentives with coffee producers upstream. The case of Arvari, India, illustrates that deals can be achieved in communal areas with high levels of mistrust and degradation, but the process is long. All decisions are made by the community, are strictly enforced and each person in the collective community is individually responsible to carry out the outlined tasks. Communities have to bear at least 25% of the costs of infrastructure.

Payments accompanying a command-and-control measure can reinforce each other, by increase resource use downstream and investing part of the avoided costs in non-point pollution upstream (Sierra de las Minas, Guatemala).

4. Commitments from downstream users are slow in coming and limited in amount

In most local schemes, present level of funding from direct downstream users is insufficient to ensure that required threshold levels are met (CPCJ, Brazil; Jesus de Otoro, Honduras; PASOLAC experiences in Central America; Zapalinamé, Mexico). The main reasons for these include:

- Lack of ‘endorsement’ from larger water user groups (i.e. large hydroelectric groups) restricts the potential for capturing sufficient funds (Fidecoagua, Mexico; Pimampiro, Ecuador). In Costa Rica this has been overcome through the creation of a new “Canon del Agua” which taxes all water users.
- Downstream users can take a “wait-and-see” attitude when an active facilitator exists, expecting them to obtain funds from somewhere else and solve the situation (Robertson and Wunder (2005) on Los Negros, Bolivia).
- Economic instability can result in reduction of membership in user groups and lower funds for investment (Cauca Valley, Colombia).
- Lack of ‘paying culture’ and free-riding makes it difficult to strike deals (Pimampiro, Ecuador; Mexico).
- Water users do not want to pay additional fees because the current water service is inefficient (Campamento, Honduras).
- Even if water charges exist, bad collection systems could result in lower than expected funds collected (Pimampiro, Ecuador);
- Political conflict over management and sharing potential benefits from collection of fees can delay or stop negotiations (Makiling, Philippines; introduction of the Canon del Agua in Costa Rica – pers.comm. with Alexandra Saenz, FONAFIFO).

5. Lack of information about impacts on production function reduces participation

In some cases, lack of environmental awareness can slow down deals (CPCJ, Brazil), or make the company see deals as public relations rather than company’s investment in risk mitigation (Sierra de las Minas, Guatemala). The first step in the FONAG-Ecuador scheme was to target the main water users for awareness through a short publication about the importance of the project, and how it would work.

Lack of adequate accounting of the contribution of watershed services in the GDP restricts the “business-case” potential of PES-type schemes (CR-PSA). Limited information sharing on the part of downstream industry for water valuation studies (Sierra de las Minas, Guatemala).

7.1.3 Determining payment levels and strategies

Final payment levels are the product of intense negotiations, usually through a facilitator (see Section 5.2.3). Payment levels are usually influenced by availability of funds or the opportunity cost of land, and tend to be a flat rate offered for all participants (Mexico, Costa Rica, Pimampiro).

Auction systems are good to reveal opportunity costs of participating in the schemes. However, this mechanism is commonly perceived ‘too innovative’ for developing countries because of uncertainty, risk aversion, administrative costs, lack of information,

etc. It is also perceived that it will result in further exclusion of small farmers with higher opportunity costs (PSAH Mexico, PSA Costa Rica). Clashes with the introduction of polluters-pay principle can be avoided by using ‘credits’ against own investment in soil and water conservation measures (proposed in Makiling, Philippines; *Canon del agua*, Costa Rica).

Making small increases in downstream charges have the advantage of being less opposed to, helping to establish the reputation of the scheme but limiting the collection of funds necessary to achieve threshold levels upstream (Jesus de Otoro, Honduras; Zapaliname, Mexico).

The use of a rotating credit fund (instead of direct payments) ensures that smaller amounts of money go further, reduces the implementation costs of activities; and reduces the expectation of ‘free subsidies’ from farmers (Cuenca, Ecuador; Myrada, India;).

Payments from downstream users linked to tax breaks and ability to choose allocation of funds could lead to abuse of the system. For example, in Certificates for Conservation have been bought by a private hotel chain (Reserva Conchal) and ‘invested’ in their own private reserve.

Using trust funds is useful to ensure long-term sustainability, but they can take many years to mature and provide enough revolving funds to support payments upstream (FONAG, Quito).

Trying to maximise the sources of funding is a useful strategy to ensure money flows that are sufficient and sustainable in time (Mayrand and Paquin, 2004). The main drawback of this approach is that it may result in general actions, rather than specific and targeted to those areas that are more likely to deliver watershed services. FONAFIFO has tried to keep different options for funding, with the view of ensuring a continuous, secure flow of funding. While still relying heavily on the fuel tax, they steadily look for other funding options such as carbon sales, agreements with private water users, environmental service certificates, loans, debt-swaps, donations, etc. The ESPH charges an extra water fee in their water bill, easy to tract and collect. Local intermediaries try to do several activities, such as consultancies, to ensure their costs are met, and do not rely completely on funds from PSA.

7.2 Facilitating the negotiations

7.2.1 Forming strategic alliances

1. Trust at the base of negotiations

Trust is the hard-won result of a long process, and a key factor in fostering watershed deals. Downstream users need to trust that particular land uses will result in improved watershed services, and that upstream farmers will stick to their ‘end of the deal’ (ICO and Los Negros, Bolivia, in Robertson and Wunder, 2005). In Los Negros, Bolivia, the facilitating NGO Natura used donor funding for setting up the system and for the first round of the payments – downstream users are now contributing to payments upstream. *“Using short-term donor funds, the farmers are thus demonstrating to downstream users—the potential long-term funders—that upstream watershed protection is feasible*

and trustworthy—as long as appropriate incentives are provided." Vargas, M. T. (2005)

2. *Creation of strategic alliances is key for the development of the schemes*

Early alliances with key stakeholders (at community, municipal or provincial levels) are key for the outcome of negotiations, influences the type of information disseminated to the public (Ambato and Pedro Moncayo, Ecuador; PSAH and Valle de Bravo, Mexico; PASOLAC schemes in Central America;) lays down the foundations for implementing a solution (Makiling and Maasin, Philippines) and provides crucial support in terms of resources, the fluidity of the process and access to international funding. Conversely, lack of political support can easily undermine a project (Makiling, Philippines) even if there is willingness to pay for watershed services, especially in the context of creation of water charges (Tarija, Bolivia).

