

INVESTING IN THE FUTURE:
AN ASSESSMENT OF PRIVATE SECTOR DEMAND
FOR ENGAGING IN MARKETS & PAYMENTS FOR ECOSYSTEM SERVICES

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F O R E S T
T R E N D S

Washington D.C., U.S.A.

February 2007

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PREFACE

Market-based instruments have the potential to generate new conservation revenues on agricultural and forested lands around the world. Through payments for sequestering carbon, conserving biological diversity (both wild and agricultural), and maintaining water resources, market-based approaches to conservation recognize that ecosystem services have value.

Communities around the world are increasingly recognizing the value of ecosystem services—such as pollination, natural water filtration, and agricultural biodiversity. Today, the continued delivery of many of these ecosystem services depends on land management decisions made by farmers, fisherfolk, and forest dwellers.

The rural poor who work on agricultural lands represent important stewards of ecosystem services. Channelling payments or other forms of support to these communities in return for their stewardship of ecosystem services could generate broad benefits, including increased food security and improved environmental health.

In exploring possibilities for ecosystem service payments, research has predominantly focused on the potential supply side. Less is known about the current and potential demand as well as willingness to pay for these services.

To date, ‘payments for ecosystem services’ (PES) have most commonly been funded by the public sector in an effort to improve the efficiency of spending on the environment. The U.S. Conservation Reserve Program and the China Sloping Lands Program are both examples of public payments for ecosystem services. The private sector, however, is increasingly paying for a number of ecosystem services, particularly carbon sequestration. Yet, little is known about the potential willingness of the private sector to pay for other ecosystem services, such as biodiversity conservation, watershed protection, and/or maintaining landscape beauty for ecotourism. This report begins to address this knowledge gap.

Ecosystems provide a wide range of services on which we all rely—from water filtration to carbon sequestration and pollination. Although not always recognized, the private sector depends on these ecosystem services for raw material inputs, production processes, and climate stability. All of these elements are key factors in the stability of businesses. And yet, few companies directly pay for ecosystem services.

As day-to-day business decisions often focus on short-term financial returns, ecosystem structures and functions are being fundamentally undercut.ⁱ The most systematic study of ecosystems globally—the Millennium Ecosystem Assessment, conducted by over 1,300 scientists from 95 countries—found that about 60% of ecosystems studied are being degraded or used unsustainably.

An increasing number of economists and environmentalists are advocating for the realignment of market forces to create incentives for the production of ecosystem services. **If market forces can reward investment in ecosystem services, a positive feedback loop could be created,** leading to increased production of ecosystem goods, as well as ecological restoration, thereby creating the basis for sustainable economic growth.

Concern is resulting in innovation. **Markets and payments are emerging for ecosystem services around the world.** Formal, multi-billion dollar markets—some regulatory and others voluntary—now trade environmental derivatives of carbon sequestration, water-quality improvements and biodiversity conservation.ⁱⁱ In addition, companies that are reliant upon particular ecosystem services are engaging in focused business deals and payments for ecosystem services (PES) on a local level.

Existing markets and payments for ecosystem services are mostly located in North America, South America, Australia, Europe, and Asia. While isolated deals exist in other parts of the world, the potential to develop markets in stable Asian and African has not been tapped fully. On both of these continents, ongoing natural resource degradation suggests market-based incentives might have an important role to play in advancing conservation if other key enabling factors are in place.

Market-based instruments, including payments for ecosystem services (PES), offer the potential for new sources of conservation revenue around the world. And this possibility is becoming increasingly important as core conservation funding—historically from government and philanthropic donors—has declined in the last decade from about US\$2 billion to about US\$1 billion (Scherr *et al.*, 2004). In addition, payments for ecosystem services may make conservation economically viable for a wider range of stakeholders, most notably the rural poor in developing countries.ⁱⁱⁱ

ⁱ For more information, please see: Daily, Gretchen C. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington, DC: Island Press, 1997; Millennium Ecosystem Assessment Board. 2005. "Living Beyond Our Means: Natural Assets and Human Well-Being." Geneva, Switzerland: The United Nations Environment Program.

ⁱⁱ For more information, please see: <http://www.ecosystemmarketplace.com/>

ⁱⁱⁱ For more information on 'pro-poor PES', see: Emerton, 1999; Ferraro and Simpson, 2001 and 2002; Kaosa-ard, 1995; Norton-Griffiths and Southey, 1995; Scherr, 2000 and Scherr *et al.*, 2003

Advocates of environmental markets assert that the private sector has incentives to pay for ecosystem services—ranging from regulatory compliance through supply chain-related business benefits and positive community relations. For example, many corporations depend on a reliable flow of high quality raw material for their products, such as timber and agricultural products. Within the eco-tourism business, tour operators depend on appealing scenic landscapes. Similarly, water utilities depend upon clean water and, therefore, may find that it is cost-effective to use the natural filtration capacity of ecosystems rather than to incur the cost of new filtration plants.

Private sector engagement with PES for carbon sequestration, watershed services and biodiversity preservation now exists—with an estimate, based on 2005 research, of 100 types of private PES and over 1,100 transactions. The geographic distribution of the types is somewhat skewed, with the bulk appearing in South America and Asia. North America includes a smaller number of types of private PES, but a large number of transactions. Currently the vast majority of transactions are within mitigation and conservation banking. Europe has few types of private PES, but a growing number of transactions in the carbon sequestration domain. And Africa plays a minor role at present related to both PES types and transactions.

At present, most of the ecosystem service deals take place at the international level within the carbon market. Water-related markets and/or payments are fewer and take place mostly at the local level.

Many of the businesses engaged in these markets are front-runners in their sectors, representing predominantly:

- **Oil and gas / energy sector firms offsetting their carbon emissions,** such as British Petroleum (BP) and American Electric Power (AEP);
- **Tourism companies securing the scenic beauty of watershed areas and the water flows within the landscapes upon which they rely,** such as the Meliá Conchal hotel chain in Costa Rica;
- **Water utilities paying to improve water quality** through the water management practices of upstream land-users, and
- **Construction companies and land developers fulfilling legal requirements** to offset damage to key habitats, such as through U.S. wetland mitigation banking and conservation banking.

Despite ‘early adopters’ in the business community, private sector engagement in PES is still relatively limited, particularly when considered in relation to other investments of these firms. The reasons are complex and vary by company and sector. Common corporate questions include: Why should companies pay for the maintenance of well-functioning ecosystems when everyone relies upon them? Why is it not the role of governments to protect ecosystem services? And even if there were widespread willingness to pay, what would be the assurance that funds spent would directly lead to enhancement of an ecosystem service? Is the functioning of services such as carbon sequestration, water filtration, pollination, and storm control understood to the level of detail expected in other corporate transactions? If not, why not wait?

Large-scale private sector engagement with markets for ecosystem services is likely to emerge from regulatory, revenue, and/or stakeholder shifts toward valuing the integrity of ecosystems. First, and most obviously, more companies will begin to invest in payments for ecosystem services if they are required to do so by regulation and/or if it is likely that regulation will come into force in the (near) future. Second, private sector engagement will increase when it is clear that payments can deliver a return on investment, either in terms of financial or non-financial benefits. Third and finally, companies will engage much more significantly if there is a sense of key stakeholder expectations among investors and/or customers.

This report, based predominantly on Forest Trends research in 2005, describes the current status of private sector interest in, and engagement with, payments for ecosystem services. It offers a point of view on current private sector demand and willingness to pay for ecosystem services in the present and projecting into the future. Specifically, the findings are based on Forest Trends' research conducted in 2005 by Ivo Mulder, Kerry ten Kate, and Sara Scherr, as well as 2005 research by Sissel Waage and 2006 analyses by Jackie Prince Roberts. The primary research focused primarily on documenting non-carbon cases of private sector engagement with PES.

Our intention is to offer a 'conversation starter' within a rapidly evolving field. We hope that this piece will ignite both discussions between public, private and non-profit players working on markets and payments for ecosystem services, as well as conversations within the private sector about the risks and opportunities associated with investing in these markets.

The potential of market-based instruments is enormous. Risks associated with market entry exist. But opportunities are also ripe for businesses that are seeking to take an innovative approach to the environmental issues of our time.

SECTION I: OVERVIEW

Experience with cap-and-trade sulphur dioxide markets goes back decades, but the current incarnations of environmental markets and payments for ecosystem services are relatively new to the private sector. Therefore, we begin by describing what these markets are and why they are important. We specifically highlight the rationale for actively engaging the private sector and detail the varied motivations driving private sector players to engage in environmental markets and make payments for ecosystem services. In addition, we suggest how these motivations are likely to evolve over the next decade, highlighting differences between the key ecosystem service types, which we tag throughout as carbon, water, and biodiversity.

We then consider the institutional arrangements that currently exist for facilitating the involvement of the private sector in PES. And we survey some of the institutional obstacles companies face when weighing an investment in ecosystem services. Finally, the report concludes with an overview of capacity and institution building needs to facilitate engagement of the private sector with ecosystem service markets and payments in the coming years.

SECTION II: BACKGROUND

Evidence of ecosystem degradation was most recently provided by the Millennium Ecosystem Assessment. The study, conducted by over 1,300 scientists from 95 countries, found that approximately 60% (15 out of 24) of the ecosystem services evaluated are being degraded or used unsustainably. This degradation represents threats to both economies and human well-being since it is likely to result in increased floods, erosion, landslides, draught, and extreme weather.

We all need healthy ecosystems to survive and thrive, but we are operating within broader economic and political contexts that are not always conducive to natural resource conservation. What are our options for ensuring the sustainability of natural ecosystems? What alternatives exist in addition to the policies being applied at present?

Environmental markets, ecosystem markets, and payments for ecosystem services are all terms that are used to refer to the suite of economic tools used to reward the conservation of ecosystem services. The term ‘environmental markets’ is commonly used to refer to all markets that have been set up to fuel environmental improvements. Markets for renewable energy, sulfur dioxide emissions reductions and organic food might all be termed environmental markets.^{iv}

Major 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. 1997. *Nature's Services*. Washington D.C., USA: Island Press.

^{iv} http://ecosystemmarketplace.com/pages/static/about.conservaion_backgroundunder.php

‘Ecosystem markets’ is a narrower term that usually refers only to those markets that trade permits or credits related to ecosystem services. The trouble comes when the moniker ‘environmental market’ or ‘ecosystem market’ is used to describe conservation payments that are not really part of a ‘market.’ In its strictest sense, a market is a regular gathering of people (whether in person, on the internet, or via other forms of communication) for the purpose of buying and selling goods and/or services.^v

Since there are a growing number of discrete deals related to ensuring the flow of ecosystem services over time, the term ‘Payments for Ecosystem Services’ (PES) has been developed as an umbrella term for the entire suite of economic arrangements used to reward the conservation of ecosystem services. While PES is increasingly used as a catch-all phrase, the term originated (and is most often used) in the field of sustainable development. In this context, PES frequently describes schemes that do not rely upon a formal market, but rather depend upon a continual series of payments to rural landowners who agree to steward ecosystem services.

Today, both markets and payments for ecosystem services have begun to emerge in countries around the world. Formal, multi-million dollar markets now exist related to carbon, water, and biodiversity. And payments are also being established for specific services provided by ecosystems.^{vi}

These payments for ecosystem services include both monetary and non-monetary transactions (such as deals related to shifting property rights) between either individuals or groups of people, who provide services (‘sellers’) and either individuals, organizations, or groups that pay for maintenance of these services (‘buyers’). The key characteristic of these buyer/seller transactions is that the focus is on maintaining a flow of a specified ecosystem service, such as retaining clean water, biodiversity, and carbon sequestration capabilities. In order to ensure that the ecological service is indeed maintained—as buyers expect for their money—the transactions require regular, independent verification of sellers’ actions and their associated effects on the resources. In sum, the key attributes of ecosystem service payments and markets are that sellers:

- maintain and restore specific ecological structures and functions, and
- remain accountable to independent verifiers that the ecosystem service being paid for is indeed being delivered.

