Payments for Ecosystem Services: Getting Started

A Primer

the katoomba group

UNEP

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Payments for Ecosystem Services
Getting Started: A Primer

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About Forest Trends

www.forest-trends.org

Forest Trends is an international non-profit organization that works to:

- expand the value of forests to society;
- promote sustainable forest management and conservation by creating and capturing market values for ecosystem services;
- support innovative projects and companies that are developing new environmental markets; and
- enhance the livelihoods of local communities living in and around forests.

Forest Trends analyzes strategic market and policy issues, catalyzes connections between forward-looking producers, communities and investors, and develops new financial tools to help markets work for conservation and people.

Forest Trends has also helped demonstrate the efficacy of markets and payments for ecosystem services through its Business Development Facility (www.forest-trends.org/programs/bdf.htm) and the joint Forest Trends / Conservation International Business and Biodiversity Offset Program (www.forest-trends.org/biodiversityoffsetprogram/). Both of these programs demonstrate how to apply ecosystem services concepts and bring them into practice.

About the Katoomba Group

www.katoombagroup.org

From its 1999 inception in the mountains surrounding Katoomba, Australia, the Katoomba Group has served as an international network of individuals working to promote and improve capacity related to markets and payments for ecosystem services (PES). The Group serves as a forum for the exchange of ideas and strategic information about ecosystem service transactions and markets. It also enables collaboration between practitioners on PES projects and programs.

About the United Nations Environment Programme

www.unep.org

The United Nations Environment Programme's (UNEP) mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.

Preface

Well-functioning ecosystems provide reliable and clean flows of water, productive soil, relatively predictable weather, and many other services essential for human well-being. Today, however, many ecosystems and the services they provide are under increasing pressure. Indeed, the most comprehensive study to date, the Millennium Ecosystem Assessment, which engaged over 1,300 scientists, concluded that more than 60% of the world's ecosystems are being used in ways that cannot be sustained.

Given these trends, what if there were ways to provide the "right" incentives for encouraging the sustainable use of these ecosystem services? What if it were possible to encourage beneficiaries to contribute their fair share to restoring and maintaining the flows of these services? Could such an approach create an incentive for restoration and sustainable use?

This sustainable use/financing rationale informs many formal and informal markets now trading in greenhouse gas reductions, wetlands, water pollution, and endangered species habitats around the world. Indeed, all of the diverse schemes highlighted in this primer are built upon two simple premises: that ecosystem services have quantifiable economic value, and that this value can be used to entice investment in restoration and maintenance.

Similarly, Payments for Ecosystem Services (PES) deals are emerging wherever businesses, public-sector agencies, and nonprofit organizations have taken an active interest in addressing particular environmental issues. These schemes provide a new source of income for land management, restoration, conservation, and sustainable-use activities, and by this have significant potential to promote sustainable ecosystem management. So PES can support the important aim of the Convention of Biological Diversity to halt and reduce the rate of biodiversity loss.

This primer forms part of the activities implemented within the Global Strategy for the Millennium Ecosystem Assessment Follow-Up, and offers a starting point from which to assess the potential for PES in specific communities around the world. It also provides pointers for designing and planning PES transactions. Community-benefit driven, or "pro-poor" PES, is the main focus of this work. Specifically, this primer describes:

- the opportunities and risks of PES schemes for rural community residents in order to enable accurate feasibility assessments for applying these new market-based mechanisms,
- steps to developing PES projects, and
- resources for additional reference and reading.

By issuing this primer, we at Forest Trends, the Katoomba Group, and UNEP seek to increase the number of organizations and communities exploring PES and, *where appropriate*, applying PES to further their goals for conservation, restoration, and sustainable ecosystem management. We hope that this publication will contribute to sustainable financing for conservation and restoration of ecosystems around the world.

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The concept and first draft were developed by Mira Inbar with input from Sara J. Scherr. This current version was written by Sissel Waage, Carina Bracer, and Mira Inbar, with input from Anantha Duraiappah on equity, editing by Steve Zwick, and significant contributions from Katoomba Group members and senior UNEP staff including: Al Appleton, Independent Consultant; Nigel Asquith, Fundación Natura Bolivia; Ricardo Bayon, EKO Asset Management Partners; Raquel Biderman, Fundação Getulio Vargas; Byamukama Biryawaho, Nature Harness Initiatives; Josh Bishop, IUCN; Beto Borges, Communities and Markets Program, Forest Trends; Josefina Brana, University of Maryland; David Brand, New Forests Pty. Limited; Marco Buttazzoni, Environmental Resources Trust; John Dini, South Africa National Biodiversity Institute; Marta Echavarria, Ecodecision; Craig Hanson, World Resources Institute; Celia Harvey, Conservation International; Amanda Hawn, New Forests Pty. Limited; Sam Korutaro, UNDP Liberia; Marina Kosmus, GTZ; Alejandra Martin, Business for Social Responsibility; Jacob Olander, Ecodecision; Erika de Paula, IPAM, Instituto de Pesquisa Ambiental da Amazônia; Brianna Peterson, World Resources Institute; Hylton Philipson, Global Canopy Program; Alice Ruhweza, East & Southern Africa Katoomba Group; Sara J. Scherr, Ecoagriculture Partners; Elizabeth Shapiro, University of California, Berkeley; Jeremy Sokulsky, Environmental Incentives, LLC; Janet Ranganathan, World Resources Institute; Jackie Roberts, Independent Consultant; David Ross, Sierra Gorda Biosphere Reserve, Mexico; Wayne White, W2 Consulting; and Sven Wunder, CIFOR.

We are grateful to all of these Katoomba Group members for sharing their expertise. This primer has benefited enormously from their input. The authors have sought to include the most accurate and up-to-date information available. Any errors that remain are those of the authors alone.

Executive Summary

This primer is designed to provide you with a solid understanding of what Payments for Ecosystem Service (PES) are and how PES deals work. It is intended for an audience interested in exploring the potential of PES – either as prospective PES sellers themselves or as staff of organizations that work directly with communities or landowners who may be interested in PES. The primer should be read before you set out to design a PES deal, as it provides guidance on conditions under which PES is most relevant and likely to succeed. It should also be read sequentially, as concepts defined in the early pages are built upon later.

In the first section, **Ecosystem Services & Emerging Markets and Payments**, you will find a detailed review of basic PES concepts, including:

- What is an 'ecosystem service'?
- What are the basic types of payments for ecosystem services?

In the second section, **Pro-poor Payments for Ecosystem Services: Opportunities, Risks, and Ideal Conditions**, you will learn how PES deals can offer the rural poor an opportunity to augment their income as stewards of the land by implementing practices to restore and maintain ecosystem services. You will also learn the pitfalls of such schemes – the danger of trying to implement PES where it is not appropriate, for example, or the potential of liability concentrated on those who can least afford it. You will also learn how to evaluate outside advisors, and when to consult them.

The third section, **A Step-by-Step Approach to Developing Payment for Ecosystem Service Deals**, is the core of the primer. Here, you will learn the four key steps to developing PES deals:

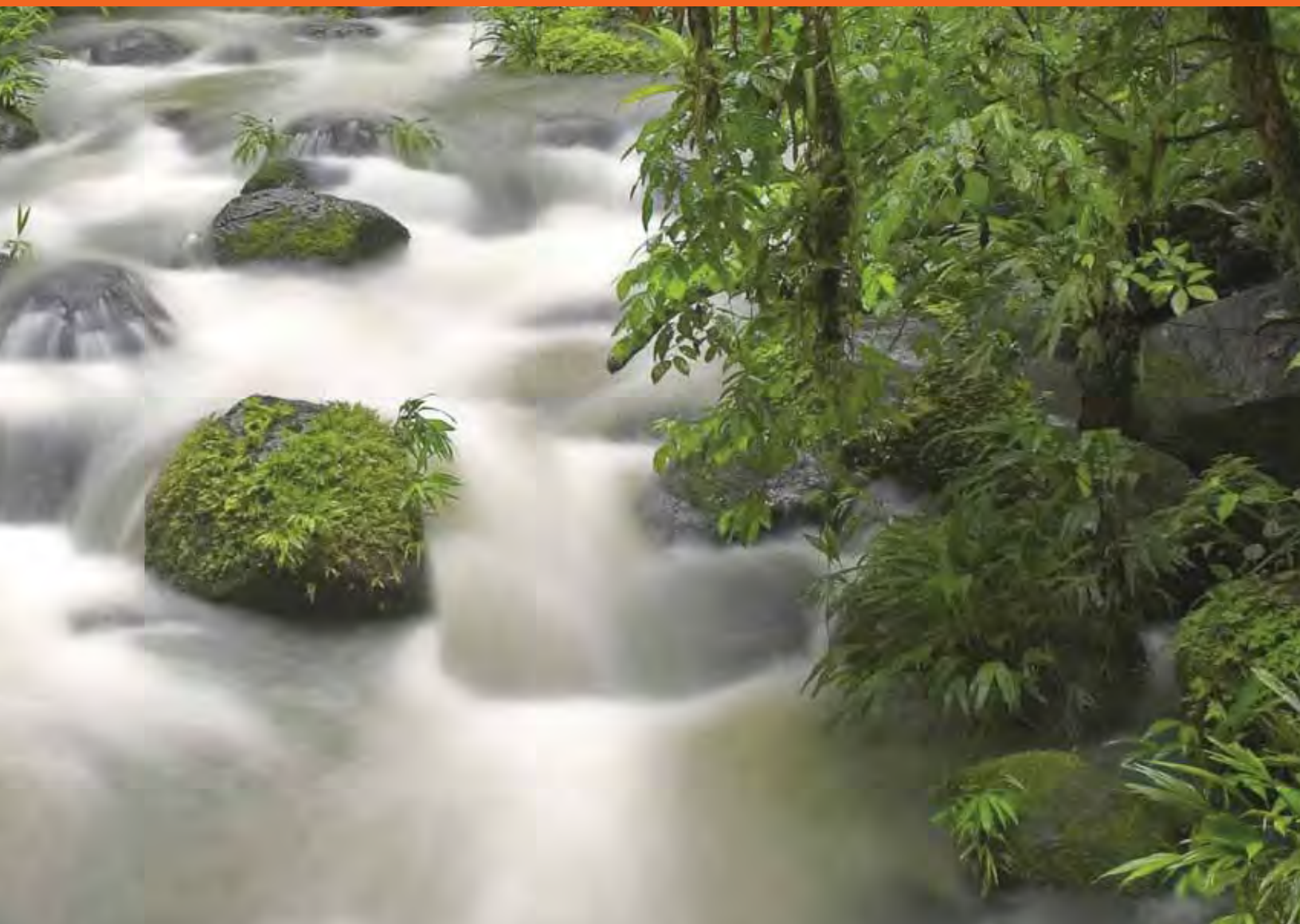
- Identifying Ecosystem Service Prospects and Potential Buyers
- Assessing Institutional and Technical Capacity
- Structuring Agreements
- Implementing PES Agreements

Each of these steps is broken down into smaller steps in an effort to introduce potential sellers of ecosystem services to the details of PES deals. Throughout the document, there are numerous case studies to illustrate components of the process.

As a complement to this primer, the Ecosystem Marketplace has issued an introductory overview of markets and payments for ecosystem services as well as an extensive glossary. We urge readers interested in further information and a full glossary to review this piece as well, which can be accessed at ecosystemmarketplace.com.[1] We hope that these materials will enable the potential of PES to be realized at a scale that is meaningful for both people and landscapes around the world.

[1] Visit http://ecosystemmarketplace.com/pages/static/about.conservation_backgrounder.php

Section 1: Ecosystem Services & Emerging Markets & Payments



Ecosystems provide society with a wide range of services — from reliable flows of clean water to productive soil and carbon sequestration. People, companies, and societies rely on these services — for raw material inputs, production processes, and climate stability. (See Table 1 and Box 1 for illustrative ecosystem services as well as a full breakdown of ecosystem service types.)

TABLE 1

Types of Ecosystem Services

	Forests	Oceans	Cultivated / Agricultural Lands
Environmental Goods	• Food • Fresh water • Fuel • Fiber	• Food	• Food • Fuel • Fiber
Regulating Services	• Climate regulation • Flood regulation • Disease regulation • Water purification	• Climate regulation • Disease regulation	• Climate regulation • Water purification
Supporting Services	• Nutrient cycling • Soil formation	• Nutrient cycling • Primary production	• Nutrient cycling • Soil formation
Cultural Services	• Aesthetic • Spiritual • Educational • Recreational	• Aesthetic • Spiritual • Educational • Recreational	• Aesthetic • Educational

Source: Millennium Ecosystem Assessment 2005 (http://www.millenniumassessment.org)

At present, however, many of these ecosystem services are either undervalued or have no financial value at all. As day-to-day decisions often focus on immediate financial returns, many ecosystem structures and functions are being fundamentally undercut.[1] The most comprehensive assessment of ecosystem services to date – the Millennium Ecosystem Assessment, which included over 1,300 scientists from 95 countries – found that over 60% of the environmental services studied are being degraded faster than they can recover.[2]

In response to growing concerns, markets are emerging for ecosystem services in countries around the world. Formal markets – some voluntary and others mandated by law – now exist related to greenhouse gases (carbon), water, and even biodiversity.[3] In addition, focused business deals and PES are also being forged to invest in restoration and maintenance of particular ecological systems and the services that they provide.

[1] For more information, please see: Daily, Gretchen C. 1997. Nature's Services: Societal Dependence on Natural Ecosystems. Washington, DC: Island Press; Millennium Ecosystem Assessment. 2005. "Ecosystems and Human Well-Being: Synthesis" Washington, D.C.: World Resources Institute (http://www.maweb.org/documents/document.356.aspx.pdf)

[2] Millennium Ecosystem Assessment. 2005. "Ecosystems and Human Well-Being: Synthesis" Washington, D.C.: World Resources Institute (http://www.maweb.org/documents/document.356.aspx.pdf)

[3] For more information, please see: http://www.ecosystemmarketplace.com/

The key characteristic of these PES deals is that the focus is on maintaining a flow of a specified ecosystem "service" – such as clean water, biodiversity habitat, or carbon sequestration capabilities – in exchange for something of economic value.

The critical, defining factor of what constitutes a PES transaction, however, is not just that money changes hands and an environmental service is either delivered or maintained. Rather, the key is that ***the payment causes the benefit to occur where it would not have otherwise.*** That is, the service is "additional" to "business as usual," or at the very least, the service can be quantified and tied to the payment.

In order to ensure that the ecological service is indeed maintained – as buyers expect for their money – the transactions require regular and independent verification of sellers' actions and their impact on the resources. Therefore, sellers must:

- maintain or enhance specific ecological structures and functions beyond what would have happened in the absence of payment, and
- remain accountable to independent verifiers (if a buyer requires) to ensure that the "service" being paid for is indeed being delivered.

A definition for PES that has become fairly well-accepted has been put forward by Sven Wunder, in which he explains, "A payment for environmental services scheme" is:

1. a ***voluntary*** transaction in which
2. a ***well-defined*** environmental service (ES), or a form of land use likely to secure that service
3. is bought by at least one ES ***buyer***
4. from a minimum of one ES ***provider***
5. if and only if the provider continues to supply that service (***conditionality***)." [4]

BOX 1

Illustrative Ecosystem Services

- Purification of air and water
- Regulation of water flow
- Detoxification and decomposition of wastes
- Generation and renewal of soil and soil fertility
- Pollination of crops and natural vegetation
- Control of agricultural pests
- Dispersal of seeds and translocation of nutrients
- Maintenance of biodiversity
- Partial climatic stabilization
- Moderation of temperature extremes
- Wind breaks
- Support for diverse human cultures
- Aesthetic beauty and landscape enrichment

Source: Daily, Gretchen (Editor). 1997. Nature's Services. Washington D.C., USA: Island Press.