The creation of **multi-stakeholder committees** involving users and providers encourages the feeling of ownership and provides a platform for discussing water uses (Cuenca, Ecuador; PASOLAC in Central America).

It is worth remembering that open and participatory discussions of PES proposals increases stakeholder engagement, but increases initial cost of the project (Ambato, Ecuador) and can delay negotiations (Mt Kanlaon, Philippines).

3. *The Government can be a large player*

Government funding can be substantial for national programmes. However, these programmes are shaped by the political agenda that does not necessarily reflect local needs. For example, lobbying groups (i.e. conservation groups in Costa Rica) can determine policy priorities, rather than having them shaped to respond to actual local needs. Government funding tends to be unsteady and prone to change with different administrations. For example the PSA in CR has changed several times, and pledged amounts have not been always delivered.

An objective of government-led programmes in Mexico and Costa Rica is to facilitate the creation of local deals. On the other hand, experience in Meijiang, China, suggest that strong national approaches led by the Government can des-encourage local engagement.

Mostly because of bureaucracy and the absence of appropriate channels for feedback, lessons from the NGO sector take time to seep into the Government sponsored schemes, and the shortage of resources results in programmes administrated by existing government staff without the capacity or skills to promote innovation (Myrada, India).

The timing and pacing of funds from the Government is not necessarily the most efficient to make the best use of matching resources:

- Implementation of schemes that require voluntary work have to be planned for the months of the year when people have more time (i.e. off-harvest times). This has a negative impact in promoting people's participation (Myrada, India).
- Funding from the Government usually needs to be spent following annual budget procedures. This can lead to rush decisions in allocation of resources (PSAH Mexico)

Decentralized management of water resources is useful to capture local resources for local needs, and engage local stakeholders in solutions for their problems (CPCJ, Brazil, Cuenca and Pimampiro, Ecuador; NIPAS Law in the Philippines);

4. *Donor funding is very important*

Using donor funding to kick-start the project is useful and very necessary to cover the high level of implementation costs and background studies. Almost all ongoing projects and advanced proposals depend on donor funding for the initial costs (Mayrand and Paquin, 2004). However, in most cases donors see their participation as transitory (Hartmann and Petersen, 2004) and sustainability of initiatives is on stake if downstream payments are not enough to continue after donor funding stops (Los Negros, Bolivia).

Funding from international donors is very important, but it needs to be treated with care. Funds coming from different sources can result in contradicting objectives and “investment overkill”, reducing the need to engage with local sources of funding (Maasin, Philippines).

5. *Long-term investment in environmental awareness*

Moving towards a more integrated and holistic approach to watershed management requires a cultural evolution of people’s preferences towards forest protection. This is a continuous, long-term process linking the education sector, private companies with high corporate responsibility standards, economic opportunities such as ecotourism, etc. In Costa Rica the process has been slow, with significant drawbacks and mistakes, but changes are taking place and in barely 20 years the country as a whole has managed to reverse one of the fastest deforestation trends in Latin America.

7.2.2 **A clear scientific background helps to build the business case**

1. *Science and perceptions*

Having the scientific base (even in rough figures) in place can help make the link stronger (Maasin, Philippines). However, in most ongoing schemes, access to climatologic data is difficult (Cuencas Andinas, Sierra de las Minas, Guatemala).

Lack of physical evidence has not stopped hydroelectric companies in Costa Rica from signing the extension of initial contracts for five additional years. Although some of these companies consider that the main reasons for paying for environmental services is public relations, they still think that a positive effect on avoided further sedimentation is taking place.

When science does not provide the answer, perceptions take their place. In most cases reviewed, there are strong perceived (rarely measured) linkages between land degradation (especially deforestation) and decline of water resources:

- Perceived links between land use and water quality or quantity help negotiate local deals (ICO, Bolivia; PSAH Mexico; Maasin, Philippines);
- Sierra de las Minas, Guatemala “*once money flows upstream, enough water will flow downstream – WWF, 2004*);

- Downstream groups believe that large forest cover will lead to better water quality and greater water availability. Most users think that water provision is the most important benefit from forests (Jesus de Otoro, Honduras)
- Uncertainty about effects of conservation on water quantity is switching the emphasis towards water quality for hydroelectric plants, encouraging the development of integrated watershed management in agroforestry systems through organic agriculture, etc. (*agroconservation* in PSA in Costa Rica, Silvopastoral project, Ecoservicios El Salvador);
- Uncertainty over negative trade-offs from reforestation (i.e. potentially less sediments, but also less water) can stop downstream users buying in (Singkarak, Indonesia);

2. *Background studies and information flows*

The importance of background studies to understand both users and providers is increasing, especially at the request of large donor-funded projects such as the World Bank and the GEF. Although their practical application continues limited, in some places not reflected in final payments and considered only ‘lip-service’ (Jesus de Otoro, Honduras), it is important to remember that most payments are the product of intense negotiation, and background studies provide the initial ranges of acceptable values.