It is important to note that the definition of payments for ecosystem services does not include transactions in which money exchanges hands but there is no associated requirement that the recipient of funds actively takes particular natural resource management actions. For example, if a community were to allow a conservation organization to use and manage their historical common property for wildlife protection and revenue sharing, it would not necessarily represent a payment for ecosystem services. In this case, the community is not specifically taking action (and/or foregoing other practices) to maintain a particular set of ecosystem services. Rather, the case of wildlife protection and conservation undertaken by an outside group that pays a community is a separate kind of transaction.

Buyers and sellers are, in principle, only interested in paying for an ecosystem service if it proves to be beneficial for each of the parties. For a supplier of ecosystem services, the

^v http://ecosystemmarketplace.com/pages/static/about.conservaion_backgroundunder.php

^{vi} For more information, please see: <http://www.ecosystemmarketplace.com/>

payment should be at least as high as the earnings foregone from providing the service. For the buyer, often the beneficiary of the service, the benefit of the payments should be equal or higher than the alternative.

To date, a number of constraints to PES exist, ranging from a lack of scientific information on the part of buyers to a lack of legal and/or financial capacity on the part of sellers. One of the most notable challenges is finding potential buyers to pay for ecosystem services. This recognition has driven increased interest in engaging the private sector in investing in the ecosystem services on which companies rely for both a stable business environment as well as production inputs, such as raw materials or water.

Importantly, there are opportunities in the realm of ecosystem services for businesses to act as sellers as well as buyers. As a seller, companies would have the potential to gain access to funds—from other firms or governments—to restore watersheds, wetlands, and habitats, as well as to store carbon through land use practices.

The private sector's role as both buyer *and* seller of ecosystem services is key to enticing further interest in payments for ecosystem services among businesses. As ecosystem service sellers, companies have the possibility of turning potential liabilities into assets, such as through restoring wetlands on industrial lands. As ecosystem service buyers, companies may perceive advantages in investing in areas that are important to the future of their business. For example, Occidental Petroleum and a consortium of six other oil and construction companies founded 'EcoFondo' in Ecuador to maintain their 'social license' to operate in the country.

These dual (buyer / seller) roles of the private sector are important because managers in companies have incentives not only to protect the bottom-line, but also to produce 'top-line' growth of new revenues and products. As potential sellers of ecosystem services, companies can find new revenue streams by restoring landscapes.

These dynamics are important as the role of the rural poor as 'sellers' is often the main focus among non-profit experts, international agency officials, and academics. While environmental markets and payments for ecosystem services potentially hold new revenues for the rural poor, ecosystem service transactions with developing country based landowners are commonly considered complex and risky by many private sector players. Some of this perceived risk can be alleviated by a reliable 'interlocutor' that can locate, screen and broker deals for companies to ensure that funds go to on-the-ground natural resource managers in developing countries. Absent such a broker, the transaction costs of identifying, closing, and managing ecosystem services deals with the rural poor, who may or may not have experience with traditional corporate negotiations and contracts, are likely to be significant. Therefore, the potential of payments for ecosystem services to serve as a channel of private sector funds to rural communities is likely to be successful, in the near-term, only with the establishment of credible, respected, international brokers and aggregators who are capable of linking businesses with a range of rural communities and community members.

Today, brokers, aggregators, and technical experts are all emerging to facilitate engagement of the private sector—both internationally and in specific countries ripe for investment—in markets and payments for ecosystem services. This increased institutional capacity and market infrastructure is evolving rapidly, due in large part to the dynamic international policy and business discussions around climate change. For example, the issue of climate change

was dominant in the 2007 Davos discussions among global business leaders. And climate change-related actions are now increasingly recognized as essential within the business community. From HSBC through DuPont and Google, multinational companies are beginning to step into carbon markets—which represent a first ‘doorway’ into discussions about other markets and payments for ecosystem services with all private sector players, both within developed and developing country contexts.

SECTION III: CURRENT CONTEXT

Private sector interest in carbon markets is rapidly emerging. A solid scientific consensus about the human contribution to climate change and the threat of international, national and regional regulation are the primary drivers of this sudden interest in carbon markets on the part of business. Stakeholders, including shareholders, are increasingly demanding corporate action on climate change issues.

Given the likely water-related implications of climate change in many regions as well as concerns about nutrient loading in waterways around the world, experts anticipate that water-based ecosystem service markets and payments will likely expand in the next few years as well. In conversation, many business people acknowledge concerns about water, particularly multinational firms operating in developing countries that rely on local goodwill for ‘license to operate’. Undercutting the ability of local residents to have clean water could easily lead to local ill will and the possible revocation of ‘license to operate.’ Water availability is therefore a key issue tied business operations.

Some food and agriculture-based private sector firms have been investing in focused water initiatives for years, which may be a harbinger of more investment in watershed services among multinationals as well as smaller companies around the world. The nature of particular companies and internal, strategic perceptions of key threats will drive decisions on what investments are made in which areas.

Finally, biodiversity transactions are likely to see more *ad hoc* growth, as some businesses are recognizing the importance of these issues, particularly in terms of maintaining ‘license to operate.’ For mining companies, tourism operators and large multinational companies, the impact of operations on biodiversity can either represent a marketing advantage or reputational risk. The challenge is that, unlike companies entering the carbon domain—which is complex and fragmented but increasingly full of players—companies entering into biodiversity agreements have far fewer organizations ready to partner with them. In response, NGOs have been collaborating through programs such as the Business and Biodiversity Offset Partnership^{vii} to rationalize this landscape.

Carbon, water and biodiversity-related markets and payments are discussed in detail below, with particular focus on the inducements to private sector engagement.

^{vii} <http://www.forest-trends.org/biodiversityoffsetprogram/>

CARBON

Carbon markets are the leading ecosystem service-related transactions at this time, due to the rapidly growing focus on climate change and greenhouse gas emissions in general, and carbon in particular. The reason is simple. A carbon-constrained future is clearly on the horizon. Even within a U.S. context, it is apparent that change is underway, given growing state-level legislation—most notably led by the State of California. In addition, large insurers and investors—on which multinational firms rely for managing risk and enabling growth—are becoming concerned about the financial implications of climate change.

Insurer Swiss Re, for example, calculates that natural disasters (which most scientists say are increasingly fueled in part by climate change) cost approximately US\$230 billion in 2005. The insurance industry had to foot the bill for a third of that total.^{viii} Hurricanes Katrina and Rita exceeded corporate assessments of worst-case scenarios. Peter Höppe, head of Geo Risks Research at Munich Re, asserts: “This is just the beginning. As climate change is accelerating, we will have to adapt to many more extreme events.”^{ix}

These insurance industry concerns are likely to translate into higher premiums, thereby driving up business operating costs. In order to create a productive way in which to respond to the issues, some insurers are offering incentives for climate-aware actions. For example, Marsh, the world’s largest insurance broker, and AIG, the world’s largest insurer, have both launched carbon emission credit guarantees and other new renewable energy-related insurance products that seek to engage more companies in carbon offset projects and carbon emissions trading markets.^x These new policy offerings are in turn creating greater awareness of, and demand for, entering into carbon-related actions, including carbon markets.

Investors are also becoming aware of the risks presented by climate change and the importance of carbon markets in creating incentives for corporate change. For example, in March 2007, global financial services firm JPMorgan and Innovest Strategic Value Advisors launched the first bond index designed to address the risks of global warming, which is “designed to address the risks of climate change in a rigorous way... to enable credit investors to make return-driven investment decisions that systematically take the risks and opportunities created by global warming into account.”^{xi} Goldman Sachs has joined peers in the investment world, such as Citigroup and HSBC, in incorporating climate risk into company lending policies.^{xii} And investment firms, such as Generation Investments, are honing research techniques that analyze the ‘carbon intensity of profits’ to understand which companies are better positioned to succeed in a carbon-constrained world. Large investors, such as the California state pension fund (CalPERS) and the California teachers’ pension fund (CalSTRS), are taking note of shareholder concerns and future carbon-related risks, and are expressing preferences for “green” investments. These pension funds have the potential to play an important role in driving investments in ecosystem services, as they are a significant source of investment dollars.

viii Vigar, David. 2006. *Climate Change: The Role of Global Companies*. London: Tomorrow’s Company.

ix “Business on a Warmer Planet,” *Business Week*, July 17, 2006.

x CERES. 2006. “Dozens of New Insurance Products Emerging to Tackle Climate Change and Rising Weather Losses.” from <http://www.ceres.org/pub/publication.php?pid=0>

xi <http://www.jpmorgan.com/pages/jpmorgan/investbk/solutions/research/jeni>

xii Information retrieved from websites at <http://www.citigroup.com/citigroup/environment/climatechange.htm> and <http://www.hsbc.com/hsbc/csr/environment/hsbc-and-climate-change>

The expansion of climate-aware investors is reflected in rapidly growing attendance of climate-focused gatherings. For example, the 2003 inaugural Investor Network on Climate Risk had participants representing assets of US\$600 billion. In 2005, participants represented US\$2.7 trillion.^{xiii} In addition, the FTSE4Good index has issued specific criteria on climate change that requires companies to have a clear greenhouse gas reduction strategy and a “long-term public goal of significant reductions over a specified time period.”^{xiv}

These shifts all signal that the economy is headed toward a carbon-constrained future. And they are all harbingers of more private sector engagement with carbon markets in the years to come.

Today, the net effect is that companies are increasingly entering carbon markets, both regulatory and voluntary. American Electric Power, Ford Motor Company, HSBC, Google and DuPont are all engaging in voluntary markets to offset their emissions. And a 2006 survey of 92 companies by The Conference Board found that about 75% of respondents are actively measuring their carbon footprint, which includes greenhouse gas emissions from both their direct and indirect operations.^{xv} Over two thirds of the corporate boards covered by the survey have carbon on their agenda. While only 50% of surveyed companies have programs in place to reduce or offset emissions, the rapid increase in company carbon inventories (entity level registries) points to a growing pool of potential market players. Only 15% of companies surveyed currently engage in voluntary emissions trading, but an additional 40% are considering voluntary engagement.

The result is that prospects for the carbon market are extremely strong. Global carbon markets have doubled in size over the past year.^{xvi} In 2005, market volume was approximately US\$10 billion,^{xvii} while in the first quarter of 2006 alone, emissions-related business transactions were valued at US\$7.5 billion. Estimates place regulated markets at US\$21.5 billion and voluntary markets at about US\$100 million for the first three quarters of 2006.^{xviii} Analysts predict that greenhouse gas emission trading markets could reach US\$2 trillion by 2012.^{xix}

These numbers are catching the eye of major investors. “Wall Street likes huge markets,” says Mark Tercek, a Managing Director at Goldman Sachs, “and the carbon emissions market could well become the biggest commodity market in the world.”^{xx} Signalling their anticipation of promising carbon market growth, Goldman Sachs bought a 10% share in Climate Exchange, a trading platform that now dominates the European and U.S. markets.^{xxi}

xiii “A Coat of Green,” *The Economist*, September 7, 2006.

xiv *Ethical Performance*. “FTSE4Good Index Unveils Criteria on Climate Change.” September 2006.

xv The Conference Board (October 18, 2006). “‘Carbon Footprint’ an Increasing Management Concern,” *Executive Action*, No. 213.

xvi The World Bank & International Emissions Trading Association (2006). “State and Trends of the Carbon Market 2006,” Washington D.C.

xvii InterCarbon 2006. “Climate Protection Propels Economic Development.” Accessed October 10, 2006 from <http://lists.iisd.ca:81/read/messages?id=31013>.

xviii Bayon, R. (2006). *Ecosystem Marketplace*.

xix UNEPFI. 2005. “The Working Capital Report.”

xx Tercek, Mark. “A View from Wall Street.” Portland Katoomba Group meeting, June 7-9, 2006.

xxi Thomas, “Goldman Takes Stake in Climate Exchange,” *The Financial Times*, September 20, 2006.