[4] Wunder, Sven 2005, quoted on CIFOR website: http://www.cifor.cgiar.org/pes/_ref/about/index.htm

These PES deals stem from three distinct domains, which are outlined in the table below.

TABLE 2

Types of Markets and Payments for Ecosystem Services

Public payment schemes for private land owners to maintain or enhance ecosystem services	These types of PES agreements are country-specific, where governments have established focused programs (as in Mexico and Costa Rica). While specifics vary by program focus and country, they commonly involve direct payments from a government agency, or another public institution, to landowners and/or managers.
Formal markets with open trading between buyers and sellers, either: **(1) under a regulatory cap or floor** on the level of ecosystem services to be provided, **or** **(2) voluntarily**	**Regulatory ecosystem service markets** are established through legislation that creates demand for a particular ecosystem service by setting a 'cap' on the damage to, or investment focused on, an ecosystem service. The users of the service, or at least the people who are responsible for diminishing that service, respond either by complying directly or by trading with others who are able to meet the regulation at lower cost. Buyers are defined by the legislation, but are usually private-sector companies or other institutions. Sellers may also be companies or other entities that the legislation allows to be sellers and who are going beyond regulatory requirements. **Voluntary markets** also exist, as in the case of most carbon emission trading in the United States. For example, companies or organizations seeking to reduce their carbon footprints are motivated to engage in the voluntary market to enhance their brands, to anticipate emerging regulation, in response to stakeholder and/or shareholder pressure, or other motivations. Voluntary exchanges are also a category of private payments (see below).
Self-organized private deals in which individual beneficiaries of ecosystem services contract directly with providers of those services	**Voluntary markets**, as outlined above, are a category of private payments for ecosystem services. Other **private PES deals** also exist in contexts where there are no formal regulatory markets (or none are anticipated in the near term) and where there is little (if any) government involvement. In these instances, buyers of ecosystem services may be private companies or conservationists who pay landowners to change management practices in order to improve the quality of the services on which the buyer wishes to maintain or is dependant. The motivations for engaging in these transactions can be as diverse as the buyers, as is explored further in the step-by-step section that follows on finding buyers.

In the following boxes and tables, you will find a few examples of different PES types. Note that each of these markets and payments operate in distinct ways, depending on the services provided, the legal or political context, and the unique social environments.

BOX 2

Examples of Self-Organized Deals

France

Perrier Vittel (now owned by Nestlé) discovered it would be cheaper to invest in conserving the farmland surrounding their aquifers than to build a filtration plant to address water quality issues found in 1990. Accordingly, they purchased 600 acres of sensitive habitat and signed long-term conservation contracts with local farmers. Farmers in the Rhine-Meuse watershed in northeastern France received compensation to adopt less intensive pasture-based dairy farming, improve animal waste management, and reforest sensitive filtration zones.

Source: http://www.iied.org/NR/forestry/documents/Vittelpaymentsforecosystemservices.pdf

Chile

Private individuals in Chile have invested in Private Protected Areas primarily for conservation purposes and high-biodiversity areas. Payments have been voluntary and driven by a desire to complement government conservation of critical habitat.

BOX 3

Example of Public Payments

The Public Redistribution Mechanism in Paraná, Brazil offers an example of a public payment. The State allocated funds to municipalities to protect forested watersheds and rehabilitate degraded areas. Also in Paraná, as well as in Minas Gerais, 5% of the revenues received from the Circulation of Goods and Services (ICMS) – an indirect tax charged on the consumption of all goods and services – is distributed either to (1) municipalities with conservation units or protected areas or (2) municipalities that supply water to neighboring municipalities. The State allocates more revenues to those municipalities with the greatest amount of area under environmental protection.

BOX 4

Example of Regulation-Driven Open Trading

The best known example of open trading is the international carbon market for carbon dioxide emission reduction certificates, commonly called 'the carbon market,' established by the Kyoto Protocol, which allows industrialized countries to trade carbon credits in order to meet their commitments at the lowest possible cost. Forestry activities which sequester carbon by promoting forest establishment and growth are one mechanism for reducing emissions within these markets.

TABLE 3

Types of Payments for Biodiversity Protection

Purchase of High-Value Habitat

- Private land acquisition (purchases by private buyers or NGOs explicitly for biodiversity conservation)
- Public land acquisition (purchases by government agency explicitly for biodiversity conservation)

Payment for Access to Species or Habitat

- Bioprospecting rights (rights to collect, test, and use genetic material from designated areas)
- Research permits (rights to collect specimens and take measurements in designated areas)
- Hunting, fishing or gathering permits for wild species
- Ecotourism use (rights to enter the area, observe wildlife, camp, or hike)

Payment for Biodiversity-Conserving Management Practices

- Conservation easements (owner is paid to use and manage defined piece of land only for conservation purposes; restrictions are usually in perpetuity and transferable upon sale of the land)
- Conservation land lease (owner is paid to use and manage a defined piece of land for conservation purposes, for a defined period of time)
- Conservation concession (public forest agency is paid to maintain a defined area under conservation uses only; comparable to a forest logging concession)
- Community concession in public protected areas (individuals or communities are allocated use rights to a defined area of forest or grassland in return for a commitment to protect the area from practices that harm biodiversity)
- Management contracts for habitat or species conservation on private farms, forests, or grazing lands (contract that details biodiversity management activities, and payments linked to the achievement of specified objectives)

Tradable Rights under Cap & Trade Regulations

- Tradable wetland mitigation credits (credits from wetland conservation or restoration that can be used to offset obligations of developers to maintain a minimum area of natural wetlands in a defined region)
- Tradable development rights (rights allocated to develop only a limited total area of natural habitat within a defined region)
- Tradable biodiversity credits (credits representing areas of biodiversity protection or enhancement, which can be purchased by developers to ensure they meet a minimum standard of biodiversity protection)

Support Biodiversity-Conserving Businesses

- Business shares in enterprises that manage for biodiversity conservation
- Biodiversity-friendly products (eco-labeling)

Excerpted from: Scherr, Sara, Andy White, and Arvind Khare with contributions from Mira Inbar and Augusta Molar. 2004. "For Services Rendered: The Current Status and Future Potential of Markets for the Ecosystem Services Provided by Tropical Forests." Yokohama, Japan: International Tropical Timber Organization (pp. 30-31).

TABLE 4

Examples of Water Market Payments

	(Water-related Ecological) Service Provided	Supplier	Buyer	Instruments	Intended Impacts on Forests	Payment
Self-Organized Private Deals	**France: Perrier Vittel's Payments for Water Quality**					
	Quality drinking water	Upstream dairy farmers and forest landholders	A bottler of natural mineral water	Payments by bottler to upstream landowners for improved agri-cultural practices and reforestation of sensitive filtration zones	Reforestation but little impact because program focuses on agriculture	Vittel pays each farm about $230 per hectare per year for seven years. The company spent an average of $155,000 per farm or a total of $3.8 million.
	Costa Rica: FONAFIFO and Hydroelectric Utilities Payments for Watershed Services					
	Regularity of water flow for hydro-electricity generation	Private upstream owners of forest land	Private hydroelectric utilities, Government of Costa Rica and local NGO	Payments made by utility company via a local NGO to landowners; payments supplemented by government funds	Increased forest cover on private land; expansion of forests through protection and regeneration	Landowners who protect their forests receive $ 45/ ha/yr; those who sustainably manage their forests receive $70/ha/yr, and those who reforest their land receive $116/ha/yr.
	Colombia: Associations of Irrigators' Payments (Cauca River)					
	Improve-ments of base flows and reduction of sedi-mentation in irrigation canals	Upstream forest landowners	Associations of irrigators; government agencies	Voluntary payments by associations to government agencies to private upstream landowners; purchase by agency of lands	Reforestation, erosion control, springs and waterways protection, and development of watershed communities	Association members voluntarily pay a water use fee of $1.5-2/litre on top of an already existing water access fee of $0.5/litre.
Trading Schemes	**United States: Nutrient Trading**					
	Improved water quality	Point source polluters dis-charging below allowable level; non-point source polluters reducing their pollution	Polluting sources with discharge above allowable level	Trading of marketable nutrient reduction credits among industrial and agricultural polluting sources	Limited impact on forests- mainly the establishment of trees in riparian areas	Incentive payments of $5 to $10 per acre
	Australia: Irrigators Financing of Upstream Reforestation					
	Reduction of water salinity	State Forests of New South Wales (NSW)	An association of irrigation farmers	Water transpiration credits earned by State Forests for reforestation and sold to irrigators	Large-scale reforestation, including planting of desalination plants, trees and other deep rooted perennial vegetation	Irrigators pay $40/ha per year for 10 years to the State Forests of NSW, a government agency that uses the revenues to reforest on private and public lands, keeping the forest management rights.

Excerpted from: Scherr, Sara, Andy White, and Arvind Khare with contributions from Mira Inbar and Augusta Molar. 2004. "For Services Rendered: The Current Status and Future Potential of Markets for the Ecosystem Services Provided by Tropical Forests." Yokohama, Japan: International Tropical Timber Organization (pp. 30-31).

Section 2:
Pro-Poor PES:
Opportunities, Risks, Ideal Conditions & Considerations of When to Pay for Expertise

Payments for ecosystem services are not designed to reduce poverty. Rather, PES primarily offer economic incentives to foster more efficient and sustainable use of ecosystem services.

There are, however, opportunities for designing PES which can enable low-income people to earn money by restoring and conserving ecosystems. This is a critical selling point, because many rural people earn their living from natural resource-based activities, such as forestry and farming. Short-term incentives exist for unsustainable forestry and farming practices, which can draw down natural capital and limit options for future development. In certain contexts, PES can present new incentives for sustainable management – in the form of regular payments for ecosystem services. These regular payments could in turn promote long-term sustainable use and even conservation of the resource base by providing both a reliable source of supplemental income and additional employment in the community. Even a modest payment, reliably delivered over many years, may in certain contexts provide a meaningful increase in net income as well as a mechanism for adopting more sustainable land management. The relationships between PES and poverty reduction are explored further in Boxes 5 and 6.

BOX 5

Pro-Poor Payments for Watershed Services

"Payments for Watershed Services (PWS) currently exist in Costa Rica, Ecuador, Bolivia, India, South Africa, Mexico, and the United States. In most of these cases, maximizing watershed services through payment systems has led to poverty reduction.

"While there is clear potential for tradeoffs between poverty reduction and watershed services goals, practitioners and policymakers around the world have already shown that they can design and implement PWS programs that minimize these tradeoffs. Indeed, because PWS initiatives are (by definition) voluntary, because they involve transfers of wealth (often from wealthier urban areas to poorer rural areas), and because they can empower the poor by recognizing them as valued service deliverers, PWS schemes are actually more likely to have pro-poor impacts than most other environmental management interventions."

Excerpted from: Asquith et al. 2007; L.A. Bruijnzeel and Meine von Noordwijk. 2007; C. Agarwal and P. Ferraro. 2007.

In exploring PES, it is important to remember that you can structure deals for individuals, entire communities, or both – depending on the situation. Regardless of who the deal is structured to benefit, however, positive "ripple effects" – such as increased local economic development and improved natural resource productivity – can flow to a number of beneficiaries. That is, over the lifespan of PES agreements, communities are also likely to derive additional indirect benefits from the regulating and supporting services these ecosystems deliver, such as water purification, natural hazard buffering, flood regulation, and others.

PES can also be established to contribute to the formalization of resource tenure and the clarification of property rights. Since PES schemes explicitly recognize the role of environmental stewards, PES agreements could strengthen rural peoples' position in other resource-based negotiations.

The key is to carefully consider the benefits that a community, group of sellers, and/or individual sellers of ecosystem services are interested in during the design stage of a PES deal.

Proceed With Caution

Despite these potential benefits and cases of success with contributing to poverty alleviation, you should note that PES are not a panacea. PES deals will seldom provide all of the financial resources needed for a resource-dependent family or community. In addition, and even more importantly, PES are not feasible everywhere.

BOX 6

Potential Benefits of PES for the Rural Poor

In the short-term:

- **Increased cash income** for consumption or investment purposes (such as increased caloric intake for children, expanded access to education and health care, new products for sale, improved enterprise productivity, etc.)
- **Expanded experience with external business activities** through PES-related economic transactions and interactions with PES-relevant intermediaries
- **Increased knowledge of sustainable resource use practices** through training and technical assistance associated with PES deal implementation

In the long-term:

- **Improved resilience of local ecosystems** and flow of ecosystem services
- Potential for **higher productivity land** due to ecosystem service investments

You may, for example, find PES quite difficult to implement in areas where institutional capacity and transparency are lacking, or where resource access and ownership are in dispute. In these situations, buyers will be leery of engaging in deals because they will have doubts that the activities paid for will be implemented over time. More importantly, if deals are poorly structured, then sellers of ecosystem services could see resource rights undermined, conflicts accentuated, and/or benefits minimized. These issues represent a few of the many potential risks associated with PES agreements for rural residents and communities.

Potential Risks of PES for "Sellers" of Ecosystem Services

A range of potential risks exist for the rural poor in entering into PES deals. Therefore, careful consideration should be taken of the following:

- **Inadequate understanding of what is being bought and sold, and long-term implications for local livelihoods and resource rights.** The use of PES implies a market-based focus on relatively abstract ecosystem services, which may contrast with cultural conceptions and economic models operating within traditional communities. It is important to identify and consider these potential issues and "friction" points prior to actively exploring a PES deal.
- **Loss of rights to harvest products, or environmental services.** Prior to agreeing to a PES deal, it is essential to lay out a resource plan that accounts for sellers' access to forest resources – for food, fuel, non-timber forest products, medicines, and other items. This component is key to ensuring that the PES deal does not result in loss of rights to critical, non-negotiable activities for prospective sellers and/or local communities. Consultations with all resource users on the land in question are essential in this process.
- **Other opportunity costs.** The possible loss of non-PES opportunities should be weighed against revenues from a PES deal. For example, if a community enters into a PES contract, donors and aid organizations may decide the community is less in need of their support. It is worth assessing whether any such potential opportunity costs are associated with a PES deal.
- **Loss of employment.** If a PES deal includes reduced land management activities, then it could reduce jobs.
- **Unfair outcomes.** There is a potential for unfair sharing of net revenues when rural communities form partnerships with business entities to supply ecosystem services, especially when there is asymmetric information on the demand market.

"Take your time. And don't sign it, if you don't fully understand."

– Chief Oren Lyons,
Onondaga Nation Council of Chiefs of the Six Nations of the Iroquois Confederacy

The UN Permanent Forum on Indigenous Issues (April 25, 2008).