Background studies are conducted by specialists in the different areas (economists, hydrologist, sociologists, etc) usually contracted out. These studies may help policy makers understanding the case for higher fees, especially where these are controlled by external regulating institutions (like ARESEP in Costa Rica).

Project implementation can be limited by capacity to use existing technology, such as GIS systems, or understanding of the participation guidelines (Fidecoagua, Mexico; Mt. Kanla-on and Watershed Rehabilitation Fund, Philippines). This can be tackled through the creation of guidelines, toolkits and programmes establishing procedures, and workshops and networks involving practitioners and policy makers to share cumulative experiences (Mexico PSHA, RUPES).

NGOs can play important role in raising awareness with communities, for example through the creation of information centres where voluntary activities are carried out, such as data generation, and conflict resolution (Maasin, Philippines).

3. *Matching commodities and watershed services*

In many cases watershed services and commodities are poorly matched. The definition of the service remains vague, sometimes on purpose as project managers try to “cast their nets wide open”, for example, from biodiversity or carbon sources. As a result, the land use practices promoted not always represent the most efficient way for providing the watershed services required by downstream users.

Even if PES is promoted as a useful mechanism to target priority areas and limit objective (Hartmann and Petersen, 2004), this is not a common practice in ongoing projects, especially those at national level. The emphasis on protecting existing forests in some projects takes away resources that could be more effectively used in restoring degraded areas, which tend to be the source of most environmental problems (Sierra and Russman, in press).

7.2.3 Management of schemes

1. *From national approach to local needs*

The applicability of national schemes at local level can be limited by funds and local capacity.

Lack of able local facilitators negatively affects national programmes, as they are unable to respond to local needs (PSA in Costa Rica). The lack of national funds to support market creation leaves most issues related to monitoring, evaluation, and long-term sustainability hanging or being ‘shouldered’ by the participants themselves (Mexico PSAH).

2. *Institutional capacity*

Management system should be based on existing capabilities, and kept simple and transparent. The basis for the Costa Rica PSA programme is a ‘no rocket-science’ approach (Johnny Mendez, pers.comm., Feb 2006). FONAFIFO has kept the concept of environmental services wide and this has facilitated their ability to adjust as the context changes. Bundling services maximises funding possibilities. The “judgement of Solomon” applied when dividing the payment into four equal parts for each service (carbon sequestration, landscape beauty, biodiversity conservation and watershed protection) was not fair, but it allowed the system to begin working. Contracts should be kept flexible, as much as possible. Open-ended, continuous payments reduce transaction costs and increase sustainability and programme credibility (Mayrand and Paquin, 2004). Flexibility allows for adjustments to improve efficiency and adapt to changing conditions. A reported drawback is the loss of institutional credibility resulting from changing the rules of the game, and that farmers living in remote areas will not have access to the information required to understand the changes (PSA Costa Rica).

The institution selected for managing the scheme has to be credible, and have a clear long-term strategy for the management of the scheme. The opposite can undermine deals if not in place (Tarija, Bolivia, Ambato, Ecuador). Personal intermediation by a (independent) promoter or PES can play an important role in motivating and informing landowners, leading to increased participation (for example, Fundecor and Codeforsa in CR).

Transparency is key in building up trust in the participants. The inclusion of as many groups as possible from the beginning will provide future support for the initiative. But it is important to remember that an over democratic and complicated system might also hinder the project. It is important to draw the line, making sure to include flexibility in the operation of the schemes. Flexibility can be introduced continuously through annual decrees. However, this is a double-edge sword, as it helps to incorporate lessons from previous years (such as setting up critical areas), but it can also confuse the rules of the game.

Downstream users might prefer deals through facilitators to avoid entering in activities not related to their business. For the CNFL in Costa Rica, hydroelectricity remains their main business and all administration of contracts with farmers is delegated to the national intermediary FONAFIFO. Partnerships between NGOs and local water utilities can be

successful, but NGOs should try to seek for local, more permanent institutions to manage the scheme in the long-term. In Pimampiro the NGO CEDERENA helped the local municipality build the scheme several years ago, and their recent departure from the area seems to go as a smooth transition. However, it is still uncertain where the Municipality will be able to obtain the additional resources needed to manage the scheme.

3. *Learning process and feedback channels*

One-to-one negotiations are lengthy and expensive, however, they help create institutional capacity and learning from what individual business want before embarking in over-the-counter deals (i.e. La Florida, CR).

Learning by doing is an important source of experience, and it is important that the facilitator builds the appropriate channels to ensure feedback. A ‘seasoned’ facilitator is key to bring trust. Good reputation from deals triggers the emergence of other deals elsewhere. FONAFIFO in Costa Rica has achieved experience in managing funds, dealing with farmers and businesses through a few local schemes (such as Energía Global and Platanar). This helps demonstrate their capacity to respond at local level with the new (significant) funding available through the new water charges (*canon del agua*).

Institutions that can develop payment mechanisms are those with (Perez, 2005?):

- a legal structure in place (personería jurídica);
- autonomous work schedule;
- decision-making power;
- already manage funds from those (indirectly) demanding water (i.e. populations);
- mechanisms to ensure local participation;
- transparency in management of funds;
- technical capacity to implement PES.

7.3 The overall institutional framework

Markets for watershed services should not be built from scratch, and should incorporate long-term lessons from the existing systems. This includes previous legislation (good and bad), technical lessons from failed projects, and learning from soil and water conservation projects.

7.3.1 Legislative framework

Existing legislative and institutional framework can affect the formation of environmental service schemes mainly in several ways:

1. Fostering deals with the creation of an institutional and legal framework through specific national laws (i.e. Environmental Services Law in Costa Rica and Mexico) or Municipal Laws (PASOLAC in Central America). An important lesson from ongoing experiences is that, through negotiations, Payment systems can help the creation of institutional and legal frameworks in places where did not exist (San Pedro Norte, Nicaragua). It can also reinforce the process in places where it already exist (PASOLAC, Central America).