Overall, the engagement of the private sector within carbon markets is building and clearly on an upward trajectory due to regulation as well as shareholder and increasingly stakeholder expectations.

The question is no longer whether carbon markets will be robust areas of transaction, but how to most effectively decrease emissions and sequester carbon. Land use changes—particularly related to agricultural and forestry practices—could garner increasing private sector investment, particularly if business concerns about risks are addressed. For advocates, the most promising pathways forward are both through integrating language on land-based carbon sequestration into emerging laws and policies, as well as ensuring that credible and effective brokers and verifiers gain a higher profile with private sector players seeking to engage in carbon markets.

WATER^{xxii}

Unlike the international focus of carbon markets, ecosystem service deals related to water will remain local—as watershed issues are geographically bound in a way that gaseous carbon is not. Therefore, assessment of private sector interest in water must be taken on a locality-by-locality basis, with the most lucrative transactions likely to be based in major cities and/or production centers around the world, particularly in arid or semi-arid climates. Global aggregations of anticipated growth of these markets and associated payments may actually be misleading as they could cover important distinctions across ecosystems with high degrees of variation in aridity and access to reliable as well as adequate flows of water.

One of the few aggregate assertions that can be made, however, is that water concerns are likely to become a significant business issue in the coming years. And therefore, companies will increasingly need to think about water use strategically—just as with any other core business issue that leads to longer-term private sector strategy and investment, such as corporate research and development (R&D). Ensuring adequate water supplies for business operations is quite likely to become a new area of corporate scrutiny, strategy and investment.

The examples of private sector players engaging in water-related PES are on the rise. Perhaps most notable is a Panama Canal deal, where millions of gallons of freshwater are required to raise and lower boats. Deforestation in the areas surrounding the canal have increased erosion rates, making freshwater supplies more erratic and leading to siltation, which requires dredging. In response, insurance companies increased premiums due to the risks of business interruption from silting or water shortages. Businesses, without any other viable alternative shipping route, pay the higher premiums. ForestRe has suggested instead that insurance companies finance the cost of a 25-year bond to restore a healthy forest ecosystem in order to reduce their risk of having to pay out damages. Since the action would lead to reduced premiums, major shippers—such as WalMart and Japanese automakers—have been asked to pay a portion of those savings in the form of recurring cash flows to pay down the bond. These steps have been the first in tying ecosystem services provided by forestry and land use into canal management.

^{xxii}This section is based primarily on an article by Amanda Hawn on payments for watershed services that appeared on the Ecosystem Marketplace (http://ecosystemmarketplace.com/pages/article.news.php?component_id=461&component_version_id=445&language_id=12)

Another, smaller scale example, is in South Africa, where a platinum mining company in need of water to process its ore approached the Government's Department of Water Affairs and Forestry about hiring people to clear invasive plants from its local watershed to increase flows.^{xxiii} And in the South African town of Hermanus, known for its whale-watching and second homes, a new water billing system—charging low rates for basic water use and premium rates for high use—was put in place. The new billing system generates enough revenue to pay people to cut down invasive trees in the region, which affects water availability. And the results have been noteworthy. One year after Hermanus instituted its innovative billing and conservation programs, water consumption was down by 30%, revenues from water sales were up by 20%, and water was more affordable to the poor. In addition, 96% percent of residents approved of the changes.^{xxiv}

In Europe, Perrier Vittel's bottled water company (now owned by Nestle) discovered in 1990 that it would be cheaper to invest in conserving the farmland surrounding their aquifers than to build a filtration plant. Accordingly, they purchased 600 acres of sensitive habitat and signed long-term conservation contracts with local farmers.

In the U.S., there are examples of factories paying farmers to reduce their pollution emissions along a river so that the factory, in turn, can operate within overall pollution caps in a watershed. In effect, the factories are purchasing pollution permits from farmers at a market price that is amenable to both parties. Such 'cap-and-trade' systems, many argue, allow communities to meet pollution standards in the most cost-effective way possible.^{xxv}

Based on early successes, there is hope that the PES model can create win-win watershed deals. Yet, it is noteworthy that while pilot projects look promising, when working across the various hydrological, legal and socio-economic terrains that distinguish each watershed from the next, one size does not fit all. Paying people to rip up pine trees—as is done in South Africa—is hardly the way to go if you want to protect a watershed in Utah. Similarly, cap-and-trade systems—which might work in Utah—make little sense on a South African river entirely devoid of factories.

And unlike carbon credits, watershed services are not fungible and so must be traded on a watershed or sub-watershed level, effectively limiting the size and scale of resulting markets. The nature of the 'users-pay' model is such that you have to implement it on a case-by-case basis.

Interested parties, however, need not continually 'reinvent the wheel.' Al Appleton, one of the chief architects behind a watershed deal which saved New York City billions of dollars, stresses that, while all business transactions are different, the lessons learned in each can be tailored and applied to the next. Hoping to streamline the process of moving PES models out of the boardroom and into the forest, scientists and economists are identifying the questions that must be answered at each stage of a project in order for it to work. The answers themselves are going to be specific to a site, but the questions are likely to be germane from

^{xxiii}http://ecosystemmarketplace.com/pages/article.news.php?component_id=461&component_version_id=445&language_id=12

^{xxiv}http://ecosystemmarketplace.com/pages/article.news.php?component_id=461&component_version_id=445&language_id=12

^{xxv}http://ecosystemmarketplace.com/pages/article.news.php?component_id=461&component_version_id=445&language_id=12

one project to the next.

'What is the problem you are trying to solve?' is the first and most important question facing both prospective buyers and sellers interested in putting together watershed services deals. Hydroelectric companies generally do not care about the drinking quality of water when using it to power their turbines, but rather focus on water quantity and sedimentation loads as these are the factors influencing their business. A little benzene does not slow down electricity production, but mud will. New York City water analysts, on the other hand, are tasked with supplying 9.5 million New Yorkers with clean, healthy water. And benzene running from the tap is unlikely to garner smiles in Manhattan, so they care about water quality just as much as they do about water quantity. In sum, figuring out who needs what from a watershed requires analysis and understanding of a particular situation.

'What is the state of scientific know-how within a watershed and hydrological system?' is the second key question. Water PES deals require considerable scientific and technical know-how. The qualitative impacts of a healthy watershed on water quality and flow generally are understood. However, healthy watersheds usually do not increase water quantity (the South African example and cloud forests are exceptions), but they do improve water quality, control flooding, and regulate water temperature. The water they give up, in other words, is better. Unfortunately, just how much better is still up in the air. "Sometimes PES programs have been developed around somewhat shaky science," notes Sandra Postel, Director of the Global Water Policy Project. The topography, soil and climate of every site varies, so the real lesson from early efforts is that projects must be designed with flexibility in mind.

'How do you transform the beneficiaries of watershed services into buyers of watershed services?' is a third key question. Lessons from Ecuador may offer some insights. In 2000, Quito created a water fund to pay for conservation in two of its major watersheds. The city's municipal water company contributed 1% of its water sales to get the fund started and the municipal electric utility and a local beer company now pay annually to keep it growing. The fund currently stands at \$1.7 million and will soon generate enough annual interest to bankroll conservation projects upstream of the city.

Pioneers working on payments for watershed services assert that visibility and tangibility determine viability when it comes to marketing watershed services. And demonstrable scientific evidence is essential to linking land use to water quality. Equally important, managers need a reliable means of assigning monetary value to the services they are marketing. The easiest way to do this, to date, has been to estimate the avoided cost of providing clean, reliable water sources using reservoirs and filtration plants. Yet, the lack of market infrastructure to match sellers with buyers is seen as one of the biggest obstacles to designing effective conservation finance mechanisms for watershed services.

Fortunately, in areas where the potential for water conflict is greatest, a countervailing potential for cooperation also exists. This cooperative impetus emerges from the desire to avoid political and economic conflict. On a deeper level, however, it is based on the innate recognition that water is essential and valuable to us all.

Markets for watershed services have the potential to be incredibly powerful because they capitalize on this recognition. By aligning the interests of upstream and downstream users, conservation finance mechanisms could create sustainable solutions to watershed management. The question, however, remains: Can watershed services become the world's

next big environmental market? For now, the field is still emerging and large-scale engagement by the private sector remains unclear.

BIODIVERSITY^{xxvi}

Biodiversity loss is being documented in ecosystems around the world. A major cause is the clearing of natural habitats to make way for agriculture, forestry, oil and gas, mining, transport, and construction. All of these developments offer jobs, services and foreign exchange, which are important to many countries.

Unfortunately, engineering solutions to environmental impacts at a development site are often inadequate to fully mitigate the damage incurred to biodiversity during the course of an operation. Rather than leave a legacy of biodiversity degradation on a corporate project site and in the surrounding area, increasingly companies are looking for ways to minimize and then compensate for their residual environmental footprints. Some businesses are recognizing that markets, payments, and/or biodiversity offsets can be effective tools that, when implemented with care, contribute to conservation and deliver livelihood benefits for local communities.

Markets and payments for biodiversity are in various phases of development around the world. For example, in the U.S., the conservation banking market is a cap-and-trade system that allows for the purchase of endangered species credits to offset negative impacts to these species and their habitat. Banks are created by permanently protecting endangered species habitat on private land. Conservation banking was pioneered in the State of California and is becoming increasingly popular in other states since the passage of federal guidelines concerning their establishment, use, and operation in 2003. Internationally, particularly in developing countries, the focus in engaging the private sector is on biodiversity offsets.

Biodiversity offsets are conservation actions designed to compensate for the unavoidable impact on biodiversity caused by infrastructure projects. Credible offsets must ensure “no net loss,” and preferably a net gain, of biodiversity. Offsets should only be used in the context of developments that are legal and appropriate, and when the developer has first used best practice to avoid and minimize harm to biodiversity.^{xxvii}

Biodiversity offsets address the developer’s full impact on biodiversity at a landscape scale. It is increasingly believed that companies can achieve significantly better and more cost-effective conservation outcomes than currently result from projects that convert habitat. By supporting sustainable livelihoods that address the underlying causes of biodiversity loss, biodiversity offsets can help alleviate poverty. Finally, offsets can assist companies that have an impact on biodiversity to manage their risks, liabilities and costs and foster good relationships with local communities, regulators and shareholders.

While offset activities will vary by site, there are a number of conservation activities that are used to demonstrate additional, measurable conservation outcomes, such as:

^{xxvi} This section is primarily based on text from the Business and Biodiversity Offsets Program (<http://www.forest-trends.org/biodiversityoffsetprogram/documents/BBOP%20Flyer.pdf>)

^{xxvii} <http://www.forest-trends.org/biodiversityoffsetprogram/index.php>

- Safeguarding unprotected areas by entering into agreements with local communities as custodians of biodiversity;
- Establishing corridors through securing the conservation management of land that provides biological corridors between protected areas;
- Establishing buffer zones around protected areas;
- Strengthening ineffective protected areas by improving the conservation status of certain neglected zones in a forest reserve or by replanting degraded areas with native species and/or removing invasive alien species;
- Addressing underlying causes of biodiversity loss by working with communities to address their livelihood needs to support sustainable livelihoods, such as shade-grown agricultural systems, and
- Demarcating and protecting marine areas important for feeding and breeding of marine animals, working with companies and communities to avoid exploitation in these areas and supporting sustainable aquaculture initiatives for communities to compensate for lost income.