- **Increased competition for land, or loss of rights to land.** Success with PES could attract speculative investors, which could in turn squeeze out indigenous landowners, especially where low levels of tenure security exist.
- **Loss of critically important ecosystem services.** In designing a project, the needs of the entire ecosystem must be taken into account. Poorly-designed carbon sequestration projects, for example, could negatively impact both the watershed and biodiversity if they lead to large-scale monoculture plantations. Likewise, watershed service projects that measure success in terms of water flow may create incentives to divert water from the irrigation of local crops to downstream water delivery in a drought year, jeopardizing subsistence farmers.
- **Confusion over resource and ecosystem service rights.** PES schemes compensate people for taking action to maintain or enhance ecosystem services, but do not necessarily transfer resource rights. This distinction (and accompanying confusion) is particularly pronounced in hydrological / water-related services payments, which do not entail transfer of water rights, per se. In the same way, biodiversity offsets payments would not necessarily imply accompanying control over biological or genetic resources. It is essential that agreements are clear on these distinctions.
- **Loss of control and flexibility over local development options and directions.** Poorly-designed easements or long-term contracts can limit land management activities to a narrow range of alternatives, which could cost community residents their rights to exercise certain options for managing their land. The limitations should be carefully scrutinized in light of potential future options that sellers of ecosystem services wish to keep open.
- **Performance risk and need for insurance.** Where payments are dependent upon delivery of specific ecosystem service outcomes, factors outside producers' control may result in failure to achieve contractual obligations and, subsequently, non-payment. For example, wildfires, insect infestations, or changes in rainfall could all affect forestry-based implementation activities. Therefore, it is ideal that all participants in PES schemes employ some type of insurance strategy, such as formal insurance or making sure that management activities cover a larger enough number of hectares to ensure the total number called for in the deal can be successfully included. Unfortunately, formal insurance policies are rarely used in tropical forestry, but new insurance products are being developed for large-scale companies (Cottle and Crosthwaite-Eyre 2002). The key of course will be the cost of these insurance policies and who bears the cost. If a buyer is willing to pay for insurance, that is – from a seller's stance – ideal. However, if that approach is not of interest to a buyer, then at least it is ideal to have risk sharing – between sellers and buyers – included in agreements so that not all risk is borne by sellers.
- **Incompatibility of PES with cultural values.** In some communities, PES is viewed as a commoditization of services that should not have a price tag attached. Critics are also concerned that communities who are the custodians of those services or other poor "downstream" beneficiaries could themselves be made to pay for services as well.

Prior to investing in a full-fledged PES deal, potential sellers and/or their partners should not only undertake a risk assessment in order to understand whether these issues or others are relevant to a specific site and context, but also consider the context in which PES deals are currently carried out, as well as the situations in which PES deals are most relevant and likely to succeed.

Limiting Factors

A range of limiting conditions currently inhibits the widespread application of PES in rural communities, including:

- **Limited access to information** about payments for ecosystem services, the economics of land use, and downstream resource users or prospective PES buyers.
- **Lack of financing for PES assessment**, start-up, and transaction costs.
- **Limited bargaining power** to influence, shape, or enforce rules and contracts; to resolve disputes; or to process grievances, particularly with private sector actors.
- **Limited asset base to absorb risks, invest time and resources in management**, or to weather periods of lower returns or higher labor requirements.
- **Limited organization or outreach to aggregate supply of services** needed to attract a range of buyers.
- **Lack of efficient intermediary institutions** to reduce transaction costs along the value chain to buyers.
- **Local priorities for meeting ecosystem service needs.**

Ideal Conditions for PES

In light of these limitations, PES deals are most likely to flourish when and where:

- **Demand for ecosystem services is clear and financially valuable to one or more players.** PES are most likely to occur when there is at least one beneficiary of ecosystem services with both an incentive to invest in the maintenance of this service and available funds for doing so.
- **Supply is threatened.** If resources are clearly diminishing to the point of scarcity because of a declining ecosystem service, then a PES deal holds potential.
- **Specific resource management actions have the potential to address supply constraints.** For PES to be a viable option, it is essential to identify what resource management practices could be changed and what ecosystem services results will ensure improvement of 'supply' issues.
- **Effective brokers or intermediaries exist** who can assist with documenting ecosystem service conditions, identifying specific resource management alternatives, aggregating multiple landowners/resource users (if needed), engaging and negotiating with prospective buyers, and any other activities related to implementation (including monitoring, certification, verification, etc.).
- **Contract laws not only exist but are enforced, and resource tenure is clear.** The supplier must have control over the area where the PES agreement is to be implemented, and the buyer must have assurance, and recourse to ensure, that contract provisions of the deal are secure.
- **Clear criteria for evaluating equitable outcomes across partners are established.** In the case where partnerships are formed to supply the ecosystem service, clear criteria of fairness need to be designed and agreed by all parties to the transaction.

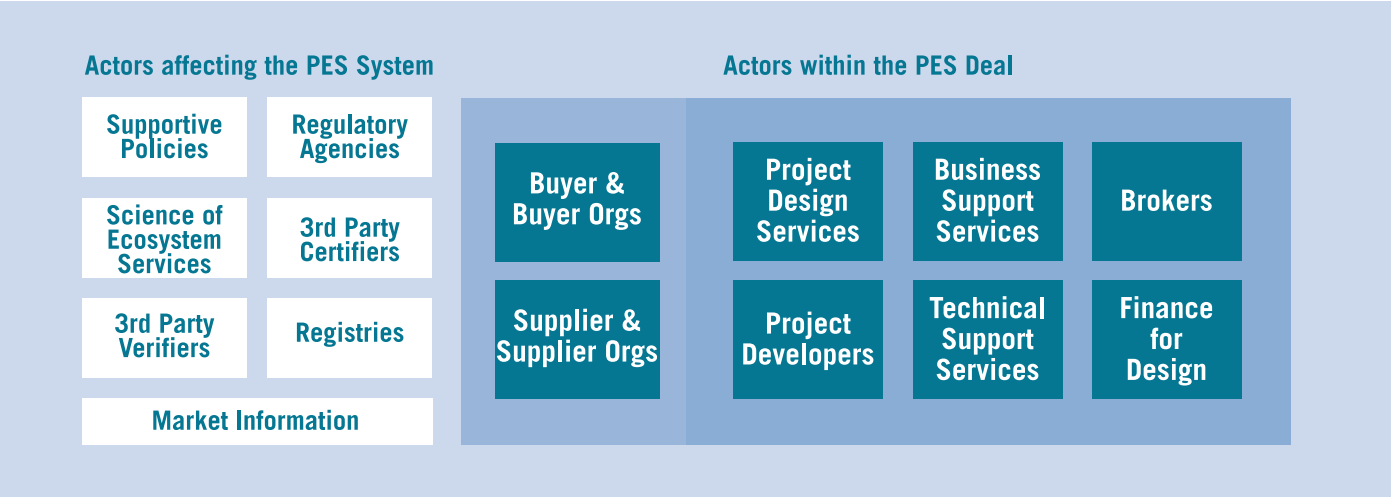
Overall, the development of PES will be shaped by the context in which it is emerging. Within this context, proactive efforts will be needed to meet the needs of low-income ecosystem service sellers and users. On a discrete PES deal-basis, honest brokers can play an important role, as discussed below and throughout this primer.

However, if PES is to develop on an ecologically and economically significant scale, then a robust set of private, public, and nonprofit institutions – as illustrated in the

diagram below – must be established to meet and adapt to market needs.

Without a dedicated effort, PES will bypass the poor. Opportunities must therefore be carefully developed, nurtured and monitored to ensure that the benefits are realized by the people who need them most. Entities and institutions that are nurturing this process along will be important components of the process.

FIGURE 1
Institutional Actors in Expansion of PES Deals



Adapted from: Bracer, C., S. Scherr, A. Molnar, M. Sekher, B. O. Ochieng, and G. Sriskanthan. 2007. "Organization and Governance for Fostering Pro-Poor Compensation for Ecosystem Services." CES Scoping Study Issue Paper No. 4, ICRAF Working Paper No. 39. Nairobi, Kenya: World Agroforestry Center.

Considerations of When to Pay for Expertise

If you are a potential ecosystem service seller or represent a group of sellers, then you need to honestly and critically appraise your own risks, opportunities, experience and abilities. In addition to considering the potential risks and benefits (laid out above), this assessment should consider capacity related to key PES activities, such as measuring and creating a "baseline" or "current status" study of ecosystem services, negotiating deals, managing complex resource management projects, and other such activities related to PES deals, before trying to develop a PES deal.

Overall, key questions to ask in any PES assessment in a particular area – or with a specific group of land owners – should include questions such as:

- **What is the capacity and past experience of potential ecosystem service sellers' (or key partners') to:**
  - Assess potential risks and benefits associated with complex agreements, such as PES deals?
  - Negotiate complex agreements with external (potentially private sector) entities, including multi-year or even multi-decade deals?
  - Handle financial transactions with external / non-community-based entities?
  - Ensure (if the deal is community-focused or even multiple seller-based) equitable and fair distribution of the revenues generated by a deal with a non-local entity?
  - Implement complex natural resource management deals?
  - Assure – through ongoing monitoring, evaluation, and even external, third party verification – that the money paid with a PES deal will indeed lead to the promised (ecosystem service-related) outcomes?

- **Based on this review of past experience and existing capacity, what needs to be done in parallel to address any gaps, such as:**
  - Analytical and/or technical knowledge related to assessing and developing a PES deal?
  - Negotiation experience or advocacy experience?
  - Financial management capability that is transparent and clear to rural community members with variable levels of experience with accounting and financial management?
  - Natural resource management know-how, such as related to sustainable / eco-agriculture, sustainable forestry and silviculture, etc.?
  - Rigorous monitoring and evaluation?

In many communities and for many prospective PES sellers, significant gaps will emerge in an initial PES capacity assessment. For this reason, it is likely that many potential PES sellers will benefit from external assistance with a few or many aspects of the PES agreement.

Many prospective sellers of ecosystem services – particularly multiple sellers within rural community – will find that they need trusted brokers and strategic partners who can identify potential PES deals, prepare key documents, and assist in negotiating agreements. Without honest brokers advising on the intricacies and risks of these deals, rural community residents could find themselves carrying all of the project liability over years or even decades. If that happens, then events beyond their control, such as wildfires, could easily wipe out their portion of the land management activities and all payments promised within PES agreements.

What's more, buyers generally are not obligated to pay for the services until the seller actually delivers them – and this, again, is often years or decades after the work has begun, raising the issue of how to cover "start-up" and "transaction" costs, which can be substantial. These include the cost of assessing the value of the ecosystem services, identifying and approaching prospective buyers, negotiating and closing a deal, and finally implementing the agreement.

An honest PES broker can advise prospective ecosystem service sellers on how to explore ways of covering these costs up front, whether through donor organizations, other revenue generating schemes, loan mechanisms, trust funds or nongovernmental organizations that are focused on PES. In rare cases, prospective buyers will be able to finance these start-up costs and then subtract them from the amount paid to the seller upon delivery.

You may also find PES intermediaries such as aggregators, who are still buyers, but focused on putting together multiple projects that they lump together and then sell further. These entities are often willing to fund the start-up, aggregation and registration costs in exchange for a profit-share with communities or landowners in the ultimate sale of the ecosystem services. Again, a honest broker can be useful in finding, comparing, and selecting a potential intermediary to work with as one way to defray start-up costs.

Brokers can also assist in finding and negotiating with potential buyers. This first element of finding a buyer is key, as is discussed in detail below. Without a willing and able buyer, there is no PES deal. Another element to finding and convincing a potential buyer to engage is assuring the buyer that a PES deal will not shift unsustainable land management practices to other areas (a concept known in the carbon arena as "leakage").

Ecosystem service buyers will be open to criticism (and less willing to continue with the deal) if such a shift in impacts occurs. Therefore, it is important to develop an explanation of why/how such "leakage" will not occur and it may be useful to have a honest broker/advisor assisting in considering this issue.

Sellers may wish to have an experienced advocate at their side during negotiations – not only to ensure that all deal details are favorable to the seller, but to ensure that the deal does not include any provisions that would ask community members to adopt land use or management practices that undermine their livelihoods or reduce their access to ecosystem services and resources. It is also useful to have an advocate for the buyer and seller sharing risk over time.

Finally, brokers can assist in advising on particulars of accounting and reporting systems to ensure that they are transparent to both seller and buyer. If the seller is a community, then members need to openly and equitably agree on how to invest the proceeds of the sale into the community in a way that does not lead to adverse unintended consequences. A third party can assist by facilitating these discussions. Open dialogue and agreement among all participants, and any community seeking to raise income via PES should explore this issue area in depth.

Overall, as you will see in the following pages, identifying and crafting PES deals requires significant investment of time and resources, which can be trying for a potential seller who is focused on ensuring that his or her family or community has food every day. Therefore, the most feasible approach may be for community-based and/or community-focused nonprofit organizations to play a role in many of these steps, such as those outlined below.

BOX 7

Potential Roles for Honest Brokers of PES Deals

- **Helping sellers assess an ecosystem service 'product' and its value to prospective buyers**, through identifying and documenting:
  - what ecosystem services may be available to sell,
  - how much exists,
  - what the market context is (such as regulated or voluntary),
  - what business case exists for a company to invest in, and
  - what value the ecosystem service has and what market price has been paid (ideally based on comparative prices from the same area).
- **Assisting sellers with establishing relationships and rapport with potential buyers**, through:
  - developing a list of potential buyers,
  - setting up meetings between prospective sellers and buyers, and
  - facilitating meetings to ensure that expectations of both buyers and sellers are met.
- **Enabling sellers get to know potential buyer(s) well**, by ensuring that meetings reveal key details, such as:
  - prices paid for comparable payments for ecosystem services (and why these are the prices),
  - buyer's views on potential business benefits, and risks, of entering into agreements and making payments for ecosystem services, and
  - challenges being faced by the company that may inform their interest and price sensitivity related to a purchase.
- **Assisting with proposal development**, by:
  - quantifying ecosystem services to ensure appeal to buyers,
  - pricing of services,
  - addressing, and lessening as much as possible, transaction costs,
  - structuring agreement,
  - selecting a payment type that interests both seller and buyer
  - assessing various approaches to financing,
  - identifying and getting agreement on corporate point people, and
  - keeping the discussions in motion.
- **Ensuring that the final agreement is in sellers' best interest and providing risk management advice and services**, as well as negotiating on behalf of the community.

Throughout the process of building PES deals, intermediaries acting as honest brokers have the potential to play an enormous enabling role.

If you are a prospective ecosystem services seller considering potential brokers, you should begin by approaching formal and legitimate organizations that are engaged in the community. Many NGOs, for example, have years of experience working with indigenous people and/or rural communities. When contacting a community organization or a support NGO, it is always important to remember that the interests of these organizations do not always reflect those of the people they ostensibly represent. It is critical to examine how the NGO interacts with and relates to the community, and to verify trust in the organization. This assessment could include reviewing:

- how a potential partner/broker is funded,
- who else they have partnered with,
- what their mission statement is, and
- whether they adhere to a set of institutional values that govern their operations.

You should, obviously, look for partners who have experience with other PES deals or similar agreements, and you can get a feel for the level of experience a broker has with PES by talking through each of the following steps and asking the potential broker / partner to describe their past experience with each element.

Now, on to the steps of assessing and putting together PES deals.

Section 3:
A Step-by-Step Approach to Developing PES Deals

The development of PES deals follows four core steps, outlined below and dealt with in more detail in the pages that follow.

Step 1: Identifying Ecosystem Service Prospects & Potential Buyers

- ✓ Defining, measuring, and assessing the ecosystem services in a particular area
- ✓ Determining marketable value
- ✓ Identifying potential buyers who benefit from the service
- ✓ Considering whether to sell as individuals or as a group

Step 2: Assessing Institutional & Technical Capacity

- ✓ Assessing legal, policy, and land ownership context
- ✓ Examining existing rules for PES markets and deals
- ✓ Surveying available PES support services and organizations

Step 3: Structuring Agreements

- ✓ Designing management and business plans to provide the ecosystem service that is the focus of the PES deal
- ✓ Reducing transaction costs
- ✓ Reviewing options for payment types
- ✓ Establishing the equity and fairness criteria for evaluating payment options
- ✓ Selecting a contract type

Step 4: Implementing PES Agreements

- ✓ Finalizing the PES management plan
- ✓ Verifying PES service delivery and benefits
- ✓ Monitoring and evaluating the deal

Read on for a more detailed explanation of each step.