2. Delaying or stopping negotiations where the legal basis for making additional charges is unclear (Makiling, Philippines).
3. Slowing down negotiations in places with inadequate water management norms and policies (Sierra de las Minas, Guatemala).
4. Sending conflicting messages by supporting the type of economic activities that the Payments schemes are trying to change. For example, the largest and most inefficient water users (agriculture, ranching) usually do not pay for water, have no extraction limits (Mexico, Ecuador), or have extensive subsidies (for example, the electricity industry in Mexico, agricultural and ranching sector in Zapalinamé in Mexico and Fuquene, Colombia).
5. Over-emphasis on forest conservation only can leave out (and send negative signals) to agricultural groups already involved in sustainable use of resources (Mexico, PSAH)
6. In some places, history of inefficient subsidies (especially to the forestry sector) may limit policy-makers and general public' trust in the introduction of payments (Mexico).

7.3.2 Property rights over land

A key advantage of payments for environmental services is that landowners retain their property rights. Because they are intrinsically linked to land, farmers must have the ability to make and hold decisions on its use for a significant period of time. Disputes over land ownership can easily stop deals (i.e. replication of ICO's in Mairana, Bolivia), or make payments to farmers difficult and expensive to track (Tarija, Bolivia). Land tenure instability can come from armed conflicts (like in Colombia), and from conflicting land allocation government projects, like land allocation for landless peasants in Costa Rica and for former guerrillas and army members in Jaltepeque-Jiquilisco, El Salvador.

Resistance to the introduction of watershed payments can come from colonist groups, who may object to giving up land for 'conservation' (Robertson and Wunder, 2005). Cattle ranching groups have strong economic and political influence and are highly profit oriented (Fuquene, Colombia).

The design of watershed deals need to take into account the degree of restriction they want to impose on landowners, as it will affect the likelihood to engage in the scheme. Landowners may not want to enter deals that restrict their land use options in areas where the value of land is high. New systems have to evolve to take this into account in areas where it is key prevent major environmental water problems (like in the ESPH, Costa Rica).

7.3.3 Property rights over watershed services

Centre to the discussion of property rights is the notion of who owns the water, and even more difficult, the watershed services.

In most places, water is recognized as a valuable input, but considered open access resource (such as Sierra de las Minas, Guatemala), undervalued, underpaid or free. Overall, the assumption is that water is a public good administered by the Government on behalf of all. While in most cases landowners do not own the water that comes out of their properties, they are implicitly considered 'protectors' of the watershed services.

In most developing countries, formal ‘markets’ to sell ‘additional units’ of watershed services do not exist and agreements are based on perceived impacts of land activities, rather than punctual measuring. But the lack of certainty over service rights can slow down deals. For example, in South Africa, downstream users are not allowed to buy additional water credits beyond their initial allocation, therefore limiting the potential for land-based activities upstream to ‘liberate’ and trade water resources.

Allocation of water rights de-linked from land rights ensures that landless poor can capitalise over their share of water, for example by selling it to larger landowners. This creates a direct incentive to participate in watershed management activities, solves the problem of inequity in benefit sharing, and compensates for loss of access to traditional grazing lands (Sukhomajri, India)

7.4 Dealing with trade-offs

7.4.1 Targeting the payments increases efficiency and effectiveness

The biggest challenge for markets for watershed services is in identifying and targeting critical areas. This potentially means differentiated payments that reflect a) the risk of loss of watershed services; b) the geographical location of the provider (i.e. riparian areas are more sensitive for sediment discharge); c) the opportunity cost involved in switching activities. This will require the move from the “first-come, first-served” approach to a more science-based approach. Hydrological maps can be overlapped with risk-prone areas, and socio-economic studies can group farmers according to their location, willingness to engage, and required compensation levels (see Hope, *et al*, forthcoming).

Targeting the areas that will deliver the most hydrological benefits is expected to increase the efficacy of the payment (Robertson and Wunder, 2005 about Los Negros, and the new approach of the Institute of Electricity in Costa Rica). For example, forest in the upper parts of high mountains is in less risk of changing or over-use than middle parts of the watershed. Payments can be designed to target those areas in particular (Vogel, 2002 on Pimampiro, Ecuador).

Lack of systematic spatial targeting results in under funding (S Wunder (2005); Pagiola 2002, lack of additionality, and potentially loss of higher environmental benefits if other areas could be integrated in the scheme (PSAH, Mexico). Explicit grading system can be incorporated in evaluation of proposals, to help identify areas more valuable for environmental benefits, and where true modification of conduct would be achieved by the economic instrument (i.e deforestation risk analysis) – PSAH, Mexico.

"the number of forest owners who apply for enrolment of areas in the scheme far exceeds the availability of funds. This is probably due to a combination of under funding of the scheme and its lack of systematic spatial targeting. In many cases, those receiving PES funds may not have had genuine intentions in the first place of putting the land to an alternative use, thus implying limited additionality of the system, i.e. the PES systems buys less extra environmental protection than would have been possible with increased targeting." Roberston and Wunder (2005).

7.4.2 Inclusive, pro-poor schemes raise transaction costs

Timeframe for bureaucratic processes can be long and can deter small farmers from entering (Cuencas Andinas; CR-PSA; Myrada, India; Mt.Kanla-on, Philippines;)

Process of engaging and fund-raising can be slow and ‘painstaking’ (FONAG, Ecuador).