A key player in the development of these offsets, and the methodology of offsetting business impacts, is the Business and Biodiversity Offset Program (BBOP).^{xxviii} BBOP is a partnership—of companies, scientists, NGOs, government agencies, and research institutes--responding to interest in the use of offsets to ensure “no net loss” of biodiversity through conservation activities that will protect threatened habitat, contribute to national biodiversity strategies and address local communities’ livelihood priorities. With the BBOP, companies are quantifying their impacts on biodiversity and seeking to offset through activities that advance conservation goals at the landscape-scale. Multinational companies are engaged in investing in sites that relate to their operations in various parts of the world. The offsets will explicitly contribute to national biodiversity priorities and address local livelihood needs on biodiversity.

Given the technical complexity of biodiversity offsets, BBOP is being run with an advisory committee comprised of international experts from disciplines including: conservation methodologies, metrics and monitoring; bioregional and landscape scale planning; botany, zoology and ecology; risk, project and biodiversity management in business; and environmental economics. These members offer technical, scientific and policy support to the pilots and are preparing tools and guidelines on biodiversity offsets.

Over 50 institutions are engaging with these questions within the BBOP Learning Network, which includes: ABN-Amro; BG Group; Earthcall; Fundação Boticario; Goldman Sachs; Rio Tinto; The International Council on Mining and Metals; The International Petroleum Industry Environmental Conservation Association; The International Finance Corporation; The Katoomba Group (over 200 international experts dedicated to advancing markets for ecosystem services); The Ministry of Housing, Spatial Planning and the Environment, Netherlands; The Secretariat of the Convention on Biological Diversity; The World Bank and World Bank Institute; The World Resources Institute; and The World Wildlife Fund.

At this time, efforts on biodiversity offsets are focused on demonstrating that biodiversity offsets can help achieve significantly better and more cost-effective conservation outcomes than normally occurs in infrastructure development. The intent is to demonstrate that no net loss of biodiversity can help companies secure their license to operate and manage their costs

^{xxviii} <http://www.forest-trends.org/biodiversityoffsetprogram/index.php>

and liabilities. As the technical aspects of the field mature, the hope is that biodiversity offsets will become a standard part of business practice for companies with a significant impact on biodiversity.

SECTION IV: ENGAGEMENT^{xxix}

Multi-million dollar markets exist in carbon, water, and biodiversity, as summarized in the tables below. Reductions in carbon emissions now trade at ~\$30/ton in Europe; in the U.S., water pollution abatement trades at ~\$45/ton; management of wetlands trades between \$5,000 and \$250,000/acre; while management of real estate to preserve biodiversity goes for \$3,000-\$150,000/acre.^{xxx}

**Table 1:
Current Scope: Environmental Markets & Payments for Ecosystem Services**

COMMODITY	TYPE OF MARKET	NAME OF MARKET (START DATE)	SIZE OF MARKET	CURRENT TRADING PRICE
Sulfur Dioxide Emissions	Regulatory (U.S.)	Regional Clean Air Incentives Market (1994)	\$600,000	\$2,000 per ton
Nitrous Oxide emissions	Regulatory (U.S.)	Regional Clean Air Incentives Market (1994)	\$20,700,000	\$4,000 per ton
Wetlands	Regulatory (U.S.)	Wetland Mitigation Banking (1995)	\$289,659,866	\$5000 to \$250,000 per acre
Biodiversity	Voluntary Biodiversity Deals (international)	--	\$331,257,678	
	Regulatory (U.S.)	Conservation Banking (2003)	\$40,773,590	\$3000 to \$150,000 per acre
	Voluntary, pilot for future regulation (Australia)	National Market-based Instruments Pilots Program (2003)	\$3,877,531	N/A
Water	Voluntary (Costa Rica)	Water-Based Ecosystem Services Markets (1996)	\$8,944,943	\$40 to \$100 per hectare of forest
	Voluntary (Mexico)	Payment for Hydrological Services (2003)	\$23,133,980	\$33 per hectare

^{xxix} Unless otherwise noted, the research reported in this section was conducted by Ivo Mulder, Kerry ten Kate, and Sara Scherr in 2005. The data that was gathered through literature review, phone and e-mail conversations with key experts and informants and interview sessions with a number of company representatives. Although the analysis aimed to cover all possible payments and investments made by private entities worldwide, the reality is that many initiatives are underway that are (currently) not well documented. Therefore, this analysis should not be seen as exhaustive. It is, however, illustrative and provides a rough overview of the status, scope and geographical extent of private PES.

^{xxx} Business for Social Responsibility. 2006. "Environmental Markets: Business Opportunities & Risks." San Francisco, California: BSR Trends Report Series. (http://www.bsr.org/meta/BSR-Trends-Report_Enviro-Markets.pdf)

	Regulatory (U.S.)	Water Pollutant Trading and Offset (2003)	\$11,293,926	\$2.37 per pound sediment/nutrients
Mercury emissions	Regulatory (U.S.)	Clean Air Mercury Rule (2005)	Begins in 2010	Begins in 2010
Greenhouse Gas emissions	Regulatory (EU)	European Union Emissions Trading Scheme (2005)	250,000,000 tons (\$ figure not available)	\$12 per ton of CO2 equivalent (from recent average of \$35/ton)
	Regulatory (international)	Kyoto Protocol (Joint Implementation & Clean Development Mechanism)	\$7,630,000	\$0.58 per ton of CO2 equivalent
	Regulatory (Australia)	New South Wales Greenhouse Gas Abatement Scheme		\$15 per ton of CO2 equivalent
	Voluntary	Chicago Climate Exchange (national/linked to EU) (2000)	2,948,400 tons (\$ figure not available)	\$4.00 per ton of CO2 equivalent
	Regulatory	Regional Greenhouse Gas Initiative (New England)	Begins in 2009	Begins in 2009
		California, Oregon, Washington	Pending	Pending

Source: Business for Social Responsibility. 2006. "Environmental Markets: Business Opportunities & Risks." San Francisco, California: BSR Trends Report Series. (http://www.bsr.org/meta/BSR-Trends-Report_Enviro-Markets.pdf), based on data from EU ETS, Ecosystem Marketplace, EPRI Solutions, RECLAIM, and Point Carbon.

TABLE 2:
ECOSYSTEM MARKETPLACE MATRIX
(CREATED BY WWW.ECOSYSTEMMARKETPLACE.COM)

PES MARKET	COMPLIANT CARBON FORESTRY	VOLUNTARY CARBON FORESTRY	COMPLIANT WATER QUALITY TRADING	VOLUNTARY WATERSHED MGNT PAYMENTS	GOV'T-MEDIATED WATERSHED PES	COMPLIANT BIODIVERSITY OFFSETS	VOLUNTARY BIODIVERSITY OFFSETS	GOV'T-MEDIATED BIODIVERSITY PES	RECREATION	BIO-PROSPECT-ING (ABS)	LAND CONSERVATION	CERT. FOREST PRODUCTS	CERT. AG PROD.
SUB-MARKETS	Kyoto: CDM, JI, NSW, RGGI, CCAR (coming soon at regulatory level)	Chicago Climate Ex change; BioCarbon Fund; Retailers; NGO Initiatives (ex. TNC in Bolivia; SELF projects, CI, etc.); VERs from pre-CDM projects	Nutrient / Salinity trading (Pennsylvania, Oregon, Virginia, New South Wales, under consideration in Europe, some trades in Minnesota but no active trading)	Beverage Companies (Vittel, Coca-Cola, Beer companies) Hydroelectric Power Companies / Dams	China, Costa Rica, Mexico, NYC, U.S. WRP, UNEP project in Danube	U.S. Compensatory Mitigation (Permittee-responsible, Banking & in lieu fee), Australian BioBanking, IEA offsets in developing countries	- BBOP - Wal-Mart - Mining in Australia, - Oil companies	- US Farm Bill conservation programs - Mexico and Colombia's biodiversity payments - Australia's native vegetation program	- Park fees - Ecotourism - Hunting licences (CAMPFIRE project and CBNRM in East & Southern Africa)	- Pharmaceutical business deals - Biotechnology business deals	- Conservation easements - Land trusts	- Certified timber - Certified non-timber forest products (NTFPs, such as, oils, resins, botanicals, etc.)	- Coffee, - Cocoa - Bananas - Various other crops - Various agro-forestry products
MARKET DRIVER	Cap and Trade / Compliance-Driven Markets	- PR - Preparing for regulation - Corporate Social Responsibility (CSR) - Individuals taking responsibility	Cap and Trade / Compliance-Driven	Voluntary Private PES	Government PES	Cap and Trade/Compliance-Driven Markets	Voluntary Private PES	Government PES	Voluntary Private PES	Voluntary Private PES	Philanthropy (tax policy driven)	Certification (consumer preference / procurement driven)	Certification (consumer preference / procurement driven)
ECO-SYSTEM SERVICE	Carbon	Carbon	Water	Water	Water	Biodiversity	Biodiversity	Biodiversity	Biodiversity	Biodiversity	Bundled	Bundled	Bundled

MARKET SIZE

<p>CURRENT SIZE OF MARKET (in \$ per annum)</p>	<p>\$21.25 billion (Total Market) \$10 billion (LULUCF Market)</p>	<p>\$25-150 million (Total Market) \$7-15 million (LULUCF Market)</p>	<p>\$7 million</p>	<p>\$5 million (many public PES are partially private - like Costa Rica ~30% private funds by electric, also Ecuador, public utility revenues)</p>	<p>\$1,000 million New York City: ~\$150 million, U.S.' WRP: \$240 million U.S.' EQUIP (estimate 50% for water-related) ~\$500 million) Mexico program: \$18 million Costa Rica program: \$5 million China program: ~ \$4 billion / year</p>	<p>\$1.4 billion (total) \$900 million (permittee-responsible & in-lieu) \$500 million (wetland & stream banking) \$50 million (species banking) \$? NSW BioBanking \$? EIA-driven offsets unknown</p>	<p>\$20 million</p>	<p>\$3 billion (just flora and fauna oriented programs, not including water and soil conservation)</p>	<p>\$1 billion? (Ecotourism)</p>	<p>\$20 million</p>	<p>\$6,000 million in US alone Size and use of easements in developing countries is unclear Current global expenditures on protected areas is ~\$6.5 billion per year, but the amount required to fully support conservation objectives is ~\$45 billion per year. This shortfall is exacerbated when considering that, of this \$6.5 billion/yr spent on PAs, less than 12% is spent in developing countries – where biodiversity is typically greatest. In developing countries government involvement may be through state electricity, water, road agencies. (Costa Rica:</p>	<p>Just FSC estimated at \$5,000 million</p>	<p>\$26,000 million in global sales \$21,000 million (ITTO)</p>
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											over \$14 Million)		
POTEN. SIZE BY 2010 (in \$ per annum)	\$55 billion (Total Market - assuming US regulation comes into place) \$2.5- 5 billion (LULUCF Market)	Between \$50 million and \$20 billion (General Market) \$10-\$100 million (LULUCF Market)	\$500 million (contingent upon details of 2007 Farm Bill)	\$50 million	\$3,000 million	\$2 billion	\$25 million	\$4 billion		\$35 million	\$10,000 million	\$15,000 million	\$60,000 million
POTEN. SIZE BY 2020 (in \$ per annum)			\$1,000 million	\$2,000 million	\$6,000 million	\$3 billion (more if other countries adopt practice)	\$100 million (if private sector engages at a significant scale)	\$7 billion		\$100 million			
POTEN. SIZE BY 2050 (in \$ per annum)			\$2,000 million	\$10,000 million	\$20,000 million	\$4 billion (more if other countries adopt practice)	\$400 million (if private sector engages at a significant scale)	\$15 billion		> \$500 million	\$20,000 million	\$50,000 million	\$200,000 million
CURRENT RATE OF GROWTH (annual %)	<i>General Carbon Market Growth:</i> 221% Increase in EU ETS trading volume between 2005-2006 (thus far this number does not include any forestry projects); NSW increased 176.8% between 2005 and the third quarter of 2006	<i>General voluntary market growth:</i> CCX trading volume increased by 700% between 2005 and 2006 The broader voluntary market also increased rapidly by an estimated 300% <i>LULUCF</i>	0.05	0.1	0.1	0.2	0.25	0.3	0.2	0.05	0.05	0.25	0.3