Step 1: Identify Ecosystem Service Prospects & Potential Buyers

Checklist

- ✓ Define, measure, and assess the ecosystem service being provided in a particular area
- ✓ Determine marketable value
- ✓ Identify potential buyers who benefit from the service
- ✓ Consider whether to sell as individuals or as a group

How do you develop a clear offer for prospective buyers?

The first step in preparing a PES deal is to identify:

- What ecosystem services exist on lands to which a potential seller has clear resource use rights and/or ownership?
- Who benefits from these ecosystem services and/or is experiencing problems due to diminished availability of these services?
- Which land use management practices will yield the desired ecological outcomes, ideally within the highest degree of scientific certainty possible?

BOX 8

Key Technical Questions for Ecosystem Service Sellers

Before initiating conversations with potential private sector buyers, ecosystem service sellers must be able to clearly answer questions such as:

- What is the quality, and current status, of the ecosystem services that might be the focus of a PES deal?
- How do you verify this? (Ecological studies? Community reports? Other sources?)
- What are the odds of an ecosystem's resilience being enhanced and maintained over time, in order to enable / support flow of ecosystem services? With what practices? Over what time span? What data supports these assertions?
- What is the price? Why? Are there comparable PES deals that you can cite?

By answering these questions, you will spell out what ecosystem service is for sale, who the potential buyers are, and how the ecosystem service can be restored and maintained. All elements hinge on technical questions (see box on "Key Technical Questions for Ecosystem Service Sellers").

For example, if Kenyan farmers were interested in gaining access to the carbon market, they would need to develop plans for projects that reduce greenhouse gases. Farmers could consider reforesting portions of their land or making changes in agricultural practices. In both of these cases, ecosystem service sellers would need to document how the adoption of specific resource management practices would sequester exactly how much carbon per hectare.

These questions are highly technical, and you will often need scientists to assist with this step. Firms can help design initiatives, prepare documentation, and even register carbon credits from different projects; but contracting such firms can be very expensive (see box on "Identifying Potential Resources and/or Partners for Quantifying Ecosystem Services" for further resources).

BOX 9

Identifying Potential Resources and/or Partners for Quantifying Ecosystem Services

Several organizations may be able to help identify resources and/or partners capable of demonstrating that a seller is able to deliver an ecosystem service that buyers can quantify. These include:

General Information

- Katoomba Group (http://www.katoombagroup.org/)
- Ecosystem Marketplace.com (http://www.ecosystemmarketplace.com/)

Carbon

- Center for Capacity Building (http://www.ccb.ucar.edu/)
- The Edinburgh Centre for Carbon Management's Plan Vivo (http://www.eccm.uk.com/expertise_services/developing_projects/plan_vivo.html)
- EcoSecurities (http://www.ecosecurities.com/)

Water

- World Resources Institute's NutrientNet (http://www.nutrientnet.org)
- The Natural Capital Project – a consortium of Stanford University, World Wildlife Fund and The Nature Conservancy (http://www.naturalcapitalproject.org/)

Biodiversity

- Business and Biodiversity Offsets Program – a joint program by Forest Trends and Conservation International (http://www.forest-trends.org/biodiversityoffsetprogram/)

A successful sale begins with answering the question, "What are you offering a buyer?" In the example of Kenyan farmers looking to sell carbon credits, the answer is relatively straightforward: their product is carbon sequestration, and prospective buyers include companies that emit large amounts of carbon and need to offset their emissions – either to comply with regulations or because their company has a voluntary carbon offset program.

Carbon sequestration, of course, is only one type of ecosystem service around which payments have been made. The major types of ecosystem services that have been sold to date include:

- Carbon storage and sequestration
- Wetlands conservation
- Watershed protection (including soil protection)
- Species, habitat, and biodiversity conservation

Any or all of these services could be the focus of PES deals, and bundling several types of ecosystem services together in one project can maximize income and diversify risk.

You also need to identify the land management actions needed to "deliver" the ecosystem service that is the focus of the PES deal. Saleable ecosystem services can be identified by focusing on:

- **Specific ecosystem services that can be enhanced through particular changes in natural resource management actions** (such as sequestering carbon through no-till agriculture, reducing sedimentation in rivers naturally through re-foresting hillsides, etc.). For example, a landowner may ascertain that buyers exist for improved water quality, which could be the focus of PES deals that include a combination of conservation easements, payments for riparian buffers, and/or payments improved livestock management.
- **New natural resource management activities that are of interest to a landowner or community, and would produce ecosystem service benefits, but are too costly to adopt without external assistance.** For example, a landowner looking to adopt agroforestry strategies for rural development may offer hydrological and/or carbon benefits.

Either starting point may be valid, depending on the project context. The key is clearly matching management activities and ecosystem services outcomes. Plenty of well-intentioned natural resource management activities, conservation projects, and development actions yield no saleable ecosystem services. Reforestation of upland watersheds, for example, may actually decrease downstream flows (see Box 13), and many valuable biodiversity conservation actions may provide only limited carbon benefits.

Beneficiaries of ecosystem services are often far downstream, well away from the

source of the service. Sellers need to keep this in mind when trying to figure out which potential buyers are most likely to find it worthwhile to pay for their services, as the case study below illustrates.

BOX 10

Developing a Clear Offer: Selling the Value of Forested Hillsides to Retailers Using the Panama Canal

As deforestation in the hills surrounding the Panama Canal has increased, it has caused erosion and siltation of the canal – as well as increased uncertainty about freshwater supplies. The result is an annual cost of about $60 million in canal dredging fees, as well as seasonal water shortages. ForestRe, a forestry insurance company, saw an opportunity to protect the watershed by paying farmers and local communities to reforest the watershed by planting trees and changing practices to avoid further deforestation. ForestRe also knew that insurance companies were charging high premiums to offset the risk that shipping would be interrupted if the canal were closed or blocked.

The company proposed the creation of a bond, the revenues from which would flow to local farmers willing to change their practices. The buyers of the bond would be canal users willing to support the bond in exchange for reduced insurance premiums.

The plan hinged on persuading insurance companies that offering reduced premiums in exchange for support of the bond would reduce the risk more than it would reduce premiums. The idea was to get major users of the canal – including giant retailers like Wal-Mart and Sony – to support the bond, which in turn would help ensure ongoing access to the canal and ideally also enhance freshwater supplies. The key question, of course, is ensuring that these actions are indeed tied to decreased siltation and dredging costs as well as reliable water flow in the Panama Canal, which should be an ongoing source of scrutiny and examination over the "lifespan" of any payment for ecosystem service.

Sources: http://rs.resalliance.org/2005/04/26/environmental-economics-and-the-economist/; http://www.luwrr.com/uploads/paper02-02.pdf says. http://www.cluwrr.ncl.ac.uk/research_projects/recent_projects/prj_panama.php

What ecosystem services do you want a buyer to pay for?

There are various methods of measuring the benefits of ecosystem services that would be the focus of a PES deal, and it may be in the best interest of all parties to engage scientists and other experts, if only on a short-term contractual basis, to undertake measurements. A few of the key measurement issues for each type of ecosystem service are detailed on the following pages.

The level of certainty (or uncertainty) that buyers are willing to accept is key, and should be assessed through similar PES deals so that prospective sellers know the level of detail to seek out in assessments as well as have a sense of potential price that will be paid. The questions and concerns related to certainty and uncertainty will vary from buyer to buyer, but could include issues such as:

- **How certain are ecologists and other experts that a particular set of natural resource management practices will result in a specific set of ecosystem service-related outcomes**, such as planting trees on a certain hillside and avoiding erosion, or improving water quality, etc.?
- **How certain is it that the desired ecosystem service outcomes will be achieved, given the potential for other unanticipated dynamics** (natural or otherwise, such as climate change factors – including varying rainfall patterns, wildfires, insect infestations in forests, demographic trends, and land pressures, etc.)?
- **What level of certainty does a buyer – particularly a private-sector buyer – need to have documented to show a comprehensive review of the issues ("due diligence")**, specifically as a component of a buyer's own risk management strategy for reputational issues, building the "business case" within their own company, or for other reasons?

- **How certain is the buyer that the sellers will fully implement the deal agreement?** What level of monitoring and verification should a buyer require?

By considering these questions and looking at other PES deals – ideally in your province or at least your country or region – you will gain a sense of the level of detail that buyers of ecosystem services may expect.

Carbon Sequestration and Capture

What?
To address key drivers of climate change, sellers might offer to provide, for a fee, services that help sequester carbon.

How?
- Preventing deforestation
- Reforesting land, particularly in tropical regions
- Reducing methane from farms, such as through manure management practices or changing the type of feed given to animals
- Implementing conservation tillage in agriculture to minimize release of carbon from the soil
- Avoiding actions that increase acidity of the ocean and release carbon.

Why?
- Keeping carbon dioxide in trees, oceans, and soil rather than releasing it into the atmosphere
- Increasing the uptake of carbon by trees and within forests
- Preventing:
  - release of methane to the atmosphere
  - increases in the atmospheric temperature
  - acidification and warming of the oceans

Measurement?
In order to quantify carbon sequestration and storage through land use, land use change and forestry activities over time, you will need to take inventories using carbon models employing a combination of on-site measurements and remote sensing.

Depending on pre-existing data and the level of details potential buyers desire, the first phase can be labor-intensive and expensive through on-the-ground work, while future measurements may rely more on remote sensing data than field collection. A growing body of information and available expertise on measuring carbon sequestration now exists, as outlined in the tables below. You should note that, although basic guidelines on forestry-based carbon sequestration in the tropics (see Table 6) do exist, you will still have to tailor the work to the needs of your specific site.

BOX 11

Materials on Measuring Carbon

- **The BioCarbon Fund's "Operation Handbook"** covers issues of permanence, preparing afforestation/reforestation projects' project document templates, and social and environmental benefits) (http://carbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=DocLib&dl=1&ht=34) ENCOFOR toolkit (http://www.joanneum.at/encofor/tools/tool_demonstration/prefeasibility.htm)
- **IPCC Good Practice Guidance** (http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm)
- **The Nicholas Institute for Environmental Policy Solutions' Zach Willey and Bill Chameides** (Editors) 2007. ***Harnessing Farms and Forests in the Low-Carbon Economy: How to Create, Measure, and Verify Greenhouse Gas Offsets.*** Durham, North Carolina: Duke University Press. (http://www.dukeupress.edu/books.php3?isbn=978-0-8223-4168-0)
- **The Tropical Agricultural Research and Higher Education Center's (CATIE) "Guidebook to Markets and Commercialization of Forestry CDM Projects"** (Technical Manual no.65), which gives pointers to the steps to develop forest carbon projects (http://www.proyectoforma.com/Documentos/GuidebooktoMarketsandCommercializationofCDMforestryProjects.pdf)
- **Winrock International's work on the Use of Aerial Digital Imagery to Measure Carbon Stocks** (http://www.winrock.org/ecosystems/publications.asp?BU=9086)

TABLE 5

Illustrative Organizations that Measure and Monitor Carbon Stocks on Land

• **Winrock International**	http://www.winrock.org
• **Environmental Resources Trust**	http://www.ert.net/ecolands
• **Treeness Consult**	http://www.treenessconsult.com
• **Edinburgh Centre for Carbon Management**	http://www.eccm.uk.com
• **New Forests Pty Limited**	http://www.newforests.com.au

TABLE 6

Basic Guidelines on Carbon Sequestration and Conservation in the Tropics

Approach	Estimated Carbon Sequestration or Conservation *(in tons of Carbon dioxide per hectare)*	Time Frame	Accumulation Rate *(in tons of Carbon dioxide per hectare)*
Plantations (fast-growing species)	100 – 200 tCO2/ha	10–20 years	10 tCO2/ha/year
Agroforestry	90-150 tCO2/ha	5–20 years	4.5 – 30 tCO2/ha/year
Rainforest Conservation	300-600 tC02/ha	Static	Static

Source: Butcher et al, 1998; Brown, Sandra 1999

Watershed Protection Services

What?

To provide high-quality and reliable quantities of water in a watershed, sellers might offer to implement, for a fee, specific natural resource management practices or activities.

How?

- Restoring, creating, or enhancing wetlands for the purpose of compensating for damage or destruction to another wetland area
- Maintaining forest cover
- Reforesting, possibly with a focus on specific (often native) tree species
- Adopting 'sustainable' or 'best' land use management practices, such as from sustainable farming or sustainable forestry

Why?

Actions would be selected to provide some, or all, of the following benefits:

- Creating or maintaining natural filters in the watershed to reduce water pollution
- Maintaining vegetation in order to aid in regulation of water flow through the year
- Controlling for floods
- Minimizing soil loss and sedimentation

BOX 12

Online Water Quality Trading Tool: NutrientNet

NutrientNet uses both site-specific information (provided by the user) and geographical data to estimate nutrient loadings. This estimation tool can be adapted for any watershed and used to perform nutrient calculations using locally accepted calculation methods, delivery factors, and trading rules.

For point sources participating in a trading program, NutrientNet uses:

- current flow and nutrient concentrations to determine whether the source is over or under their permitted discharge limit, and
- a balance sheet to track each source's credits.

For estimating non-point source nutrient loadings, *NutrientNet* offers various methodologies for calculating nutrient reductions. Since agricultural non-point sources may differ between watersheds and water quality trading programs, the relevant stakeholders in the trading program must agree upon which *NutrientNet* calculation methodologies they plan to use.

Finally, *NutrientNet* has a Geographical Information System (GIS) mapping interface which can be used to pinpoint the location of the relevant operation or facility and provide any underlying spatial information needed to estimate nutrient loadings. Market participants can input zip codes as well as either aerial photos or a reference map to locate their farm and delineate where a conservation best management practice (BMP) will be implemented or installed. Various data layers underlying the map contain information such as soil type and texture, area, delivery factors, soil type and texture, and runoff volume, which can be used in the estimation of nutrient loadings.

For more information see www.nutrientnet.org.

Measurement?

Water quality issues are perhaps the easiest components to measure, while other hydrological dynamics related to flow (quantity of water) are more difficult. While many watersheds lack sufficient data, it may be possible to learn from measurements and relationships from similar watersheds where such data is available.

For example, efforts are being made to create basic guidelines for specific areas. In the case of Andean ecosystems, for example, a series of overall guidelines have been developed by Marta Echavarria, of Ecodecision, for the Tropical America Katoomba Group (available at www. katoomba group.org). In addition, tips on land use and hydrology from a 2007 meeting of hydrological experts are summarized below.

You may be tempted to extrapolate data from other watersheds to your own project, or at least satisfy the certainty demands of some buyers. This may work, but more often does not, and you must exercise extreme caution when doing so because watershed dynamics can vary greatly.

BOX 13

Tips on Land Use and Hydrology: What Do We Know?