7.4.3 Conflicts over final objectives of the schemes

1. *Water service required from end-users may be linked to distribution*

End-users may feel entitled to improved water services as a result of increased water charges. In most cases these improvements are more related to infrastructure, water distribution, treatment, cleaner production (Pimampiro, Ecuador, Sierra de las Minas, Guatemala;; Mexico PSAH); or more directed to conservation of biodiversity (Sierra de las Minas, Guatemala; Los Negros, Bolivia), than land-related watershed services. In most cases, payments are most efficient when they take place parallel to improvements in water infrastructure projects that ensure proper delivery of water to final users (Pimampiro, Ecuador).

2. *Conservation agenda may not respond to downstream needs*

Conservation groups pushing their own agenda ‘forcing’ the water link of forest-water can create conflicts of interests with downstream users (for example, circulation of incorrect information about the role of paramos in Ambato, Ecuador). Over-stressing doubtful relationships (i.e. forests and increased water quantity) may obstruct possibilities of concentrating on more positive spin-offs from watershed-based deals (PSA in CR).

Payments for forest protection could potentially result in better water quality and biodiversity conservation. However, downstream users are generally more interested in water quantity, which relates directly to water management and not so much forest conservation (Los Negros, Bolivia).

3. *Overstressing the poverty agenda has costs*

Where possible payments should target small farmers to have a social objective. However, the actual objective should be the actual delivery of environmental services (PASOLAC, Central America). Dealing with larger properties reduces transaction costs and help achieve threshold levels more easily, and it is possible that pressure to convert to other uses is less. (Zbinden and Lee, 2004). However, smaller properties have higher risk of conversion and inappropriate land management, and should be especially targeted.

An important limitation to projects is the political agenda of local municipalities (especially in poorer areas), which tends to be more focused to solving short-term, tangible projects (such as health or water supply), weakening the link between investment and environmental service (Watershed Rehabilitation Fund, Philippines).

8 Annexes

8.1 Case Profile

Summary		
Maturity of the initiative		Proposal or ongoing scheme Active since when? Status with respect to silver bullet.
Driver		Unclear, government regulation, supply side, demand side
Stakeholders	Supply	Categories: public gov.land public communal land private landowers private reserves local ngos and trusts Small involved? (information on the size of properties involved)
	Demand	National level government local government (municipality) About the intermediary... also its funding/ affiliation? (ie. Independent donor, percentage charged over the payment, etc) , is it a participant or a stakeholder?
	Intermediary	corporate business (hep...) user associations
	Facilitator	national/local ngos and trusts international ngo research groups, universities
Market design	Service	Water flow regulation, water quality maintenance, erosion and sedimentation control, land salinisation reduction/water table regulation, maintenance of aquatic habitats.
	Commodity	Best-Management Practices: Reforestation for commercial plantations Conservation and protection of existing ecosystems Rehabilitation of degraded ecosystems for protection
	Payment mechanism	Direct negotiation intermediary based transactions (trust, government agency, ngo) pooled transaction over-the-counter clearing house transaction auctions internal trading retail-based market (environmental service) user fees What are the eligibility criteria/requirements for participating in the scheme eg formal land title, minimum size of landholding is it voluntary or compulsory? How do they avoid free-riding? What exit strategy can buyers use if they wish to stop buying the es? (from wunder and robertson) ??? Are its incentives aligned for a successful system, better environment, happy people, low transactions costs, pr, etc?
	Type of payment	- in kind (describe which eg. Training; support to access loans, markets; behives) - cash one-off - cash instalments (describe period and conditions)
	Funds involved	

Analysis	Costs and benefits	Economic	Includes the costs of institution building (e.g. Transaction costs). This should be a focus of this new review. How much (roughly) are they? It might be worth to try to obtain indicator (number of people involved, since when did the proposal begin, etc). Who is paying for setting up costs? For how long? Who will pay for them after? Is the initiative likely to be self-sustainable?	<ul style="list-style-type: none"> - Are costs and benefits verified and perceived/expected - try to relate the costs and benefits to the different stakeholder groups
		Environmental	Describe the physical characteristics of the upstream area and why is it important to protect (this is already on the demand point of view); environmental impacts other than on the environmental service being considered, proportion of the whole watershed under the scheme? Scientific evidence? Has each case made studies? Have trade-offs been considered? What types of land use activities were taking place there before the system? Have these activities stopped or are they taking place somewhere else? (leakages) (see also monitoring)	
		Social	Describe the socio-economic characteristics of the upstream area – main land uses, livelihood strategies, stakeholder groups, size and distribution of landholdings, income groupings, etc; impact of the payments onto the family’s income (we have to estimate this from standard minimum wage, for example	
			Impacts on vulnerable groups: impacts for current welfare flows (economic, social, environmental) impacts on assets (physical, financial, human, social, environmental capitals) impacts on security (e.g. Property rights, livelihood, financial, etc) impacts for empowerment	
	Legislation issues	Legislation issues: preconditions for market establishment (and operation), e.g. Legislation, institutional capacity, mechanisms for ensuring local participation, the development of partnerships, government support, educational programmes, finance, etc. <i>Legislation issues</i> . Country-wide regulations? Local initiative? Existing laws for water and land use? Overlapping and contradicting laws. How is the initiative dealing with this? There might not be much information about this, but it will provide useful insights for on-going initiatives that have to deal with water being controlled by many authorities.		