		<i>Growth:</i> Decreased in retail area, but still probably a total increase due to growth in market for 30% growth rate											
POTEN. SIZE BY 2020 (in \$ per annum)	<i>Total Market (CDM):</i> \$15 billion	<i>Total Market:</i> Between \$500 million And \$ 2 billion, <i>LULUCF Market:</i> \$50 to 250 million				Currently unknown, but not likely to take off rapidly considering substantial legal and enforcement systems required.	\$60 million (if international corporations adopt practice)	\$100 million					

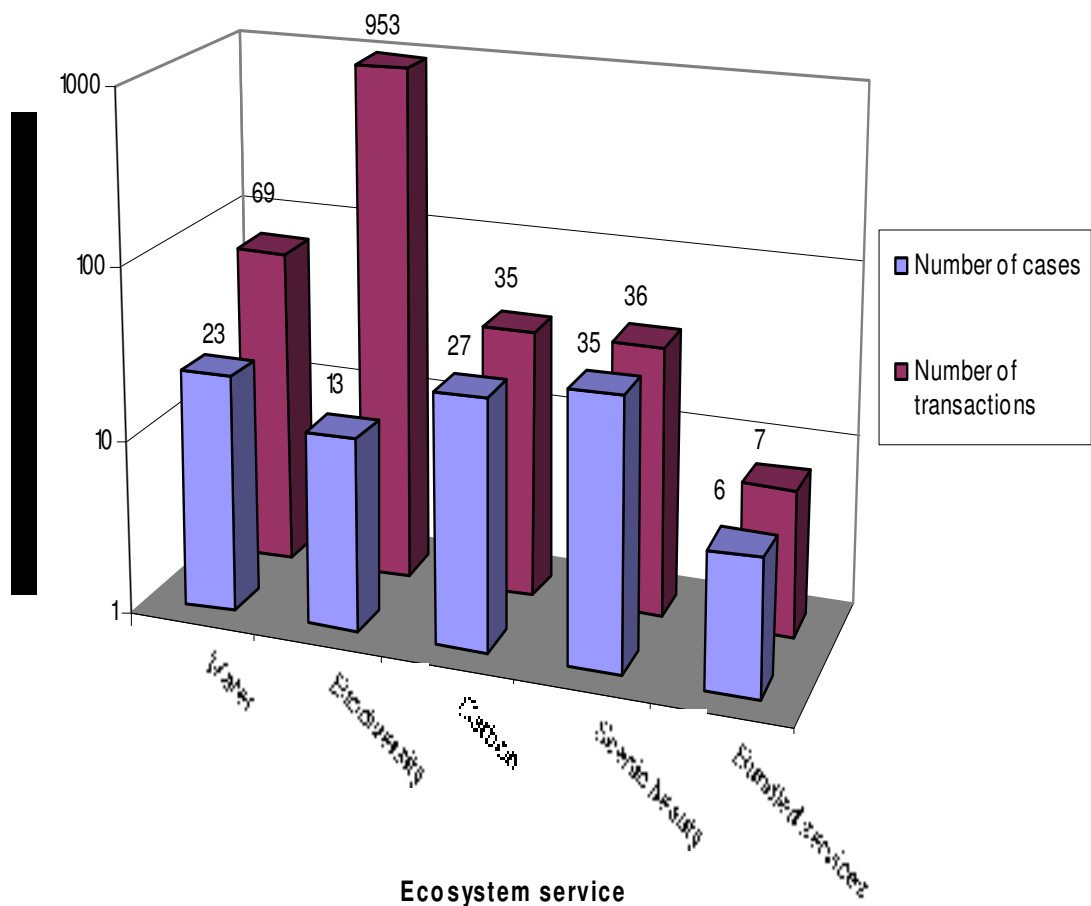
MARKET PARTICIPANT

BUYERS	<ul style="list-style-type: none"> - Regulated industry - Governments - Carbon funds - Climate Trust 	<ul style="list-style-type: none"> - Corporations (e.g. Mitsubishi, AEP, Cinergy, GM, Texaco), - NGOs - Universities (e.g., Yale) - Individuals 	<ul style="list-style-type: none"> - Treatment plants - Other point source emitters - Potentially government buyers through reverse auctions 	<p>Private Sector (e.g., Evian, Ecuadoran beer company, water utility, hydroelectrics, Vivendi, Lyonnaise, Florida Ice and Farm, Energia Global, Compania Nacional Fuerza y Luz etc.; Coca-Cola; sugar companies (Guatemala), rice and palm agroindustry (Tanzania), mining companies (Peru), individual water users</p>	<p>Government water agencies / utilities (City of New York), private utilities mandated by governments; Water authorities (Tanzania); Public water authorities (Peru/Mexico)</p>	<p>Dept. of Transportation, Public Works Projects, Military, commercial and residential real-estate developers</p>	<p>Corporations, major conservation NGOs, and individuals (Rio Tinto, Newmont, ICMM - International Council on Mining & Minerals, EBI - Energy Biodiversity Initiative, IPIECA)</p>	<p>US Government, Australian Government; government-owned electricity companies, government-owned utilities and mining/oil concerns; Individual landowners/ developers; Brazilian government (transferable development rights)</p>	<p>Individuals and commercial operators</p>	<p>Pharma, Biotech (Diversa Corp, Genencor, Novozymes, Merck, others)</p>	<p>NGO: TNC, TPL, Am. Land Conservancy, Conservation Fund, Land Trust Alliance and Local Land Trusts, Recreation, Hunting and Fishing, corporations needing tax benefits. Public: Partners for Fish and Wildlife (USFWS), Local Governments</p>	<p>Global middle/upper class, Home Depot, socially aware retailers</p>	<p>Whole Foods and other organic/natural grocery stores</p>
SELLERS	<p>Project developers: Precious Woods (forestry related CDM); Pearl River project developers (State Forestry Administration, Research Institute of Forest Ecology, Environment and Protection, Chinese Academy of Forestry, International Bank for Reconstruction and Development/ Bio Carbon Fund)</p>	<p>Retailers (Future Forests, EAD Environmental, Carbon Fund, Climate Care, Blue Source, Green Fleet) Project developers (mostly NGOs, i.e. TNC, CI and Pre- CDM VERs), Governments</p>	<p>Non point source emitters, including farmers, owners of streams, wetland developers.</p>	<p>Private landowners, Utilities, Forest companies, National Parks or other government lands, cooperatives, etc., local development councils, communities living by parks and forests (Indonesia)</p>	<p>Private landowners, Utilities, Forest companies, National Parks or other government lands, cooperatives, etc., municipalities, upstream communities (Philippines)</p>	<p>Private mitigation banking companies, State Dept. of Transportation, Env. Agencies, Govt.-run banks, NGOs, private landowners</p>	<p>Private and public landowners (for offsets, this could include conservation NGOs, indigenous groups, community organizations, and protected area reserve managers and companies)</p>	<p>Private landowners - often farmers, agriculture, communities</p>	<p>Federal, state, and private land owners</p>	<p>Govt., states & communities (InBio, Center for Reproduction of Endangered Species (CERS) - San Diego Zoo); in developing countries it is possible for smaller communities, indigenous groups to become sellers; property rights are an issue</p>	<p>Private landowners, in particular generational transfer of Ag. lands (US, Canada, Latin America)</p>	<p>Certified producers</p>	<p>Small and large scale producers</p>

Within this complex and still emerging landscape, the private sector is beginning to engage in environmental markets and payments for ecosystem services. In order to gain an understanding of the corporate actor landscape, Forest Trends undertook a study in 2005 on private sector ecosystem service buyers, with a particular focus on non-carbon transactions as carbon was an area of such rapid growth and increasing research.^{xxx1}

This Forest Trends 2005 study recorded 100 *types* of private PES and more than 1,100 *transactions*^{xxxii} with a distribution across ecosystem services, as detailed in the following figures. The geographic distribution is skewed. The bulk of the current initiatives take place in South America, with Asia accounting for a number of types. North America and Europe have fewer types but boast many more transactions. Africa has few private PES deals.

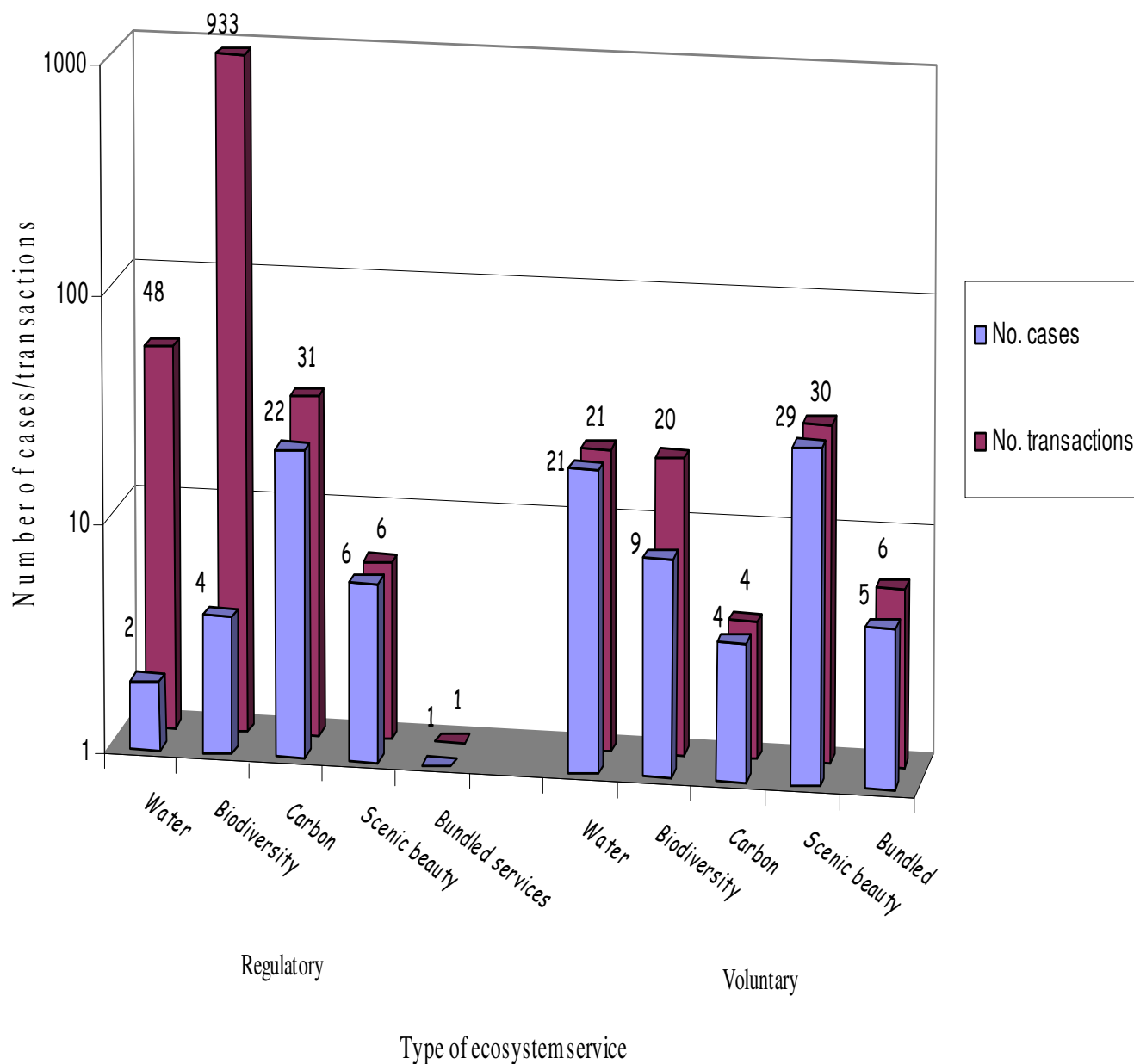
**Figure 1:
Private Sector Payments by Ecosystem Service**



^{xxx1} The research was conducted by Ivo Mulder, Kerry ten Kate, and Sara Scherr.