The relationship between land use and hydrology is complex and at times counter-intuitive. Some of the more important general patterns include:

1. **A good cover of intact natural vegetation guarantees moderate water use and therefore optimum stream flow under given geo-climatic conditions.** It also affords maximum soil protection and therefore provides optimum regulation of seasonal flows and moderates erosion and stream sediment loads.
2. **M*ontane cloud forests* and related cloud-affected ecosystems such as paramos provide maximum amounts of stream flow** due to a combination of high rainfall, extra inputs from cloud water capture by the vegetation and low water use due to frequent occurrence of fog.
3. **Intact natural vegetation cover per se is no guarantee that flooding or landslides will not occur, but it does provide assurance that their frequency will be less** than is usually observed after conversion.
4. **Reforestation does not re-create the conditions of old-growth forest within the lifespan of most programs designed to restore hydrological conditions.** Indeed, the initial hydrological response to reforestation can in fact be negative from the perspective of downstream water users if the amount of water taken up by the trees offsets the benefits to the stability of the watershed.
5. **Large-scale (> 1,000 – 10,000 km2) removal or addition of old-growth forest in humid parts of the world affects rainfall during the transition between rainy and dry season.** Effects on annual rainfall are modest (5-10%) but are manifest mostly during this critical time of year.
6. **Removal or addition of forest initially affects annual water yield** (published range 100-800 mm for a 100% change in cover) with the actual change depending on rainfall and degree of surface disturbance. Subsequent water yield depends on the new land-cover type.
7. **Converting forest to non-forest cover increases low flows as long as soil degradation is kept moderate** (criterion: overland flow to remain <15% of rainfall assuming annual precipitation of ca. 2,000 mm).
8. **Converting forest to other uses is likely to reduce low flows once soil degradation proceeds to a stage where overland flow exceeds 15-20% of rainfall.** This degraded stage is typically reached after prolonged exposure of bare soil to the elements, by intensive grazing or the use of heavy machinery, too frequent or poorly timed use/occurrence of fire hampering vegetation recovery, and by the introduction of paved surfaces such as roads, settlements, and urban areas.
9. **Establishing forest on croplands or grassland is likely to reduce low flows when the extra water use of the trees is not off-set by improved infiltration. Increases in low flows require a sufficiently large improvement in infiltration after forestation.** For example, to compensate for 300 mm of extra water use by trees, a 30% switch from overland flow to infiltration is needed at an annual rainfall of 1,000 mm/year to break even. This can only be expected where soils are fairly degraded at their surface and yet deep enough to store the extra infiltrated water.
10. **Reforestation is unlikely to reduce flooding risk to the same degree as the former old-growth forest** because recovery of degraded soils often takes several decades and the impacts on drainage infrastructure (roads, housing) are not undone by tree planting.

Excerpted from: Asquith et al 2007; L.A. Bruijnzeel and Meine von Noordwijk. March 2007.

You should also be aware of ongoing scientific controversy, as well as challenges to various elements of "conventional wisdom" related to water flow. There is, for example, rigorous debate on the relationships between forests and flood control, between reforestation and water demand, and other such dynamics. Any resource management changes in a PES deal should be scientifically supported or carefully monitored during implementation to assess whether expected ecosystem service outcomes are being realized.

While there is no single, universally-applicable approach for all watersheds, various tools and software programs related to water quantity and quality do exist, and these offer a starting point from which to adapt or derive inspiration for work in a particular area.

Soil Protection Services

What?
To provide for healthy and intact soil, sellers might offer to undertake, for a fee, specific land and soil management activities.

How?
- Using forest cover to minimize soil erosion and loss of nutrients
- Implementing sustainable and/or 'precision' agricultural techniques to prevent excess application of fertilizers and other nutrients
- Switching to alternative agricultural practices such as conservation tilling, or protection of natural waterways to prevent soil erosion and maintain soil health and overall fertility

Why?
- Avoiding loss of soil through runoff
- Maintaining healthy soils and minimizing need to apply fertilizers and pesticides
- Reducing soil salinity

Measurement?
In measuring soil protection services, it is essential to consider erosion rates and current soil loss.

Biodiversity Protection

What?
To protect biodiversity, sellers might offer to protect species habitat or prevent a habitat from being fragmented in a way that undercuts the ability of the species to fully utilize it.

How?
Sellers might offer to provide, for a fee, activities such as:
- Establishing biological corridors between protected areas
- Creating new protected areas or strengthening ineffective protected areas
- Replanting degraded areas with native species and/or removing invasive alien species, as well as maintaining healthy soils and minimizing the need for fertilizers and pesticides
- Managing biodiversity to maintain quality agricultural products, ensure pest control, pollination, protecting genetic resources or general provision of key habitats
- Avoiding damage to areas of cultural, spiritual or aesthetic value
- Launching conservation projects outside of the project area

Why?
Maintaining biodiversity

Measurement?
Due to the expansiveness and complexity of biodiversity, there is no single agreed-upon way to measure it. Instead, biologists use many methodologies for assessing biodiversity across structural (type and amount of species) and functional (ecosystem services) levels. Two examples of current work on measuring biodiversity include:

- A group of experts and practitioners led by Forest Trends and Conservation

International in the Business and Biodiversity Offset Program is doing innovative work on the development of best practice biodiversity offset methodology, which includes biodiversity assessment techniques, and is available at www.forest-trends.org/biodiversityoffsetprogram.

- The Landscape Measures Resource Center (LMRC) aids in the development of locally-appropriate evaluation methods and indicators that jointly assess biodiversity conservation, sustainable production and rural livelihoods. The LMRC is an interactive, web-based tool that brings together methods and experience from around the world.

Ultimately, however, the metric to be measured in a specific biodiversity transaction will be agreed upon by the parties in the transaction.

Finally, note that not all measuring tools are ecosystem service-specific. The following, for example, was developed to measure the knock-on benefits to society of wetlands protection in Uganda, and could be adapted to measure the same knock-on benefits flowing from biodiversity and carbon sequestration projects:

BOX 14

Tool to Support Policy Decisions: Analyzing Tradeoffs of Using PES in Agricultural Settings

A policy decision support system known as Trade-Off Analysis (TOA) has been developed as a Joint Research Project by Montana State University, Wageningen University, and Makerere University. It is based on computer models to simulate land use and input use decisions and their impact on a variety of factors such as environment, poverty, human health, and food security. The tool will help to investigate the economic and institutional feasibility of using PES. It has been tested in both Kenya and Uganda to help farmers protect wetlands.

In its current application in Uganda, the key goal is to test the idea that PES could be an alternative to conventional agricultural and environmental policy tools in poor rural areas. The feasibility of using PES to reduce farmers' encroachment into wetlands, instead of paying government agents to enforce environmental regulation, is also being assessed. It is also being used to quantify the effects of PES on poverty and compare the effects to traditional agricultural and environmental policy instruments.

Local capacity building in application of this tool has been underway, as Makerere University teachers and researchers have been trained in the Tradeoff Analysis tool and its application.

For more information, contact Imelda Nalukenge, Makerere University - nalukenge@agric.mak.ac.ug.
See also: www.tradeoffs.montana.edu.

What "proof" can you offer of what a PES buyer is purchasing?

As with any business relationship, payment is contingent on the reliable delivery of the services being bought. A seller of a PES project will therefore need to provide documentation about both the 'baseline' – which is the initial status of the ecosystem services around which a deal is crafted – as well as the ongoing status of the services over time in order to show that the services being paid for are either continuing or improving. Sellers may also need to provide regular and/or independent verification of their actions and how these actions provide specific ecosystem services. The specifics of these requirements will vary depending on what the buyer requests and what is negotiated in the final agreement.

To document the current status of ecosystem services and how current natural resource management practices affect these services, potential ecosystem service sellers and their partners can work with science-based organizations to:

- Map ecotypes and the services they provide
- Map land uses
- Identify and quantify as much as possible the ecosystem services provided
- Analyze how different land-use activities affect the provision of ecosystem services
- Quantify and/or conduct analyses to value (or place a price on) the ecosystem services, ideally based on comparable deals in the area

As we mentioned earlier, there are a variety of methods for quantifying ecosystem services that are distinct for carbon sequestration, water, or biodiversity. Many of these methods are highly technical. It may, therefore, be in the interest of all parties to engage scientists and other experts to undertake measurements, if only on a short-term contractual basis.

A range of public, private, and non-governmental institutions can provide support services here. Verification and documentation, for example, have become veritable cottage industries. In fact, wherever highly specialized expertise is needed for limited time periods – such as when quantifying ecosystem services or developing ecosystem monitoring methods – specialized entities can be found to provide business and technical support services (For information, please see appendices and the 'PES Tools' page of the Katoomba Group website at: http://www.katoombagroup.org/).

Potential sellers can also explore working with an aggregator – an entity that assembles groups of sellers and then goes on to negotiate for a deal related to all of these sellers together – with the explicit request that the aggregator take this scientific assessment on as part of their work in crafting a PES deal. Be aware that the aggregator will probably factor these costs into the deal and negotiate for a greater share of the profits from the ultimate sale.

Sellers should generally decide how they want to document ecosystem services before they begin looking for buyers or formulating a PES deal. If they don't want to spend money on scientific expertise, they can explore other avenues for getting this covered – such as forming a partnership with a science-focused nonprofit organization or working with certain aggregators. Either way, sellers need to carefully consider the financial impact their decision will have on the deal's bottom line.

How do you assess marketable financial value?

The price for an ecosystem service is ultimately determined by what the buyer is willing to pay and what the seller is willing to accept and deliver. In regulated markets, this 'willingness to pay' is often mandated, while in voluntary PES deals it is negotiated.

Negotiations can include a range of reasons for setting a price, such as:

- **Economic value** or the quantification of economic benefits of the services from a societal point of view (both direct and indirect),
- **Financial value** which is a combination of:
  - the actual private financial benefits to specific actor(s) that can be estimated based on the costs of replacing an ecosystem service if it were damaged or not available
  - the costs to the landowner of making needed resource management changes, such as costs of planting trees
  - the costs of developing the transaction, including creating baseline documentation of current ecosystem services status, developing a plan for changing practices to improve ecosystem service flows over time, etc.
- **Relative costs of alternatives** such as the cost of building a water treatment plant versus investing in natural ecosystem service-based filtration,
- **Market or transaction price** which is partly a reflection of perceived risks and uncertainty as well as bargaining power or the existence of co-benefits, and
- **Pricing of similar deals.**

Many factors determine the price that buyers are willing to pay for an ecosystem service, as well as the price at which a seller is willing to deliver the same service. The degree of competition in both supply and demand is, of course, key.

Buyers will tend to seek the lowest-cost suppliers of services, though there is growing interest in – and a premium placed on – the 'co-benefits' from some PES deals, such as conservation of habitat, poverty alleviation, and other factors. That is, there is a growing number of buyers who are looking for deals that have proven benefits to the surrounding community or that have been endorsed by a credible NGO, thereby reducing the risk that the transaction will be labeled 'greenwash.' In these cases, while cost is important, it is secondary to the 'quality' of the product or even the 'story' associated with the PES deal.

In most current deals and markets for ecosystem services, potential supply is likely to outstrip market demand, suggesting that prices will typically be fairly low. A case in point is carbon: the market value (i.e. the price paid for a CO2 credit) varies depending on whether one is selling into the US market, where compliance is almost always voluntary, or into the European Union market, which is driven by a need to comply with the Kyoto Protocol. This price is determined by the interaction of supply – and the marginal cost of providing an offset and bringing it to market – and demand, which includes the marginal cost of reducing emissions to meet mandatory caps or the perceived public relations benefit of buying voluntary offsets.

In some cases (and these may be rare), valuation studies can help generate demand for a service. However, in no case should valuation studies be confused with the actual price of an ecosystem service.[1]

[1] Perhaps the most well-established use of valuation methods to determine "marketable value" is in the area of park entry fees and hunting licenses.

Further information and tools on measuring the economic value of ecosystem services are provided in the table below.

TABLE 7

Tools for Measuring the Value of Ecosystem Services

Name / Organization	Description	Web Site
Convention on Biological Diversity	Website with materials on valuing biodiversity	http://www.cbd.int/incentives/valuation.shtml
Ecosystem Valuation Website	Website that "defines and explains some important concepts related to how economists approach ecosystem valuation"	http://www.ecosystemvaluation.org/1-02.htm
The National Academies Press	Book entitled Valuing Ecosystem Services: Toward Better Environmental Decision-Making (2004)	http://www.nap.edu/openbook.php?isbn=030909318X
Timothy Dalton and Kelly Cobourn	Ecosystem Services Valuation & Watershed Services: An Annotated Literature Review	http://gisweb.ciat.cgiar.org/wcp/download/ecosystem_valuation.pdf
World Changing Tools	Ecosystem Goods and Services Series: Valuation 101	http://www.worldchanging.com/archives//006048.html
World Resources Institute	Economic Valuation of Coral Reef Goods and Services in the Caribbean	http://www.wri.org/biodiv/project_description2.cfm?pid=222

In sum, as sellers begin to think about negotiating a price for a PES deal, they must make sure that the following are factored into the offering price:

- **costs for complying with the agreed-upon land management practices** over time
- **impact on the seller's earnings**, in present value terms, in terms of changing land management practices to comply with agreement terms
- **administration costs** under the expected PES transaction over time.

In negotiating, sellers must never forget that payment is contingent on delivery – and delivery is contingent on structuring a realistic deal. If the market price offered does

BOX 15

Valuing Ecosystem Services: Additional Resources

For more information on valuing ecosystem services, please see:

- Department for Environment, Food and Rural Affairs. 2007. *An Introductory Guide to Valuing Ecosystem Services.* London, England: UK Government's Department for Environment, Food and Rural Affairs. (http://www.defra.gov.uk/wildlife-countryside/natres/pdf/eco_valuing.pdf)
- Jindal, Rohit and John Kerr. 2007. "Valuing Environmental Services," in *USAID PES Sourcebook: Lessons and Best Practices for Pro-Poor Payment for Ecosystem Services*, pages 40-42 (http://www.oired.vt.edu/sanremcrsp/documents/PES.Sourcebook.PDF.pdf)

not cover the costs of the land management that will be provided, the deal is not realistic. Therefore, it is essential to ensure clarity and agreement on measurable indicators of compliance with the PES deal as well as agreement on how risks of unavoidable non-compliance with the deal – such as through insect infestations, shifts in rainfall patterns, wildfires, etc. – will be shared between buyers and sellers.

How do you identify prospective buyers?

Every potential buyer of an ecosystem service has their own distinct interest and set of motivations for engaging in PES deals, as laid out in the table below.

TABLE 8

Buyers & Motivations

Buyer	Motivations
Private Company	*Regulatory Markets:* • **Regulatory compliance** (e.g., related to greenhouse gas / carbon markets) *Voluntary Markets:* • **Reduction of operating and maintenance costs** by investing in ecosystem services • **Hedging of risks** (e.g., related to supply of key natural resource inputs, potential future regulation, etc.) • **Increasing investor confidence** by proactively addressing environmental issues • **Enhancing brand** and improve public image • **Maintaining license to operate** by investing in good relationships with communities, non-governmental organizations and regulators
Private Intermediary	• Simplifying the supply chain for buyers • Turning a profit
Government	• Implementing international policy (e.g., United Nations Framework Convention on Climate Change) • Adhering to national regulations to protect environment • Investing in long-term natural resource supply • Responding to public pressure • Averting environmental cataclysmic events (e.g., floods due to degradation) • Reducing costs (e.g., investing in natural filtration systems rather than building a water treatment plant)
Donor Agency	• Act on environmental and/or development mission • Increase sources of revenue for conservation
NGO	• Acting on environmental and/or development mission (e.g., The Nature Conservancy (TNC) currently purchases easements from landowners; payments could become another mechanism to explore achievement of conservation goals) • Reducing organization's environmental footprint (e.g., move towards carbon neutrality, water neutrality, or biodiversity impact neutrality – though the latter two terms remain open to discussion in how they are defined)
Private Individuals	• Acting on environmental and social concerns (e.g., purchasing offsets to reduce individual carbon, water, and/or biodiversity footprints) • Investing in new business ventures (real-estate, etc.)