	Monitoring	Monitoring (contingency issues) what has been the degree of/ likelihood of compliance so far, and what factors have influenced it? What's the mechanism for monitoring and performance assessment? Are the payments directly contingent on ES provision (e.g. On water quality) or rather on the land use that is supposed to produce the ES (e.g. On conservation of native vegetation)? Time/frequency of monitoring. Monitor: external or internal? Certification schemes? Establishment of baseline. Biophysical monitoring? Leakages? How are different fluctuations and risks which ES providers traditionally have little/ no control over being dealt with (e.g. Drought, fire, external intruders' actions)?
	Main constrains (problems)	Main obstacles faced in market establishment and how these have been overcome. Obstacles to market development can be split between demand side (e.g. Low willingness to pay, lack of information) and supply-side factors (e.g. Insecure property rights, lack of finance, political risk, inadequate legal framework).
	Main policy lessons	Is sustainable joint production with other forest goods and services possible? Impacts for current welfare flows (economic, social, environmental) impacts on assets (physical, financial, human, social, environmental capitals) impacts on security (e.g. Property rights) livelihood, financial, etc) impacts for empowerment
Additional information		<ul style="list-style-type: none"> · additional references to chase up · problems with reference · gaps in information
Contact		
References		
Links		

8.2 List of cases reviewed

Country	Name	Current Status	Status during Silver Bullet
Africa		(14 cases reviewed)	(5 cases reviewed)
Kenya	Western Kenya Integrated Ecosystem Project	Ongoing	
Malawi	Electricity company watershed protection contracts	Uncertain	Pilot
Malawi	Water boards -protected area contracts	Uncertain	Proposal
Malawi	Water boards -watershed protection contracts	Uncertain	Pilot
South Africa	Working for water	Ongoing	
South Africa	Working for wetlands	Ongoing	
South Africa	Maluti Drakensburgh	Ongoing	
South Africa	Sabie-Sand catchment	Advanced proposal	
South Africa	Selati River	Advanced proposal	
South Africa	Stream-flow reduction licences (PES component)	Abandoned or discontinued	Pilot
Tanzania	South Nguru Mountains (WWF/CARE/IIED)	Advanced proposal	
Tanzania	Uluguru Mountains (WWF/CARE/IIED)	Advanced proposal	
Uganda	Brewery and wetlands in Lake Victoria	Borderline	
Zimbabwe	Integrated catchment management in dryland areas	Abandoned or discontinued	Proposal
Asia		(38 cases reviewed)	(15 cases reviewed)
China	Forest Ecological Compensations programme;	Ongoing	
China	Guangdong Province,	Uncertain	Pilot
China	Jiangxi Province	Uncertain	Pilot
China	Meijiang;	Ongoing	
China	Shiangxi Province,	Uncertain	Pilot
China	Hebei Province,	Uncertain	Pilot
China	Northwest	Uncertain	Pilot
China	Sloping lands conversion programme;	Ongoing	
India	Bhodi	Ongoing	
India	Kuhan	Ongoing	
India	Sukhomajri	Ongoing	Mature
India	Arvari	Borderline	Mature
India	Bhoj wetlands	Advanced proposal	
India	HM (Inter-state watershed protection contracts)	Uncertain	Proposal
India	Myrada	Borderline	Pilot
Indonesia	Lake Toba	Ongoing	
Indonesia	Bandung (GEF/LP3ES)	Potentially ongoing but no info	
Indonesia	Brantas	Ongoing	
Indonesia	Cidanao	Ongoing	
Indonesia	Halimun (WWF/RUPES)	Advanced proposal	
Indonesia	Nunukan district, East Kalimantan (WWF/CARE/IIED)	Advanced proposal	
Indonesia	Sinkarak Lake (RUPES)	Advanced proposal	
Indonesia	Sumberjaya (with RUPES);	Ongoing	Pilot
Indonesia	Ujung Kuon (WWF/CARE/IIED)	Advanced proposal	

Country	Name	Current Status	Status during Silver Bullet
Indonesia	West Lombok (Nusa Tenggara Barat)	Advanced proposal	Proposal
Korea	Green Belt Project	Advanced proposal	
Nepal	Kulekhani	Advanced proposal	
Pakistan	Mangla-Dam	Ongoing	Pilot
Philippines	Bakun (RUPES)	Advanced proposal	
Philippines	Kalahan (RUPES)	Advanced proposal	
Philippines	Maasin	Ongoing	
Philippines	Maikiling	Advanced proposal	Proposal
Philippines	Mount Isarog (WWF/CARE/IIED)	Advanced proposal	
Philippines	Mt Kanla-on	Ongoing	
Philippines	North Sierra Madre (WWF/RUPES)	Advanced proposal	
Philippines	Sibuyan island (RUPES/WWF/CARE/IIED)	Advanced proposal	
Philippines	Watershed Rehabilitation Fund	Ongoing	Proposal
Vietnam	Government watershed management contracts	Uncertain	Pilot
Central America and the Caribbean		(42 cases reviewed)	(13 cases reviewed)
Costa Rica	CNFL	Ongoing	
Costa Rica	Del Oro	Abandoned or discontinued	Proposal
Costa Rica	Energia Global	Ongoing	Proposal
Costa Rica	ESPH	Ongoing	Proposal
Costa Rica	ICE	Ongoing	
Costa Rica	ICE-Arenal Watershed Fund	Abandoned or discontinued	Pilot
Costa Rica	La Esperanza	Ongoing	Pilot
Costa Rica	La Florida	Ongoing	
Costa Rica	Platanar	Ongoing	Pilot
Costa Rica	PSA –including CSA	Ongoing	Pilot
Costa Rica	San Jose Watershed Fund	Abandoned or discontinued	Pilot
Costa Rica	Silvopastoral	Ongoing	
Dominican Republic	Procaryn	Advanced proposal	
El Salvador	Jaltepeque-Jiquilisco	Ongoing	
El Salvador	Coatepeque	Ongoing	
El Salvador	Ecoservicios (national programme)	Ongoing	
El Salvador	El Imposible	Ongoing	Pilot
El Salvador	Pasolac led #1 (place?)		
El Salvador	Pasolac led #3 (place?)	Ongoing	
El Salvador	Pasolac led # 2 (place?)		
Guatemala	Cerro San Gil	Ongoing	
Guatemala	Cooperative agreements in Sierra de las Minas	Advanced proposal	Proposal
Guatemala	MAGA National	Ongoing	
Guatemala	San Jerónimo (GTZ)	Ongoing	
Honduras	Campamento	Ongoing	
Honduras	El Escondido	Advanced proposal	
Honduras	Jesus de Otoro	Ongoing	
Honduras	Orica Creek (WWF/CARE/IIED)	Advanced proposal	
Honduras	Rio Platano (GTZ)	Advanced proposal	
Jamaica	Buff Bay	Advanced proposal	
Jamaica	Watershed protection contracts and fees	Uncertain	Proposal
Mexico	Copalita	Potentially ongoing but no info	