^{xxxii} The distinction between the two can be explained by the following example. Both wetland mitigation banking (“water”) as well as conservation banking (“biodiversity”) in the USA account for a considerable market. As an initiative in itself, they are both represented as 1 *case*. However, the number of *transactions* that take place is far larger; wetland mitigation banking (*water* market) accounts for about 47 transactions and conservation banking (*biodiversity* market) about 930.

**Figure 2:
Private Sector Engagement with Ecosystem Service Deals:
Summary of Number of Cases & Transactions**



The carbon market is somewhat different from the other markets in the sense that by signing and ratifying the global climate agreement (Kyoto), a market was instantly created by allowing trade of carbon credits under the Clean Development Mechanism (CDM) and Joint Implementation (JI). So far, the private sector has dominated both the buy-side and sell-side of this market. Due to the nature of carbon dioxide, most of these deals take place at an international level.

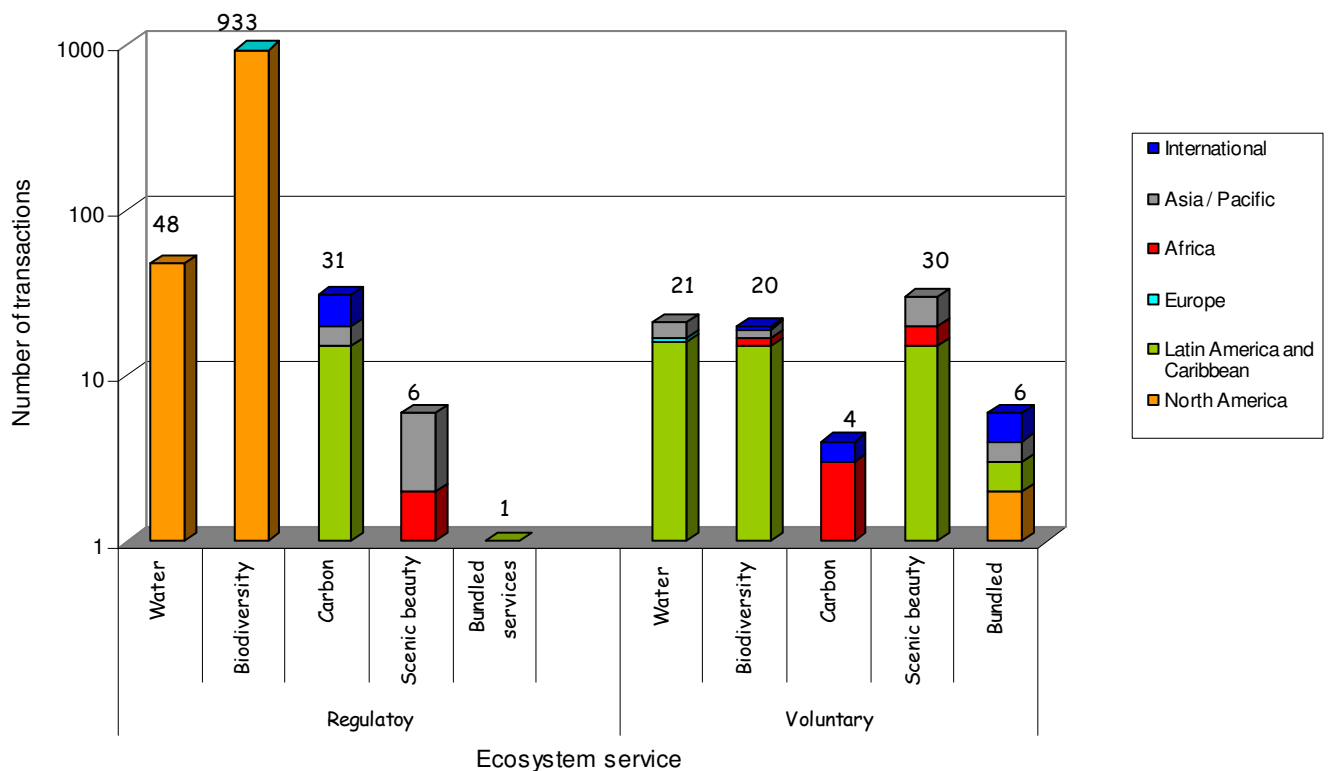
The market for 'water services' is also dominated by the private sector, which accounts for 60% of recorded buyers and 65% of recorded sellers, as of the 2005 findings. Demand and

supply for landscape beauty is somewhat differently skewed. Private individuals and companies, mostly related to the eco-tourism industry, constitute the most important buyers, while private landowners are the largest sellers, followed by governments.

It is noteworthy that the large number of transactions for water and biodiversity are a consequence of the many transactions that take place under the conservation banking and wetland mitigation banking initiatives in the U.S. In both cases, regulation triggered a considerable market.^{xxxiii} Furthermore, the total number of transactions under conservation banking and wetland mitigation banking includes both offsets by public and private parties in the current dataset. The total number of private transactions therefore is lower. Finally, most of the deals in the voluntary market are so-called “self-organized private deals” with varying levels of government involvement.

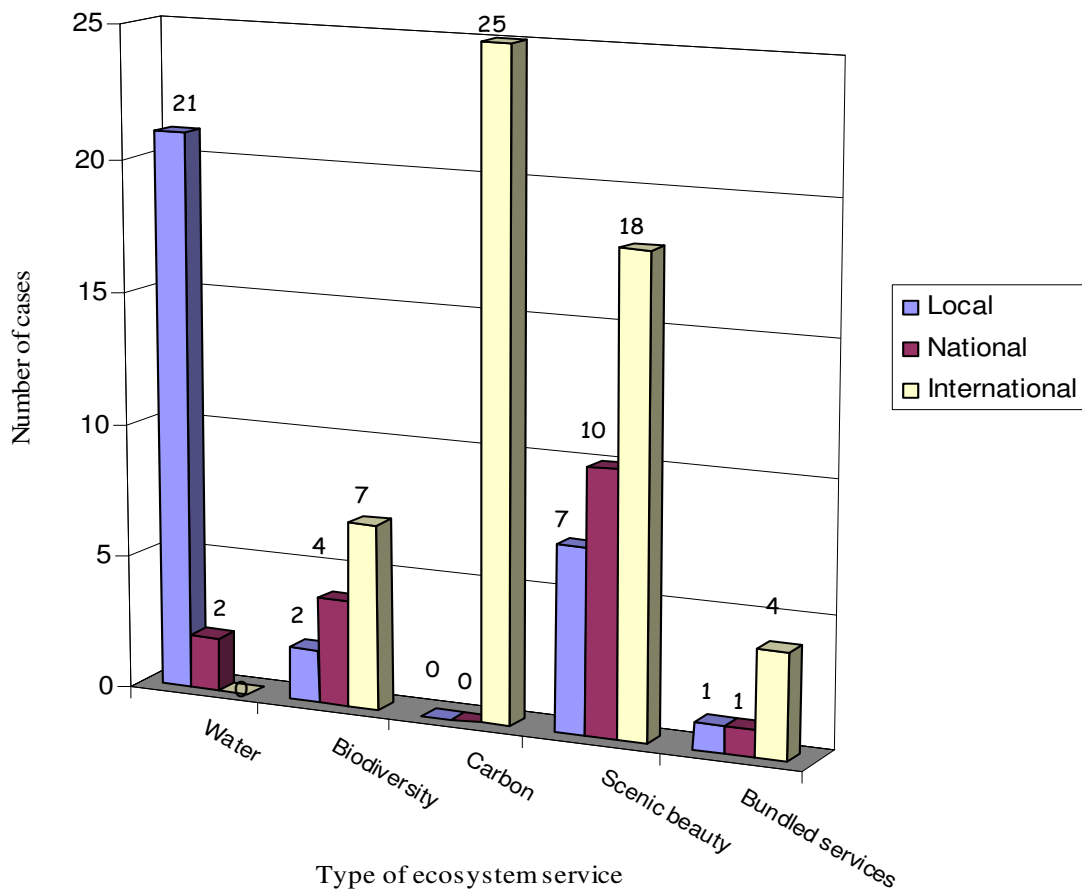
As illustrated below, the majority of cases of private PES (although not number of transactions) are located in Latin America and the Caribbean, especially in the markets for water-related services, biodiversity, carbon and the scenic beauty of the landscape. Payments for biodiversity mostly take place in the U.S., due to the conservation banking market and wetland mitigation banking market.

**Figure 3:
Geographic Distribution of Private Sector Payments by Ecosystem Service**



^{xxxiii} Both markets came into existence under the Endangered Species Act 1973 (biodiversity) and the Clean Water Act 1972 (water).

**Figure 4:
Scale of Private Sector PES Deals
(Local, National, or International)**



A wide range of industry sectors are currently active in the field of ecosystem service payments, as illustrated below. Not surprisingly, carbon buyers are most notably in the oil and petrochemical industry. And watershed-related buyers are predominantly in the food and beverage industry. The construction / land development industry are significant players in the biodiversity offset market, due to conservation banking and wetland mitigation banking in the U.S., as well as regulatory biodiversity offsetting in Brazil and the Netherlands. Finally, buyers paying for services related to the scenic beauty of the landscape can be found especially in tourism and to a lesser extent advertising. As a 2005 interview with a tourism company indicated, the industry is dependent on scenic beauty, biodiversity as well as water used in hotels.