Determining the most promising type of buyer is the first issue. A preliminary assessment should be based on the level of activities and engagement of the various players listed above – including private companies, private intermediaries, government agencies, donor agencies, NGOs, and individuals – in a particular area.

At this point, potential sellers of ecosystem services should begin to 'brainstorm' or generate lists of prospective buyers. To begin the process, you can ask questions such as:

- Who are the largest employers in the province, country, or even the region?
- Who relies on ecosystem services from a prospective PES deal site in a significant way through:
  - Using significant resources (e.g., downstream water users)?
  - Owning large landholdings and affecting habitat / biodiversity on these lands?
  - Emitting greenhouse gases and carbon dioxide?

If you are not sure, then you can turn to locally-operating nonprofit organizations or government agencies. Both entities can often provide data on employers, landowners, and so on. Water utilities may be willing to provide lists of the top water users.

To develop a list of potential private-sector buyers, a few other brainstorming questions include:

- **Has a particular industry or company been receiving negative press about their environmental practices lately?** (If yes, they may be more receptive to a PES deal offering environmental and/or social benefits.)
- **Has a company been losing ground to competition – either on social issues or more generally in the marketplace?** (If so, new initiatives – such as a PES deal with significant public relations / media potential – can boost a company's marketing position.)
- **Has a company or industry been a leader on other social or environmental issues?** (If so, a PES deal may offer the opportunity to continue holding that leadership position.)
- **Is management innovative?** (If so, a PES deal may offer the opportunity to continue to innovate.)
- **Is a company growing fast?** (If yes, this company might not be the best to approach as new initiatives may be too difficult to implement in that context.)

In courting the private sector, keep in mind that each company is unique. What one company sees as a business benefit, another may not – even if the two are in the same industry or region. It is therefore up to the firm's own internal decision-makers and strategists to define the benefits of making an investment – while it is up to the seller to make the case for the deal.

BOX 16

Illustrative List of Business Sectors with Potential Ecosystem Service Buyers

- Oil & Gas
- Utilities – Energy such as dams
- Utilities – Wastewater Treatment/Water Facilities
- Mining
- Food & Agriculture
- Transportation
- Forestry/Pulp & Paper
- Retailers
- Municipalities and governments

BOX 17

Private Sector Ecosystem Service Buyers

Private sector buyers can be:

- **a single company,**
- **a group of companies** (such as ecotourism operators), or
- **a participant within a larger cap-and-trade system of buyers**, formed when a regulated system requires purchase of a certain amount of services to offset damages (and therefore streamlines the relationship building process).

The seller can do this by contributing ideas for executives to think about when determining how to value an ecosystem service for which they may be paying. This step is key, for not only will a company be more likely to undertake a PES operation if its executives perceive economic benefits flowing from it, but these same executives are likely to recommend similar deals to their peers – which could lead to the growth of PES deals in a country or region.

Without perceived benefits, however, companies are unlikely to act, except through philanthropy – which is a minor and typically short-term source of investment compared to their mainstream business.

As sellers brainstorm about potential business benefits, the questions that should be asked include:

- **Are there regulatory requirements that a PES deal could help a company meet?** (For illustrative regulatory requirements, please see box on "Examples of Regulatory Incentives for Private Sector Payments for Ecosystem Services.")
- **Where regulatory requirements related to ecosystem services do not exist, are there other business benefits that may motivate businesses to invest in ecosystem services voluntarily?** For example:
  - Do any ecosystem service trends present risks to companies (e.g., deforestation leading to siltation / sedimentation in rivers, which could lead to dredging costs for utilities and even operational problems for dams)?
  - Could greenhouse gas / carbon dioxide emissions be a public relations issue?
  - Could diminished quantity or quality of water affect core operations and/or future growth?
  - Could impacts on habitat and biodiversity affect corporate reputation or even core operations and/or future growth?

Further questions, in the case of water issues, include:

- Where will the water that a company needs to operate come from in the future?
- Will the source provide reliable rates of flow?
- Will the source provide high quality water?

For many businesses, investments in ecosystem services offer concrete management tools for addressing these emergent expectations among key stakeholders. The key is to come up with some ideas that executives can then adapt to make the most compelling "business case" for engaging in a PES deal within their firm.

BOX 18

Examples of Regulatory Incentives for Private Sector Payments for Ecosystem Services

Legal provisions can provide effective incentives for investing in payments for ecosystem services, such as through policies or laws mandating engagement in markets or payments for ecosystem services. Some examples of current legal requirements include:

Biodiversity:

- Wetland Banking (U.S. Clean Water Act)
- Conservation Banking (U.S. Endangered Species Act)
- Habitats and Birds Directive (European Union)
- Offsets for Forest Regulation and National System of Conservation Units (Brazil)
- Federal Law for the Protection of Nature and Landscape (Switzerland)
- New South Wales Green Offsets Scheme and other initiatives (Australia)
- Biodiversity offsets program (Netherlands)
- National Forestry Commission Fund to finance forest ecosystem services (Mexico)

Watershed:

- Forest Law 7575 - Payments for Ecosystem Services program (Costa Rica)
- Sloping Land Conversion Program (China)
- Forest Ecosystem Compensation Fund (China)
- Safe Drinking Water Act, Clean Water Act (US)

Carbon:

- Regional Greenhouse Gas Initiative (U.S. 9 Northeastern and Mid-Atlantic States)
- California Climate Act of 2006 (U.S., State of California)
- Kyoto Protocol to the UN Framework Convention on Climate Change EU Kyoto
- New South Wales (NSW) Greenhouse Gas Abatement Scheme (Australia)
- Oregon CO2 Standard (U.S., State of Oregon)

Multiple Ecosystem Services:

- Forest Law 7575 - Payments for Ecosystem Services program (Costa Rica)
- EU Environmental Liability Directive (European Union)
- Environmental impact/risk analyses required in various planning processes and/or permitting requirements (U.S. and other countries)

For more information, please use the search function with any of these laws as key words in the Ecosystem Marketplace (http://www.ecosystemmarketplace.com).

Should sellers engage in PES deals individually or as a group of multiple sellers?

Sellers of ecosystem services can be either individual landowners or organized groups, such as a community association selling services on either communally-held land or on land parcels to which community members have individual rights.

Each has its advantages and disadvantages. For example, you will probably find it easy to determine who implements the agreement and other such details for individual sellers, while a group effort can lead to conflicting concerns among other resource users and landowners. You may be able to minimize this by working with an aggregator, who in turn forms one-on-one agreements with multiple parties.

The key is to understand that there are multiple ways to engage and to think through what an individual seller may prefer.

Regardless of whether sellers decide to engage as individuals or a group, it is essential to have clarity on:

- Who will implement the agreement terms on the ground?
- How will do the monitoring, certification, and verification (as required in the agreement)?
- Who receives the revenues and how these are distributed?

If sellers decide to join together, then all of these issues can be addressed for groups in a range of ways. (For further information and examples, please see the boxes on "Aggregation of Multiple Buyers and Sellers" and "Examples from Uganda and Mexico of Aggregating Multiple Sellers").

If brokers or aggregators are involved, you should make sure that all sellers have a voice in all aspects of PES negotiation. Easements, concessions, long-term land leases and management contracts may lock landowners and resource users into particular management commitments for long periods of time, depending on the term of the agreement. If these commitments forbid sellers from engaging in other activities, sellers may find their hands tied when it comes to responding to new economic opportunities and threats.

For example, as prices change over time, payments for ecosystem services and income from new management systems may no longer cover opportunity costs. Therefore, it is essential to think through all of these issues, and prepare from the very beginning. In addition, it is imperative to negotiate sections of the contract that would enable the sellers to re-negotiate terms in the event of specific circumstances (such as costs of implementation or inputs needed rising far above current rates).

BOX 19

Aggregating Multiple Buyers and Sellers

Multiple buyers and sellers can be aggregated in a variety of ways.

Pre-existing community organizations can serve as the basis for an aggregated group of buyers, provided that most (or all) people engaged in this community organization wish to participate and that there is interest on behalf of the buyer in having that set of lands for which the group is responsible engaged in the sale.

Another approach is for an external organization to work with community residents to assess interest in PES deals and to assemble an interested group of landowners and resource users.

Many other pathways to aggregation exist – with a range of structures, such as working with pre-existing (or forming new):

- cooperatives
- legally-registered organizations
- government managed aggregation entities

BOX 20

Examples from Uganda and Mexico of Aggregating Multiple Sellers

Aggregation of farmers in Uganda has occurred in order to engage in international carbon markets, in this case with the buyer being the UK-based packaging firm Tetra Pak. The group of farmers interact with the Uganda-based NGO Ecotrust, which in turn works with the Edinburgh Center for Carbon Management.

Beatrice Ahimbisibwe is one of the farmers within this deal, which has required her to plant a hectare of land with native trees. Over the course of the contract years, these trees will sequester 57 tons of carbon, and Beatrice will earn $8 per ton or $456. While the trees are growing, Beatrice will be able to let her goats graze around the trees. When the contract is complete, she will be able to use or sell the wood.

Similarly, in Sierra Gorda, Mexico, farmers are being aggregated and their carbon sequestration activities are being sold as part of the offset program for the United Nations Foundation and other organizations.

Sources: Bayon, Ricardo. 2005. "From Ugandan Schoolteacher to International Carbon Consultant: A Profile of Beatrice Ahimbisibwe." The Ecosystem Marketplace (http://ecosystemmarketplace.com/pages/article.people.profile.php?component_id=4000&component_version_id=6451&language_id=12); http://www.unfoundation.org/features/earthday2006.asp; http://www.sierragordamexico.org/en/index.html

Step 2: Assess Institutional & Technical Capacity

Checklist

- ✓ Assess legal, policy, and land ownership context
- ✓ Examine existing rules for market trading
- ✓ Ensure presence of support institutions and organizations

What is the legal, policy, and land ownership context?

> *"Payment for watershed service (PWS) schemes do not operate in a legal, social or political vacuum. A range of laws, policies and institutions will affect them. However, it is important to note that there are no policy, legal and regulatory changes that are always required to establish a PWS scheme. Rather, PWS schemes need to be developed to fit their particular contexts…. In practice, working with existing law is usually the best course – at least initially."*
>
> **– Asquith, Nigel et al. 2007; Appleton, Al. 2007**

Before designing and implementing a PES scheme, take careful stock of the context in which it will take place. Make sure that laws, practices and institutions in a potential PES deal site support, or at least do not obstruct, the development of these payment schemes. If government policies or even agencies are engaged in ecosystem service issues (most likely related to greenhouse gases or water), these may serve as important sources of information and expertise as you develop a PES deal.

Where legal and policy frameworks are lacking, contract law becomes the framework within which PES develops.

Either way, people engaged in developing PES deals must familiarize themselves with the overall legal, policy and land tenure context as it relates to the deal. In many countries, there are still significant gaps in government policy and regulation around transactions for ecosystem service payments. Getting feedback from other organizations and entities in your region that have gone through the process themselves and learned the permitting and legal requirements are a good source of guidance.

After assessing the legal and policy context at national, regional, and municipal levels of government, it is time to assess local land tenure and use rights.

NGOs that are scoping potential areas for PES deals can ask:

- Do prospective ecosystem service sellers have legal rights to engaging in economic activities on the land that is the focus of the potential PES deal?
- Are there other users of this land?
- Are there people who would be impacted by a PES deal in terms of their current resource access or land use patterns?
- Will the act of managing the land to provide the marketed ecosystem service detract from the ecosystem's capacity to provide other services? If so, who depends on these other services, and how will their rights to the service be affected?

- Do local and/or national laws enable (or at least not prohibit) payments for ecosystem services?

If people in rural communities do not have legal and practical access to an ecosystem service, a buyer will likely find the risks of forging a PES deal too great. If clarity on tenure or use rights do exist, however, then so does a critical element of the context in which PES can develop.

All claims to land and land-use rights, therefore, must be understood in order to ensure that all parties with a stake in the resources at a particular PES deal site are involved in any prospective PES discussion. This broadening of the discussion to include traditional users can, in some cases, deliver the additional benefit of promoting clarity and legal certainty in land tenure issues. However, it is essential to be cautious and ensure that the prospect of an ecosystem service deal does not motivate 'land grabs' or efforts to gain control of land and resources with the intention of financially benefiting from PES deals, while resulting in less secure tenure and even resource access among the poor. It is complex, and all of these issues must be considered, particularly by NGOs that are seeking to identify potential PES sites.

BOX 21

Rules for Selecting Among Applicants to PWS Program: Targeting Efficiency in the Mexican PES Programs

To achieve better targeting of funds among program participants, and to improve program efficiency, the Mexican Technical Committee for PES programs recommended in 2005 that an explicit grading system for evaluating proposals be incorporated into the rules of operation. The grading system helps to identify those areas that are more valuable for their environmental benefits, and where true modification of conduct is achieved. Every year, the properties with higher scores are included in the program until the annual budget is exhausted.

Overexploited aquifers:

- 3 points for extremely overexploited
- 2 points for overexploited
- 1 point for aquifers in equilibrium

Priority Mountains

- 2 points if the property is on a priority mountain

Natural Protected Areas

- 2 points if it is within a Natural Protected Area

High risk of floods

- 3 points for highest risk of floods
- 2 points for higher risk of floods
- 1 point for high risk of floods

High water scarcity municipalities (2,1,0)

- 2 points for higher water scarcity municipalities
- 1 points for high water scarcity municipalities

Deforestation Risk

- 5 points for highest risk of deforestation
- 4 points for higher risk of deforestation
- 3 points for medium risk of deforestation
- 2 points for lower risk of deforestation
- 1 points for lowest risk of deforestation

Other criteria include:

- poverty level of the municipality;
- if it is an indigenous community; and
- if the community has a watershed "protection plan".

For more information about the targeting, please consult: www.ine.gob.mx/dgipea/download/draft_ecological_economics.pdf.

For more information about the Operation Rules of Mexican PES programs see: www.conafor.gob.mx.

What are the rules of the environmental market or the parameters of similar PES deals?

"Rules" for ecosystem service markets vary depending on the service and regulatory or voluntary market in question. The rules may refer to the regulations of a cap-and-trade market, or to the guidelines for public payments. Alternatively, "rules" may refer to the terms set by private buyers or sellers in specific transactions. These rules depend on what type of payment for ecosystem service is being pursued. The bottom line is that specific rules for markets and trading exist, with varying degrees of complexity and formality in their establishment and protocols for making changes. It is essential to understand which rules are defined and which are not before you begin structuring a deal.

What PES support services and organizations are available?

Due to the amount of specialized information needed to get PES deals off the ground, support institutions may be a cost-effective – and perhaps unavoidable – investment. A range of institutions – established by public, private, or NGO players – now exist to support or reduce transaction costs and connect buyers with sellers.

These services may add transaction costs, but without them, there may be no deal. At their best, these groups not only provide the validation demanded by many buyers, but also move the process along. Some intermediary groups with expertise in community organization, for example, may be selected to take responsibility for local project management, as well as mediation between investors and local people.