Country	Name	Current Status	Status during Silver Bullet
Mexico	Fideicoagua	Ongoing	
Mexico	National PSAH	Ongoing	
Mexico	Pronatura	Potentially ongoing but no info	
Mexico	Valle de Bravo	Ongoing	
Mexico	Zapaliname	Ongoing	
Nicaragua	San Pedro Norte	Ongoing	
Nicaragua	Silvopastoril	Ongoing	
Panama	Chagres (Panama Watershed Canal)	Abandoned or discontinued	Proposal
Panama	Filo del tallo	Uncertain	Proposal
St Lucia	Talvern Watershed	Advanced proposal	
South America			
Bolivia	Bermejo (international with Argentina)	Abandoned or discontinued	Proposal
Bolivia	Comarapa Municipality	Potentially ongoing but no info	
Bolivia	ICO	Borderline	
Bolivia	Los Negros	Ongoing	
Bolivia	Prometa (HEP)	Potentially ongoing but no info	
Bolivia	San Pedro (GTZ)	Advanced proposal	
Bolivia	Sucre (GTZ)	Advanced proposal	
Bolivia	Tarija	Ongoing	
Bolivia	Vallegrande municipality Watershed management programme (GTZ)	Potentially ongoing but no info	
Bolivia		Advanced proposal	
Brazil	CPCJ	Ongoing	Pilot
Brazil	Proambiente (GTZ)	Advanced proposal	
Brazil	S Joeo Watershed (WWF)	Potentially ongoing but no info	
Chile	Water share trading and PES	Abandoned or discontinued	Proposal
Colombia	Afluentes del Cauca	Advanced proposal	
Colombia	Campoalegre	Borderline	Proposal
Colombia	Fuquene	Ongoing	
Colombia	La Miel	Advanced proposal	
Colombia	Plan Verde	Ongoing	Pilot
Colombia	Silvopastoril	Ongoing	
Colombia	Valle del Cauca	Ongoing	Pilot
Ecuador	Ambato	Ongoing	
Ecuador	Arenillas	Potentially ongoing but no info	
Ecuador	Cotacachi, Imbabura	Potentially ongoing but no info	
Ecuador	Cuenca	Ongoing	Mature
Ecuador	EcoFondo Podocarpus National Park	Advanced proposal	
Ecuador	FONAG	Ongoing	Pilot
Ecuador	Pedro Moncayo	Ongoing	
Ecuador	Pimampiro	Ongoing	
Ecuador	Rio el Angel (Cuencas Andinas)	Advanced proposal	
Ecuador	Shutan Bajo	Borderline	
Peru	Alto Mayo (Cuencas Andinas)	Advanced proposal	
Peru	Arequipa (Cuencas Andinas/GTZ)	Advanced proposal	
Peru	Jequetepeque ((Cuencas Andinas/WWF/CARE/IIED)	Advanced proposal	

Country	Name	Current Status	Status during Silver Bullet
Peru	Piura (Cuencas Andinas)	Advanced proposal	
Venezuela	Partnerships for National Parks	Advanced proposal	

8.3 Glossary of terms

Mat urity of the scheme	<p>The maturity of the scheme refers to its current status. They could be ‘ongoing’, proposals, borderline schemes, abandoned, or uncertain.</p> <ul style="list-style-type: none"> ▪ Borderline scheme. These are schemes where their market component is not clear. For example, it is difficult to distinguish the buyer from the seller in intra-village arrangements. Some of these schemes were included in Silver Bullet. However, this new review puts them in a separate category highlighting their significance as examples of fair deals but with no market connection. ▪ Ongoing schemes. These are initiatives in which payments are being made from the users (direct and indirect), suppliers, or both. ▪ Proposals. Only relatively advanced proposals have been included in this review. This includes those with advanced baseline studies, stakeholders coming together in negotiation meetings, etc, but no payments are actually taking place yet. Some of these proposals take years to mature into ongoing projects, and this highlights the difficult nature of setting up payments for watershed services. ▪ Abandoned schemes. These schemes have been abandoned, either as a whole, or the environmental service component has been dropped for lack of support or leadership. ▪ Uncertain schemes. It was not possible to obtain sufficient information proving that the scheme had been abandoned or was still ongoing. Some schemes may have evolved into another local or national programme (such as the Chinese regional schemes reported in 2002), but we have not been able to confirm this.
“First generation” schemes	Initial round of market for watershed services schemes. Most of them are local and relatively isolated pilot schemes characterised by a “learning by doing” approach”. Most of the schemes reported in the initial Silver Bullet publication fall in this category.
“Second Generation” schemes	Schemes are slowly beginning to take into account existing experiences and lessons from other projects. Stronger emphasis is placed on the design of baseline studies, monitoring and information sharing. Many of these schemes are subsidised by donors and tend to be part of larger regional projects such as Cuencas Andinas or the Silvopastoral Project.
Service Providers	<p>Service providers are those stakeholders with a contractual relationship with the users, who commit themselves to implement land conservation practices in their landholdings (specifically in the water recharge area). Potential service providers are those with land in the target areas but without any contractual relationship with users or intermediaries. Kosoy, et al, 2005.</p> <ul style="list-style-type: none"> ▪ Private landowners: They have clear ownership of their land, with either land titles or undisputed possession rights. ▪ Public lands: This group represents farmers living in public land (usually declared as national parks or protected areas). Farmers do not have possession rights, but manage their plots of land as private areas. ▪ Communal land: Farmers living (or drawing their livelihoods) from communal areas.