**Figure 5:
Industries Represented within Current Payments for Ecosystem Services**

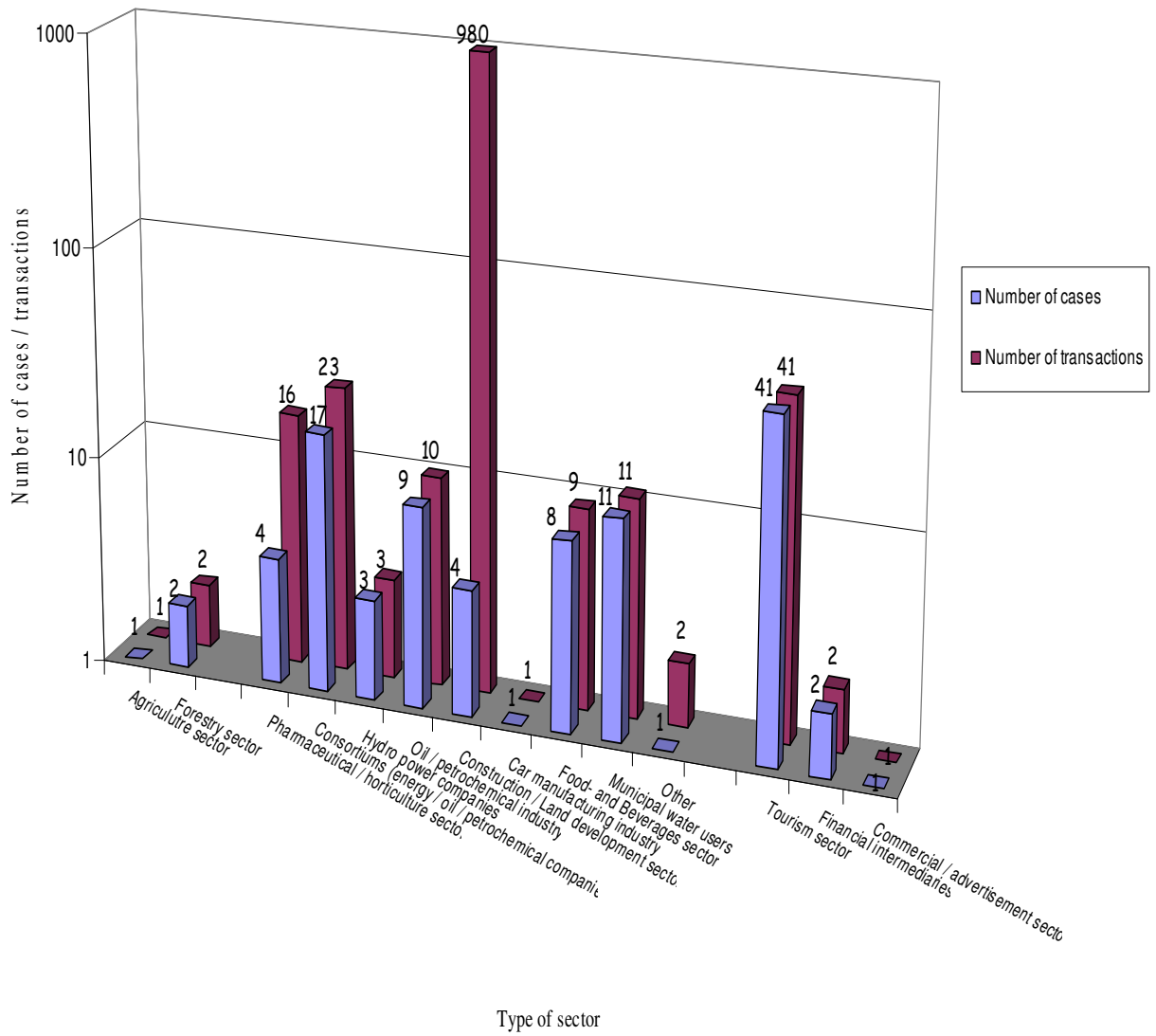
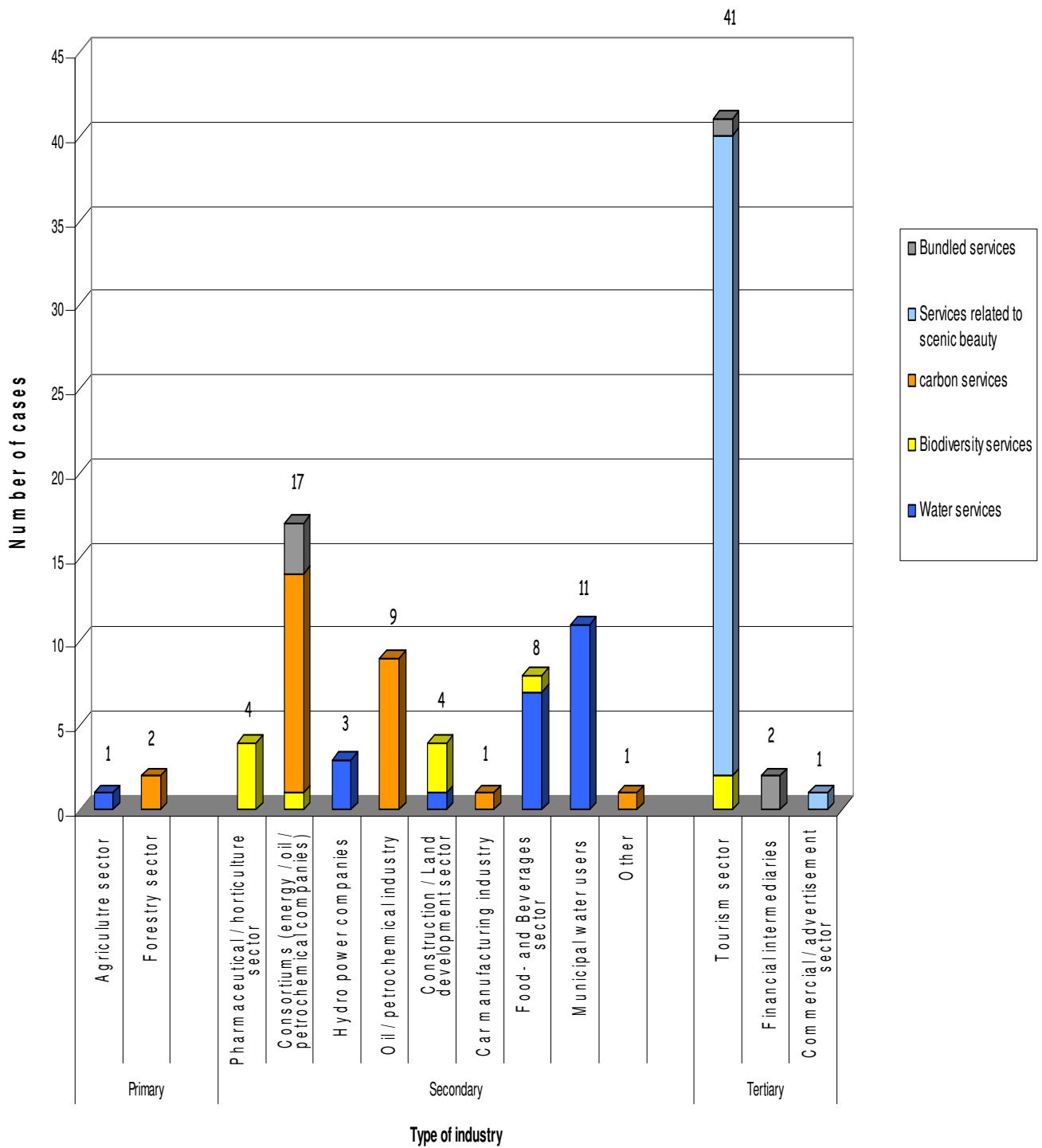


Figure 6:
Types of Ecosystem Services Payments by Industry^{xxxiv}



^{xxxiv} The high number of transactions in the construction and land development sector is a consequence of the wetland mitigation banking and conservation banking initiatives

Section V: Business Drivers^{xxxv}

Motivations for engaging in ecosystem service markets and payments vary from industry to industry and even from company to company. However, there are likely core drivers that cut across firms.

First, and most obviously, companies will invest in payments for ecosystem services if they are required to by regulation and/or if it is likely that regulation will come into force in the (near) future. Second, private sector engagement will increase if it is clear that payments can deliver a return on their investment, either in terms of financial- or non-financial benefits. Third and finally, companies will engage if there is a sense that stakeholder expectations include such payments. This set of motivations is summarized in the following table.

**Table 3:
Potential Private Sector Motivations for Engaging with
Ecosystem Service Markets**

TYPE OF MOTIVATION		MOTIVATION	EXAMPLES
Regulation	Legal	Comply with regulations	<ul style="list-style-type: none"> • Law • Cap-and-trade regulatory system • International convention
Voluntary	Business benefits	Act on business opportunity	<ul style="list-style-type: none"> • Earn money through carbon offsets or water market • Reduce environmental risk (e.g. insurance industry inducements, investor requests, and/or eco-efficiency related) • Build brand through ‘greening’ enterprise
		Secure, sustain or reduce costs of key natural resource inputs required for business operations	<ul style="list-style-type: none"> • Clean, reliable flows of water needed • Intact ecosystems essential for maintaining “charismatic” mega-fauna for eco-tourism operation • Genetic resources needed for pharmaceutical company (i.e. bioprospecting)
		Maintain ‘license to operate’ by managing potentially difficult relationships	<ul style="list-style-type: none"> • Improve relations with regulators and/or enjoy regulatory good will by complying with (1) Equator principles; (2) ISO 14001 guidelines; or (3) International conventions such as CBD or Ramsar Convention • Improve relations with local communities, who are key for informal license to operate, and enable avoiding disruption/losses from protests
		Enhance or maintain the financial value of land, forest	<ul style="list-style-type: none"> • Manage owned natural resources in order to improve ecosystem structure

^{xxxv} The research reported in this section was conducted by Ivo Mulder, Kerry ten Kate, and Sara Scherr in 2005. The data that was gathered through literature review, phone and e-mail conversations with key experts and informants and interview sessions with a number of company representatives.

	or other assets belonging to the company Manage reputational risk and/or build brand	and function, thereby improving habitat and earning from sequestering carbon as well as possibly (if there are buyers) entering watershed deals <ul style="list-style-type: none"> Invest in ecosystem service payments for marketing purposes to influence consumers, investors or others committed to “green” products
Voluntary Not related to core business	Increase employee morale and enhance both recruitment and retention of high-quality staff	<ul style="list-style-type: none"> Improve quality of applicants and employee retention rates as people feel positive about working for the company
	Align business values with all aspects of operations	<ul style="list-style-type: none"> Improve quality of applicants and employee retention rates as people feel positive about working for the company
	Donate philanthropically	<ul style="list-style-type: none"> Improve relations with local communities, who are key for informal license to operate, and enable avoiding disruption/losses from protests Improve quality of applicants and employee retention rates as people feel positive about working for the company

Within the group of companies paying for ecosystem services, our 2005 research found that the link between payments for ecosystem services and a business rationale often existed. Carbon regulation was a factor, as was the quality and availability of a key natural resource for business operations, such as water quality and availability. Finally, the presence of “charismatic mega fauna”—such as elephants, pandas, etc.—was an element for the tourism sector. It is noteworthy that most of the private sector entities engaged with markets and payments for ecosystem services perceive that they will accrue business benefits from paying for the ecosystem service in which they are investing.

A number of companies also will realize specific financial gains, such as the newly created Australian company New Forests Pty. and the British company ForestRe. In addition, a clear business case exists for two water companies in Costa Rica, namely Matamoros Empresa Eléctrica Platanar and Empresa Servicios Públicos de Heredia (ESPH), which are paying forest dwellers living in upstream watersheds for maintaining the forests in order to secure continuous water availability.