Areas where competence will be essential, either from within a community or externally include:

- **Scientific and technical knowledge** for measuring and documenting the existence and current status of ecosystem services that sellers wish to provide, and also for comprehensive land management plans
- **Negotiation skills and contractual experience** (including financial planning) that ensure that buyer and seller can, with full knowledge, agree on all terms of the contract
- **Implementation, monitoring and verification expertise** which may involve technical assistance associated with implementation and/or third-party verifiers, depending on the buyer's needs and the complexity of the tasks. For example, as large forestry-related projects are designed and launched, it is often important to have experienced, practical foresters on staff or acting as close advisors to the process to get from seed collection to the nursery through the distribution logistics of seedlings, site preparation, planting and maintaining a large reforestation area. In other words, these forestry-related projects are likely to need strong partnership with successful silviculture know-how.

Local institutions that have the business skills to negotiate private deals and the capacity to handle complex organizational arrangements can facilitate market development and maximize participation by local groups, including the rural poor and indigenous groups. (To understand the different steps and elements involved in negotiations, refer to "Negotiating Watershed Services" at http://www.flowsonline.net/data/Flows21.pdf.)

Where highly specialized expertise is needed for limited time periods – such as designing ecosystem monitoring methods, or developing service contracts – specialized companies, public agencies or experienced NGOs can provide business and technical support services. The table on the previous page offers an overview of

TABLE 9

Illustrative Business and Technical Support Services for Project Implementation

Service	Description	Provider Examples
Aggregators	Creation of multi-project portfolio by buying from numerous efforts within one discrete geographic area or across multiple areas	• TerraCarbon (http://invertia.terra.com.br/carbono/eua/) • Conservation International (http://www.conservation.org)
Brokers	Facilitation of linkages between sellers and buyers	• Cantor CO2E (http://www.cantorco2e.com)
Business/ Project Development	Preparation and training in identifying new projects, developing business plans, and advising on implementation	• Technoserve (http://www.technoserve.org) • The Nature Conservancy (http://www.nature.org) • Katoomba Ecosystem Services Incubator (http://www.katoombagroup.org)
Certification	Examination of service/product according to set of guidelines	• Rainforest Alliance (http://www.rainforestalliance.org) • TÜV SÜD (http://www.tuev-sued.com/) • Societe Generale de Surveillance (http://www.sgs.nl/agro/pages/carbonoffset.asp)
Financing	Provision of necessary capital/ operating funds to implement activities	• BioCarbon Fund (http://www.carbonfinance.org/biocarbon)
Insurance	Protection from risk and compensation for loss	• Swiss Re (http://www.swissre.com) • AIG Insurance (http://www.aig.com)
Legal Services	Legal advice	• Baker & Makenzie (http://www.bakernet.com) • Sociedad Peruana de Derecho Ambiental (http://www.spda.com)
Measurement	Determination of value of ecosystem service	• Ecolands Program of Environmental Resources Trust (http://www.ert.net)
Monitoring	Regular collection and analysis of ecosystem service data to ensure accountability	• Edinburgh Centre for Climate Management (http://www.eccm.uk.com) • Winrock International (http://www.winrock.org)
Technical Assistance and Marketing Strategies	Expertise on the state of the market and points of access	• New Forests, Pty Limited (http://www.newforests.com.au)
Technical Assistance for Improved Land and Resource Management	Expertise on designing and implementing new and improved forest management regimes	• Winrock International (http://www.winrock.org) • EcoSecurities (http://www.ecosecurities.org)
Registries	Collection and configuration of information within a database	• Environmental Resources Trust (GHG Registry) (http://www.ert.net) • NutrientNet (http://www.nutrientnet.org
Verification	Process of review to ensure accuracy of information	• TÜV SÜD (http://www.tuev-sued.de/home_en) • Winrock International (http://www.winrock.org

Note: More expansive directories of support organizations can be found at www.katoombagroup.org, www.ecosystemmarketplace.com, www.econtext.co.uk, and www.carbonfinance.org.

the range of business and technical support services available. Note, however, that new institutions and services evolving all the time – and will continue to do so as PES develops. Therefore, this list should be seen as illustrative only.

When selecting support institutions, it is essential to compare the costs of "hiring in" expertise with the risks of going it alone or without adequate support. It is also wise to check references and the track record of the organization with which a partnership is being explored. Also, keep in mind the variety of arrangements that offer partners a stake in the success of the project. Note, also, that some organizations work on a pro-bono / free basis.

Ultimately, all legal and technical responsibilities will remain with the community or seller of the ecosystem service. Therefore, it is critical that any support institutions which sellers and communities engage also transfer the required expertise to the community members.

Finally, for community-based PES, it is essential to consider key issues related to decision-making, such as:

- Are local organizations experienced with project management and technical support on the project site?
- Have community representatives been selected and authorized to negotiate with outsiders?
- Are investments meeting community goals, determined by a cross-section of the community (including women and lower-income members)?
- Do participatory processes form the basis of decisions, and is there adequate 'buy-in'?
- Are there ways that local people, including women, can appropriately participate at every level of the project (including design, implementation, and monitoring)?

Even if all of the support services are not in place, PES projects can still be pursued. It is simply important to be aware of what exists and what does not, and take necessary decisions.

Step 3: Structure Agreements

Checklist

- ✓ Design management and business plans to provide ecosystem services that are the focus of the PES deal
- ✓ Reduce transaction costs
- ✓ Review options for payment type and select an approach
- ✓ Establish the equity, fairness and distribution of net benefits accruing from PES
- ✓ Select a contract type

What issues should be considered in the design of management and business plans to provide the ecosystem service?

BOX 22

Inclusion of Adaptive Management in PES Agreements

Due to the dynamic nature of ecological systems, it is essential to include adaptive management principles and language in PES deal agreements.

Using adaptive management techniques simply means that projects are assessed throughout and findings about what works and what does not work are incorporated into revisions of the activities and work plans.

An adaptive management starting point underscores that resource management is a complex domain in which assessment and mid-course corrections are the norm, not the exception.

This approach will ensure that both buyers and sellers are focused on improving ecosystem services and making adjustments to improve program effectiveness.

Sources: Jeremy Sokulsky, Environmental Incentives, LLC. ; Salafsky et al. 2001

The process of structuring agreements can be time-consuming, and external experts and advisors can help both save time and ensure that the agreements are entered into knowledgably on all sides.

It is advisable to begin with a "Term Sheet" where the basic elements of the project are stated and agreed upon by the parties. This term sheet can then be used as a negotiation and discussion tool to help parties clarify the specifics to be included in a contract.

Before entering into negotiation with a prospective buyer – and even before identifying support institutions and partners – a prospective seller or group of sellers should assess:

- projected costs that may be incurred during implementation of the deal
- projected revenues
- intangible benefits (such as training, technical assistance, etc.)
- potential risks and responses.

Since some PES agreements can last for decades, business plans must include provisions for how to transfer management over time and to adapt the project to the results of monitoring and periodic verification.

Prospective sellers must be clear on the implications of failure to meet the terms of the agreement, either because of their own inaction or due to unanticipated events beyond their control. All responses to potential risks must be clear and discussed with buyers.

Private sector buyers engaging for Corporate Social Responsibility (CSR) will likely

want to use the transaction for bolstering their reputation. Thus, sellers should be clear on how the company is allowed to transmit its message about the PES deal to the world at large, and what that message will be. Among the issues that need to be addressed ahead of time: whether the buyer will be permitted to use the seller's name (or organization's name) in descriptive literature, whether or not the seller wishes to engage with the media, and other such factors.

Once a prospective seller begins discussions with a potential buyer, both parties will need a preliminary listing of the management activities required. This list of activities provides the basis for discussing whether environmental objectives can be met throughout the duration of the potential contract period – with the caveat that the PES management plan should be adaptable with new information over the lifetime of the project. (See box on previous page on "Inclusion of Adaptive Management in PES Agreements.") Sellers should reference the plan on a regular basis to ensure proper implementation.

Developing project management goals, objectives, and monitoring indicators should be 'SMART':

- Specific
- Measurable
- Agreed-Upon
- Realistic
- Time-Constrained

How can transaction costs be reduced?

"Transaction costs" include all of the time and money expended developing and implementing a PES deal. Of these two components, time is easily the one most often overlooked (unless someone is billing for it). These costs include the time required to:

- assess which ecosystem services could be the focus of a PES deal,
- compare them to other deals,
- survey prospective buyers,
- negotiate an agreement,
- implement the agreement, and
- monitor and, if needed, verify that the agreement is being met.

At one extreme, and in cases where communities and land managers have little prior organizational expertise, start-up and transaction costs can absorb a significant portion of the seller's hoped for profit. This situation is why it is critical to estimate and review transaction costs throughout the process – a costly activity in its own right, and one made difficult by the fact that all costs will vary not only from project to project, but also throughout the lifecycle of many individual projects.

If the costs are too great, the PES deal developers should explore ways of covering them, or even adjust or halt the process to address expenditures.

Solutions may be quite simple. It's sometimes possible, for example, to add PES implementation to other reliable, pre-existing conservation, or rural development / sustainable management projects which have already established an infrastructure for handling the detail-oriented and costly tasks of monitoring and managing. Additional ideas are offered in the table below on institutional innovations that have helped to facilitate transactions and reduce transaction costs.

TABLE 10

Institutional Innovations to Reduce Transaction Costs

Institutional Innovation	Activities	Examples
Aggregators of projects	• Streamline sales and negotiations among multiple process and funding mechanisms	Cauca Valley Water Association aggregated water users in Colombia
Build on existing community development programs	• Diagnose local needs, priorities and PES opportunities • Strengthen community organization and local knowledge related to a PES project	Farmer and researcher partnership in the Scolel-Te project in Chiapas, Mexico
"Bundle" environmental service payments	• Link to local or national water and/or conservation projects, • Develop multiple payments for different activities on the same piece of land.	Australia's New South Wales state government is seeking to "bundle" carbon, biodiversity, and water services to reforest upland agricultural areas undergoing extreme salinization
Create cost-sharing mechanisms	• Specialized firms or agencies for community-based projects can solicit contribution from: – national or state agencies – overseas NGOs (developmental or environmental) – private-sector companies – municipal utilities – local communities	Australian forest conservation: rice farmers to market 'green' rice at premium
Create specialized services from intermediary organizations	• Specialized firms or agencies for community-based projects can: – provide technical expertise in project design, – support central negotiations, – establish mechanisms for financial transfer, and – verify PES actions.	The Nature Conservancy role in brokering forest carbon projects in Belize, Bolivia, and Brazil
Establish intermediary management institutions	• Draw up and register farmers' plans related to PES, • Assess plans for ecosystem service contributions, • Develop ecosystem service agreements between buyers and sellers, • Provide technical assistance, • Monitor project	South African Wattle Growers Union contracts for 600 small-scale producer members to supply international pulp and paper companies.
Establish large-scale, area-wide projects	• Develop project over entire jurisdiction, committing to defined increase in forest cover or area protected • Partner with other small providers to share transaction costs of project development	Forestry project in Madya Pradesh, India is working with 1.2 million households
Reduce data costs	• Improve data and methods for project planning, baseline development and monitoring	Low-cost participatory carbon monitoring methods, such as those used at the Noel Kempff project in Bolivia
Set up a Trust Fund	• Serve as central repository of funds, decision making body, multiple stakeholder entity where conflicts can be resolved preemptively	FONAG in Quito, Ecuador Fondo de Querétaro, México

Excerpted from: Smith and Scherr, 2002.

BOX 23

Bees and Barbed Wire for Water in Los Negros, Bolivia

A Fundación Natura Bolivia initiated scheme has established PES deals with upstream landowners where they receive an artificial beehive and training in honey production for every ten hectares of cloud rainforest conserved for a year. The local municipality of Pampagrande is contributing to the payment scheme to improve water management, on behalf of downstream water users, who would likely suffer severe economic losses from reduced waterflow.

For more information, see a video and related documents at: http://www.naturaboliva.org.

You may find more resources for reducing these costs by engaging PES-focused international donors, networks and institutions – such as RISAS in Latin America, RUPES in Asia, and the Global Katoomba Group (with regional networks in Tropical America as well as East and Southern Africa). These organizations and networks often seek to increase capacity of individuals and institutions wishing to learn more about PES. (For more information on organizations that can assist in understanding and decreasing transaction costs, please see: www.katoombagroup.org)

What are the options for payment types?

PES deals have a range of potential payment types from which to choose, including:

- **Direct financial payments**, usually compensation for opportunity costs or loss of livelihood incurred by ecosystem service protection, such as the conversion of managed farmland to natural forest
- **Financial support for specific community goals**, such as building of a school or clinic to remunerate for ecosystem services
- **In-kind payments**, such as the beehive-for-conservation payment transaction that Fundación Natura is making in Bolivia (For details, please see box on "Bees and Barbed Wire for Water in Los Negros, Bolivia")
- **Recognition of rights**, such as increased land rights and increased participation in decision-making processes.

In addition, other methods are listed in the table below.

TABLE 11

Examples of Alternative Methods of Compensation for Ecosystem Service Deals

'Pay per tree'	Rewarding individual tree growers for carbon sequestered and capacity for future carbon sequestration on a per tree basis.
'Pay for forest establishment or forest protection'	Compensating community forest management organizations to protect or regenerate forest areas, or establish plantations. The community organization is then given financial benefits to distribute among members.
'Enable more profitable and sustainable land management'	Funding extension services, tree nurseries, marketing infrastructure, community-based forest enterprises, and other such support services for individual producers (or forest protectors) who will then gain financially by participating in new land-use activities or sharing income from forest protection.
'Pay communities with improved services'	Providing services, such as health clinics, education, or enhanced rights to resources (land, forest, grass, and water) that improve household or community welfare.

Whatever payment mechanism is selected, all stakeholders must agree to it in the early stages of project design. Choosing the appropriate payment types will ensure more durable transactions between buyers and sellers. Similarly, in the case of community-owned resources, payments for services from communally-managed lands have the potential to be more long-lasting if they are managed transparently and in a way that is appropriate to the local circumstances, where local people affected are pleased with the outcomes over time.

What are potential criteria for considering fairness, equity and distribution issues associated with agreements?

We have alluded extensively to the importance of making sure that PES agreements are both fair and flexible, and it needs to be reiterated again, as these are practical concerns. (Please see boxes on "Tips for Designing Fair and Effective Contracts" and "Potential Criteria to Consider for Assessing Pro-Poor PES.")

BOX 24

Tips for Designing Fair and Effective Contracts

"Designing clear and effective contracts that avoid the exploitation of the seller by the buyer (and vice versa) is of crucial importance as PES programs are intended to be long-term programs where the buyer will want to maintain existing contracts and sign new contracts over time.

Fairness of agreements by sellers may be an important determinant of future outcomes, and buyers will want to make every effort to ensure that contracts are both fair and efficient. Fairness often is in the eyes of the beholder. However, if asymmetries of information or power lead to the acceptance of contracts by sellers that make them worse off (i.e. payments that are less than the sellers opportunity costs) then the contract is unfair. Likewise if such asymmetries lead to the buyer paying above the value of the expected hydrological services the contract is unfair. In both these cases the contract is not only unfair but inefficient.

Property rights for specific hydrological services produced by land management do not generally exist. Therefore, contracts typically call for the seller to undertake a specific land use and/or land management activity. An alternative is to specify indicators of performance in terms of downstream services. As maintenance of forest cover and land management activities are the cause of the desired effect (hydrological services) these are contracts not for services but for the performance of activities that cause (or produce) the services."

Excerpted from: Asquith et al 2007; B. Aylward. March 2007.