	<ul style="list-style-type: none"> Private reserves: private landowners (individuals or groups) registered as reserves and committed to conservation of specific ecosystems.
Service Demand	<p>Stakeholders that are interested in the provision of watershed environmental services can be roughly divided into direct demand or service users, and indirect demand or beneficiaries.</p> <ul style="list-style-type: none"> Direct demand, or service users, is those individuals or organised groups that depend on water-based services affected by upstream land management. This group could include final consumers of domestic water (organised through private or municipal water utilities), hydroelectric projects, and water-based industry (e.g. beverages, mining, pulp or irrigation groups), as well as environmental users such as wetland users or conservation groups. Indirect demand for watershed environmental services may be derived from several sources, including national and local governments and international agencies. International agencies can play a key role in providing conservation or development grants to pilot schemes until downstream groups adopt payments. Alternatively, national government may wish to pool service buyers in the public interest for strategic watershed services that cannot be realistically financed by downstream demand. The Costa Rican PES programme, the South African Working for Water programme and the Chinese Sloping Land Conversion Programmes are examples of upstream payments being wholly or partly funded nationally for improved or protected public goods' provision.
<i>Administratively-determined pricing mechanisms</i>	An authority can determine payment levels externally. In these cases, bargaining power by landowners is limited, although they can still voice their willingness to accept by choosing not to join. This potentially can send signals back to the authority to adjust their payment levels. This type of payments is mostly used in national-level strategies.
<i>Direct negotiation between sellers and buyers.</i>	These mechanisms involve detailed contracts outlining best management practices, land purchase agreements and conservation easements. Direct negotiations are mostly used in situations when there are few stakeholders involved and/or are capable watershed programme already exists, direct negotiation will be easier and faster. It usually involves detailed contracts setting out best management practices, or land purchase agreements. However, payments are generally part of larger projects, and they are the result of (usually) a long bargaining process.
<i>Negotiations through intermediary.</i>	As the number and distribution of stakeholders increase, so does the need for an intermediary. They are used to control transaction costs and risks, and are most frequently set up and run by NGOs, community organisations and government agencies. In some cases independent trust funds are created. Intermediaries are vital in national schemes such as the PSA in Costa Rica and the PSAH in Mexico, and the final contribution from downstream users will reflect their capacity to negotiate on behalf of upstream farmers.
Pooled transactions	Pooled transactions control transaction costs by spreading risks amongst several buyers. They are also employed to share the costs of a large transaction as often required in the watershed markets.
Internal trading	Transactions within an organisation, e.g. intra-governmental payments.
Over-the-counter trades and user fees	These occur where the service is pre-packaged for sale, e.g. water quality credits. Watershed services are frequently offered at a standard rate for different beneficiaries through user fees. This rate is normally not negotiable and imposed on all beneficiaries.
Clearing-house transactions	A more sophisticated intermediary that offers a central trading platform for buyers and sellers is a clearing-house. This mechanism depends on the existence of a standardised pre-package commodity, e.g. salinity credit, water quality offset.
Auctions	Often associated with clearing-house mechanisms and over-the-counter trading, auctions attempt to move a step closer to a competitive market for watershed services. Auctions are proposed for determining the supply of watershed services as well as for allocating obligations to pay.

Retail-based trades	Where payments for watershed protection are attached to existing consumer purchases, e.g. Salmon Safe agricultural produce. Normally associated with certification and labelling schemes that generate consumer recognition and willingness to pay.
National or local government budget allocations.	National level projects, like the PSA in Costa Rica or the PHSA in Mexico, have annual government budgets allocated for payments for environmental services. In Costa Rica the main source is the 3.5% of collections from a 15% tax on fuels. In Mexico it is approximately US\$20-30 million per year.
Voluntary investment from private users	Probably the most common way for companies to decide their payment levels is an internal, voluntary decision based on their own willingness to pay. In most of these cases, funding comes from the company's profits rather than transferring the cost to the final consumers, and is usually registered as 'donation' (many tax-free) in their annual budgets.
International donor support	There are many initiatives of payments for watershed services that are prompted and supported by international donors. In theory, funding is only used to provide a kick-start in the project and support the very high setting-up transaction costs. In the practice, it is unlikely that many of these initiatives will manage to raise enough local funds to be self-sustainable in the long-run.
Regulatory mechanisms	Some markets for watershed services are based in externally imposed requirements, especially in developed countries where environmental regulations are stricter. Market-based strategies are used to help companies reach environmental targets while reducing costs of compliance.
Watershed	The term watershed refers to the geographic boundaries of a particular water body, its ecosystem and the land that drains to it. It also includes groundwater aquifers that discharge to and receive discharge from streams, wetlands, ponds and lakes. Large watersheds are sometimes referred to as river basins. It is sometimes referred to as 'catchment'.
Market	Markets are defined as voluntary transactions between buyers and sellers, where the price is set on the basis of supply and demand.

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