The unfairness of a deal often emerges after implementation has begun, so sellers should propose clauses that not only allow for re-negotiation under clearly-defined and pre-determined circumstances, but also ensure that sellers have the know-how (or access to technical assistance related) to re-negotiate. Such clauses may, for example, provide for the adjustment of prices paid over time or allow for a reevaluation of service value either as new information arises or at periodic, pre-set intervals. This approach would ensure that communities do not get locked into one price for decades.

If a buyer is not amenable to these terms, however, the seller must simply consider the offer and decide whether they are willing to enter into the PES agreement or not. This issue is explored in more detail below.

BOX 25

Potential Criteria to Consider for Assessing Pro-Poor PES

1. **Pareto criterion**, which states that an economic intervention is efficient if it benefits at least one person without leaving any other person worse off even if it may still leave people worse off in relative terms.
2. **Equity Gap Principle**: The income gap between individuals or groups after a PES deal should be no larger than the gap before the intervention. In this way, if one individual has benefited from the economic instrument, then some transfer will need to take place to ensure that the gap between that individual and others will remain the same. In other words, some form of social redistribution mechanisms will need to be institutionalized at the same time the economic instruments are being implemented. This however keeps the status quo of the existing equity gaps within society.
3. **Fairness Principle**: The net benefits accruing from the intervention are distributed according to some ratio whereby the increase in welfare of the worse off individual is larger proportionally that the welfare increase of the better off individual (Duraiappah 2006)

Adapted from Perrings, C. E. Barbier, S. Baumgärtner, W.A. Brock, K. Chopra, M. Conte, C. Costello, A. Duraiappah, A.P. Kinzig, U. Pascual, S. Polasky, J. Tschirhart, A. Xepapadeas (2008) The economics of Ecosystem Services, in S. Naeem, D. Bunker, A. Hector, M Loreau and C. Perrings (eds) Biodiversity and Human Impacts, Oxford University Press, Oxford. In press.

What contract types exist?

There are many types of contracts from which to choose in formalizing a PES deal, including:

- Memorandum of Understanding (MoU) or Memorandum of Agreement (MoA)
- legal contracts
- customary law agreements
- 'handshake' agreements
- quid-pro-quo arrangements

It is critical to keep the agreements realistic – for they are of no use if they cannot be fulfilled. Frustration and mistrust can destroy even the most well-intentioned project.

This does not mean one should not strive to be bold, enthusiastic and proactive; just that potential limitations must be well-understood.

What are the key elements of PES contracts / agreements?

PES agreements should clearly lay out:

- who will pay transaction costs as well as ongoing management and monitoring costs
- who is responsible for what actions
- what ecosystem service results are expected
- how results will be demonstrated and who will be responsible for monitoring, evaluating, verifying, and certifying them
- who will receive what amount of money in what specified time frame
- which criteria will be used to evaluate the fairness of the PES deal
- how risks (particularly around unexpected natural events) will be handled and even shared between buyers and sellers

Overall, key elements of PES agreements include:

- **Terms and type of payment** specifying when, how much, how often, to whom, and other details, such as: cash to one person, to a community group, to a vendor of a community service (e.g., builders of a school) as well as whether the payment is in the form of cash, in-kind technical assistance, in-kind materials for building a community building, etc.
- **Timing of payments** in terms of when the ecosystem service activities are carried out by the seller, when the buyer ensures that monitoring of the action occurs, or a combination of both.
- **Requirements that need to be met** for payment, such as periodic monitoring, reporting and verification needs.
- **Managing risks**, particularly those beyond a seller's control (such as unexpected natural events) through specific clauses in agreements detailing how certain risks are shared between sellers and buyers, or even insurance (provided it is available, cost-effective and feasible).
- **Signatories to the contract** should be directly affiliated with the buyer (or group of buyers) and the seller, though it may be useful to have provisions for specific roles of support institutions, as well as details on the exact payment that will be made for services rendered by the intermediary.

BOX 26

Amending Contracts & Introducing Performance Clauses

While contracts can be amended if both parties agree, long-term contracts should specify dates when the contract will be reviewed and potentially amended. Contract adjustments can be administratively difficult, so adjustments to existing contract terms are only practical every two to five years. New contracts, however, should incorporate best available knowledge that improves ecosystem services while still attracting willing sellers.

When buyers have specific concerns about project performance, contracts can include verification procedures to assess performance. For example, contracts can include a rating system that is the basis for increasing payments for outstanding performance and decreasing payments for underperformance.

Source: Jeremy Sokulsky, Environmental Incentives, LLC.

The boxes below offer a detailed contract checklist, as well as an online tool for CDM contracts, and a sample contract from the sale of land-based carbon offsets offered by PlanVivo. Other sample contacts are available in the online version of this 'Getting Started' manual, available at www.katoombagroup.org.

BOX 27

Checklist with Common Contract Components

While contracts and agreements for PES vary widely, some elements are typically common to all. These are:

- Key start and end dates
- Key stakeholder details and addresses
- Responsibility of each stakeholder
- Detail of physical area the contract will impact
- Description of the legal rights each party has in the PES contract
- Define and clearly state actions that need to be agreed upon from each party
- Acceptance of the rules of the market (including whether actions are seen as "additional to current practices and are actually improving the overall situation with the ecosystem services, rather than simply shifting impacts to another area, which is a dynamic referred to as "leakage")
- Payment terms
- Monitoring requirements
- Verification requirements
- Allowed role of third parties
- Actions to be taken in unforeseen circumstances
- Rules for modifying or adapting the contract
- Accepted reasons to void contract
- Contract timeframe
- How risks of unavoidable loss (such as related to natural events) are to be handled and how this risk will be shared between buyer and seller(s)
- Signature of each party (legally in a position to do so)

BOX 28

Tool for Legal Contract for Open-Source Agreement for CDM Projects

The Certified Emission Reductions Sale and Purchase Agreement (CERSPA) is "a free, open-source contract template for buying and selling Certified Emission Reductions (CERs) generated under the Kyoto Protocol's Clean Development Mechanism (CDM)." That is, the CERSPA offers a simple open-source agreement intended to help buyers and sellers in the carbon market draft, understand and negotiate contracts, and intends to balance the interests of all involved parties.

For more information, please see: www.cerspa.org.

BOX 29

Elements of a Contract: From the Plan Vivo System at planvivo.org
Contract of Sale Agreement for Carbon Service Provision

Date:

Plot ID:

Producer ID:

Between ……'the producer' of ……..…… and XX. The conditions specified in this contract apply to all sites registered by the producer with the trust fund for the provision of carbon services.

Your XXXX was assessed by……..on……..…..and has been approved for registration with the carbon fund with the following details:

Forestry system:

Area (ha):

Proposed date of planting:

Carbon offset potential (tC):

Terms and Conditions:

- The producer agrees to make all possible efforts to maintain the agro/forestry system specified in the letter of site registration for a period of _____ years.
- The producer agrees to place 10% of his/her carbon credits in a carbon risk buffer maintained by the XX.
- The producer agrees to sell only the amount of saleable carbon credited to his/her account by XX.
- The carbon fund cannot guarantee a fixed price of carbon but agrees to facilitate the sale of carbon as specified in sale agreements made with the producer. The producer will be free to accept or reject any offer made by the XX.
- Payments for carbon sold through the XX will be made after the verification of monitoring targets specified below.
- Payments will be made on the verification of monitoring targets according to the following schedule:

Date of Monitoring	Monitoring Target	Payment ($)
Year 0	33% plot planted as described in plan vivo	20%
Year 1	66% established	20%
Year 3	100% established, survival not less than 85%	20%
Year 5	Average DBH not less than 10cm	20%
Year 10	Average DBH not less than 20cm	20%

The undersigned understand and agree to abide by the conditions of this contract.

Source: www.planvivo.org

We cannot state this enough: if these agreements are to be realistic and sustainable, they need to meet the needs of both sellers and buyers, because sellers need to continue to make use of products derived from the land, and buyers need to be sure the promised services are being delivered.

Step 4: Implement PES Agreements

Checklist

- ✓ Finalize the PES management plan and begin activities
- ✓ Verify PES delivery and benefits
- ✓ Monitor and evaluate the deal

After an agreement has been made, it's time to implement the PES deal. During this stage, the project must not only be managed effectively, but also consistently monitored and evaluated for service delivery and adequate distribution of benefits in accordance with the parameters laid out in the agreement. Third-party verification (and in some cases certification, depending on the buyers' preferences) may also be required to ensure that the project is meeting its objectives.

Attention now shifts to implementing the agreement, monitoring progress, reporting results, and making changes if the desired results are not being realized.

Remember, ecological systems are complex, and the best-laid plans of buyers, sellers, scientists and lawyers can go awry in the early stages. This reality is why we have continually stressed the importance of 'adaptive management'. By planning from the outset to adapt to the results of monitoring and periodic verification, you will help ensure that a successful agreement can continue to be carried out over the duration of the agreement.

What issues should be considered in finalizing the PES management plan and prior to beginning activities?

Detailed land management plans, laid out in the agreement, should be finalized; implementation of the activities described should begin. Key elements needed to ensure on-site project management success include:

- hiring people prepared and willing to take on particular roles and responsibilities
- preparing accounting, management and tracking systems for the project
- opening accounts to manage funds
- educating community members on the opportunities and associated management activities for implementing the agreement
- ensuring appropriate representation of community members – including women and low-income members – in the ongoing reporting and management of community-based PES deals, with clear roles and assurance of clarity and transparency.

What details should be agreed upon with regard to verification of PES delivery and benefits?

Certification of ecosystem services may occur as early as the design and contracting phases or as late as a few years into the implementation, when you verify that the

ecosystem service certified to be designed continues to be provided. The contract may also specify a periodic re-verification of the service provision as the project progresses, thus giving the buyer certainty that the service is being obtained.

Sellers must never forget that, no matter how much work goes into the project, payment only comes when verifiable results are delivered (note however that sometimes the contract is for land management, which includes monitoring, and the buyer only verifies that the land management practice agreed to is being accomplished). This is why third-party, independent verifiers and experienced environmental auditors are so critical to the success of PES projects. (For ideas on service provides, please see earlier box on "Business and Technical Support Services for Project Implementation" or inquire locally for national entities that carry out verification.)

Prior to inspection, the buyer, seller, and verifier should discuss and agree upon monitoring standards and implementation methodology. Is the focus, for example, on whether an agreed-upon land management practice is being undertaken, or is it on monitoring the actual delivery of service?

When negotiating the design of monitoring, inspection, and methodology, you should take the following into account:

- the process and frequency of the internal auditing program
- the scale and impact of the organization's activities on the environment
- how much control the organization has over this impact
- the cost of the verification program
- past verification results

Analysis of the verification report will identify the shortcomings of the monitoring and evaluation scheme and yield insight into the effectiveness of the PES project.

Verification results should be made available to buyers, intermediary institutions, and the public to increase transparency and legitimacy, as well as to facilitate adaptive management processes.

What issues should be considered in monitoring and evaluating the deal?

Implementation of an accurate monitoring and evaluation (M&E) plan will indicate whether or not the PES deal is meeting its objectives. It will also provide information as to how sellers can improve their management.

It is essential to be clear on who undertakes M&E activities throughout the life of a PES agreement. The role can be undertaken by community members, an external / third party entity, the buyer (or a designated proxy of the buyer), a government agency, or another entity. The key is to be clear on where the responsibility for M&E lies.

The importance of this element means that M&E programs should be well-planned prior to implementation. The M&E plan should be developed with the input of all key stakeholders to ensure all parties are satisfied with the parameters that are being monitored. In addition, the plan should be evaluated and modified over time as the project progresses, ideally with the input of all stakeholders throughout.

Core areas of monitoring that should be considered during the planning phase include:

- **Determination of who selects indicators and who is reporting to whom**
- **Selection of Indicators**, all of which should be:
  - relevant to the PES project
  - measurable
  - respond to changes in the environment
  - fit into the rest of the M&E scheme
  - reliable
- **Creation of a "Local Ecosystem Conceptual Process Model"** that:
  - outlines the cause-and-effect relationships that occur within the ecosystem
  - identifies which specific characteristics of the ecosystem to monitor
- **Selection of Monitoring Sites**, the most commonly-used practice being a "stratified random sampling" technique which can:
  - reflect the overall distribution within the project area
  - ensure that the monitoring sites are sufficiently spread out

BOX 30

Monitor and Evaluate the Project: Resource Articles on Indicators and Processes / Protocols

- Biodiversity Conservation Network (BCN). "Guidelines for Monitoring and Evaluation of BCN-Funded Projects). (http://www.worldwildlife.org/bsp/bcn/learning/BCN/bcn.htm/)
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Monitoring sites should be permanent throughout the duration of the PES project so that reliable information on trends can be collected. A permanent-site approach also makes it is easier for independent verifiers to locate the appropriate sites.

If possible, a control site should also be selected for monitoring to help gauge the impact of the PES project, often to demonstrate that the project is providing new / "additional" benefits to the current state of affairs. Although few implementing organizations will be willing to finance the monitoring of a control group, research organizations or public agencies with oversight mandates may be good partners for this activity.

Apart from these core elements of a PES monitoring scheme, M&E parameters might include not just the type of ecosystem services – such as sequestering carbon, increasing biodiversity, etc. – but also *other stakeholder concerns*, such as:

- total project costs
- timeliness of financial disbursements
- performance of various support services or financial intermediaries
- protection of local ecosystem values
- equity in local distribution of PES project benefits
- specific household and community-level benefits

Finally, the M&E plan made at the outset of the project should also specify who will conduct the monitoring, how frequently and at which times, and using which methods, as well as who will pay for monitoring.

Overall, M&E activities will identify what is being accomplished and how project management can be improved. The M&E results should be made available to buyers, intermediary institutions and the public to increase transparency and legitimacy.

Annexes

Annex I: Navigating the Ecosystem Marketplace

The Ecosystem Marketplace (EM, www.ecosystemmarketplace.com) was born to provide you with the information services needed to build a revolutionary new economy that will pay for, and invest in, ecosystem services. In particular, EM covers payment programs for three kinds of ecosystem services:

- Climate stabilization (carbon sequestration in trees, plants and marine ecosystems)
- Water-related ecosystem services (water quality, groundwater recharge, flood control)
- Biological diversity benefits (scenic beauty, ecosystem resilience, pollination, pest control, disease control, etc)

The EM has tagged the different areas of its MarketWatch coverage simply as: carbon, water, and biodiversity.

You will find a link to the MarketWatch section on the homepage at www.ecosystemmarketplace.com; you can use it to track transactions across 14 different markets around the globe. If you want to find out what buyers are paying for ecosystem services in different corners of the world, click on the MarketWatch section and then pick your market.

In addition to MarketWatch information, EM provides several other types of services that might be of interest. The homepage runs new features focusing on important issues in the world of environmental markets, as well as wire reports and other news gathered from media sources around the world that touch on some aspect of payments for ecosystem services. Check the list of articles on the right hand side of the screen for a daily update.

After features run on the homepage, they are all permanently archived on the site, where you can find them by entering a keyword in the search bar at the upper right of the homepage. If you click on the news tab, you will see all the news articles of the past two months.

Beyond MarketWatch and news services, EM has a directory that you can use to find organizations working on setting up payments for ecosystem services in your area, and an event section where you can keep your eye out for conferences and meetings you may want to attend.

Last but not least, EM has a sizeable library of scholarly articles, case studies, and toolkits that you can access by clicking on the library tab on the homepage. You might use this area to find out how to measure soil carbon or to research other projects that may be similar to your own.

However you choose to use EM, we hope it will be of use to you and we welcome your feedback: info@ecosystemmarketplace.com

Annex II: Additional Resource Articles

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