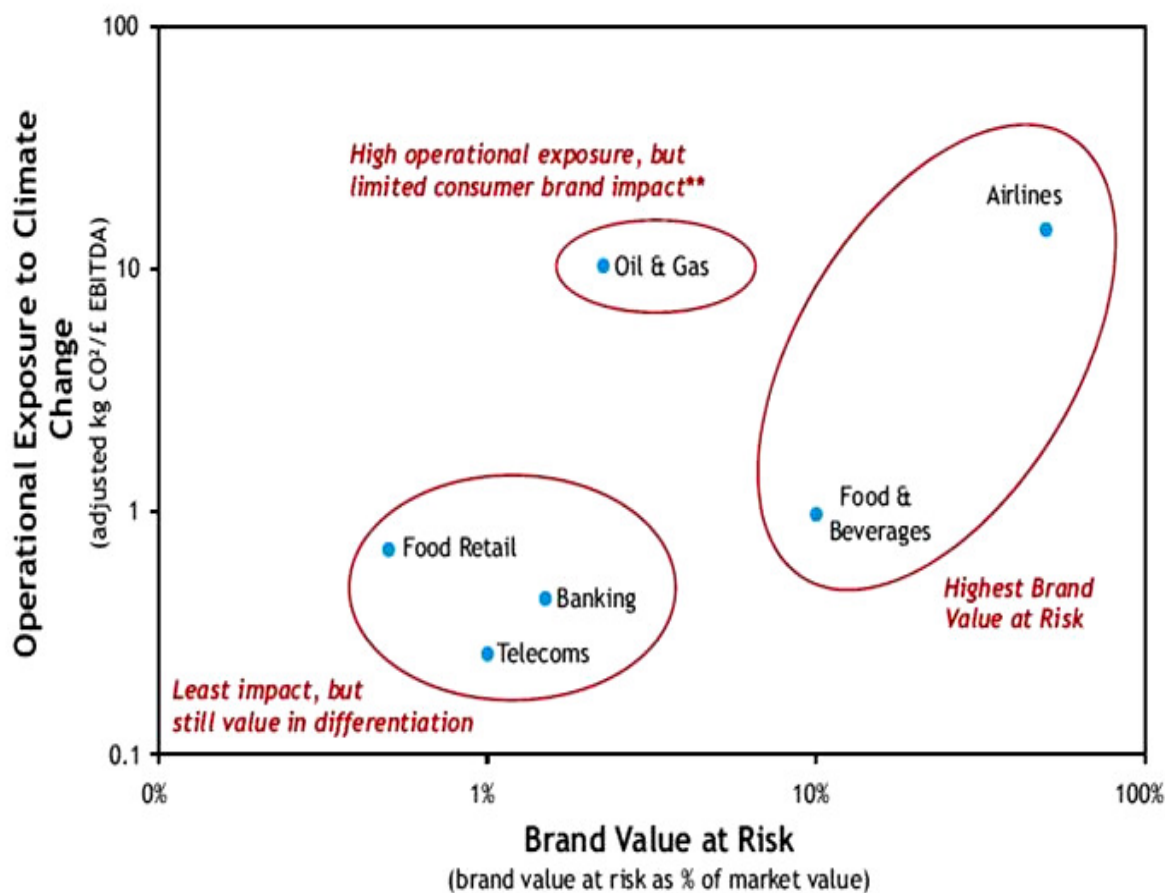
A large number of companies mentioned more general business motivations for engaging in ecosystem service markets as including:

- securing the license to operate,
- improving company (green) image,
- protecting brand,
- preventing government regulation,
- managing risk, and
- increasing employee morale and corporate recruitment.

These kind of ‘intangibles’ are increasingly recognized as important to businesses,^{xxxvi} particularly in differentiating consumer-facing brands.

The role of intangibles, such as brand value, is being more closely assessed in terms of climate change. For example, one study found that both airlines as well as food and beverage companies have 50% and 10%, respectively, of intangible market value at risk due to climate change (see figure). Investments in ecosystem service markets may play a role in contributing positively to a firm’s public image.

Figure 7:
Brand Value at Risk due to Climate Change for Six Major Sectors



Source: Carbon Trust, 2005

Ecosystem service investments may also create compelling PR ‘stories’ that can differentiate products and companies. For example, hydropower companies may have an incentive to pay upstream landowners for reforestation to secure water quality and reduce siltation. While the actual benefits—improved water quality and reduced silt—may become apparent over time, the indirect benefits could accrue more quickly. Improvement of relations with local communities and government officials as well as a positive ‘glow’ within the global community could yield inspiring stories to share with customers about how the energy company is ensuring the future stability of water resources in the area.

^{xxxvi} For example, see: http://www.bsr.org/meta/200602_intangibles_csr.pdf

Today, a considerable number of payments for ecosystem services are “isolated self-organized” private deals. Nonetheless, particular industry sectors have been—and are likely to continue—engaging, such as:

- **Oil and gas companies / energy sector related to offsetting carbon emissions** (e.g. British Petroleum and American Electric Power)
- **Tourism companies seeking to secure scenic beauty and watershed service important to income generation** (e.g. the Meliá Conchal hotel chain in Costa Rica)
- **Water utilities that wish to secure and/or improve water quality and regulation**
- **Construction companies / land developers required to offset damages** (e.g. U.S. companies that affect wetlands and/or habitat for ‘red-list’ species and therefore engage in wetland mitigation or conservation banking)

Overall, companies and other private entities that are currently involved in environmental markets and payments for ecosystem services are often front-runners in their sectors. This leadership role is not surprising, as the hope is that there will be some competitive advantage associated with early engagement—if only through greater experience and familiarity in an innovative area.

Further details on the companies and the deals are presented in the tables below.

**Table 4:
Illustrative Private Sector Actors Investing in Ecosystem Services**

Company name	Type of ecosystem service market						Sector	Region / Country	Criteria	Ecosystem Service Paid For	Anticipated link with business case
	Water	Biodiversity	Carbon	Scenic beauty	Bundled services	General					
Chevron Texaco		X	X				Oil / petrochemical	International	Carbon sequestration through an afforestation project in Brazil	Moderate – Low	
Empresa Servicios Públicos de Heredia (ESPH)	X						Drinking water – municipal/ public	Latin America / Costa Rica	Conservation and reforestation of 3 watersheds to protect public health at lower costs	High	
Florida Ice & Farm	X						Food- and beverage	Latin America / Costa Rica	Conservation and reforestation of the Rio Segundo watershed to secure high quality drinking water	Moderate	
ForestRe						X	(Re) Insurance	Europe / UK	Incorporating ecosystem services as added utilities in the forest insurance business. Investments can be made for whole range of services; most likely ones include carbon and water	Moderate - high	
Godrej and Boyce Ltd. Pty	X	X					Manufacturing industry (precision- and security equipment, construction and ready mix concrete)	Asia / India	Conservation of mangroves in Mumbai, which function as coastal zone protection	Low (charitable private organization)	
Matamoros – Empresa Eléctrica de Platanar	X						Energy (hydropower)	Latin America / Costa Rica	Protection of forests upstream in the watershed in order to secure the company’s primary resource (i.e. to maintain the quality of the water)	High	

Company name	Type of ecosystem service market						Criteria			
Melia Conchal Hotel chain		X					Tourism	Latin America / Costa Rica	<ul style="list-style-type: none"> Investing in river basin protection to secure water quality / availability Investing in protection of neighboring nature areas, most notably Tempisque Conservatoin Area in Guanacaste, to secure tourism business Seeking to address some local conflict and concerns over water due to a new water concession in an area of water scarcity³⁷. Sponsoring forest conservation³⁸ in the catchment of the aquifer from where they were applying for the contentious new water concession. 	Moderate (depending on current and expected future status of the nature areas)
Nestlé		X				X	Food- and beverage	Int'l	Sustainable production of raw materials (to secure high quality products)	High
New Forests Pty, Ltd.					X		Forestry	Pacific / Australia	Investing in forestry, thereby also utilizing the value of the ecosystem services, such as carbon sequestration and water services to have a competitive advantage with regard to conventional forestry companies	High
Perrier Vittel	X						Drinking water - commercial	Europe / France	By engaging in reforestation practices as well as control of non-point source pollution, nitrates and pesticide run-off has been reduced and natural water purification has been restored reducing costs that would have otherwise going into water filtration plants	High
Cervecería Costa Rica (affiliate of Florida Ice & Farm)	X						Beer company (Food- and beverage Industry)	Latin America / Costa Rica	Management of the watershed (including forest cover) to secure high water quality	High
Swiss Re			X				Re insurance	Internatio nal	Considering climate change related risks and opportunities associated with core business of re-insurance	Moderate – could become high in near future

³⁷ See for example complaints to the Central American Water Court:

http://www.tragua.com/esp/contenidos/segunda_audiencia/resumenes_segunda_audiencia/caso_acuifero_nimboyores.pdf

http://www.tragua.com/tca_esp_docs/contenidos/segunda_audiencia/legajos_segunda_audiencia/demanda_nimboyores.pdf

³⁸ http://www.fonafifo.com/paginas_english/invest_forest/i_ib_que_es_csa.htm

**Table 5:
Illustrative Private Sector Motivations to Invest in Ecosystem Services**

Company name	Motivation for the payment			Link with business case	Nature of payment	Has the PES deal delivered anticipated benefits?
	Regulatory	Business benefits	Not-business related			
Chevron Texaco	X	X		<ul style="list-style-type: none"> Explore viability for carbon credits under the Clean Development Mechanism Learn and develop methodologies for carbon monitoring 	Moderate (dependent on government regulation to offset carbon emissions)	
Empresa Servicios Públicos de Heredia (ESPH)		X		<ul style="list-style-type: none"> Protect public health at a lower cost (reduce the risk of health diseases and reduce the use of chlorination) 	Direct / Strong link	Payments made through higher water bill by customers
Florida Ice & Farm		X	X	<ul style="list-style-type: none"> Environmental responsibility Social responsibility Secure water availability and quality 	<ul style="list-style-type: none"> Moderate (for short term) Possibly strong link for long term (as demand for bottled water is likely to increase in the future increasing the need to secure proper water quality) 	TBD--Benefits of preserving forest to protect aquifers are visible only in the very long term (see also case of Cervecería Costa Rica)
ForestRe		X		<ul style="list-style-type: none"> Enter into the forest insurance business thereby using ecosystem services as utilities with competitive advantage 	Strong	Payments are made by investors who believe this new way of forestry insurance, by reducing risks and adding to return on investment

Godrej and Boyce Ltd. Pty		X	X	<ul style="list-style-type: none"> Improving the “green” image of the company Charity / philanthropy 	<p>Moderate to weak.</p> <p>(The payment to protect the mangrove forests was part of the Green Governance and Social Commitment of the corporation. There was no legal compulsion at that time to safeguard the mangroves. However, now there is.)</p>		Yes, both in terms of acceptance by the society and environmental restoration.
Matamoros – Empresa Eléctrica de Platanar		X		<ul style="list-style-type: none"> Expected reduction in siltation due to forest protection Increased awareness of the problem Contribute to good community relations 	<ul style="list-style-type: none"> Strong link for long term (expected reduced siltation) Moderate link for short term (improved public image / improved local license to operate) 		
Meliá Conchal Hotel chain		X		<ul style="list-style-type: none"> Main motivation: secure water quality / availability by river basin protection Side motivation: secure natural beauty of landscape and biodiversity 	<ul style="list-style-type: none"> Strong for securing water services (dependent on current and expected future availability and quality) Moderate for securing landscape beauty and biodiversity (also dependent on deteriorating quality of both services) 		
Nestlé (Perrier Vittel is an affiliate)		X		<ul style="list-style-type: none"> Secure high quality of end products by producing their raw materials by sustainability standards 	Strong (company depends on high quality products)		The company is ranked on the Dow Jones Sustainability Index.
New Forests Pty, Ltd.		X		<ul style="list-style-type: none"> Business opportunity – the embedding optionality (e.g. ecosystem services as desalinization, carbon sequestration) increase the value of forestry assets 	Direct / Strong link	Currently New Forests is managing the forests involved with large investments	

Perrier Vittel (currently owned by Nestlé waters)		X		<ul style="list-style-type: none"> Secure high quality spring water at lower costs by reducing agricultural run-off (pesticides and nitrates) and using natural filtration capacity of the soil. 	Strong (dependent per spring on status and quality of it)		
Swiss Re		X		<ul style="list-style-type: none"> Investments in clients (i.e. insurance companies) that are proactive (with regard to ecosystem services) and that operate in a sustainable way are regarded as the best long term low risk opportunities. 	Strong (risk avoidance & proactive with regard to markets for ecosystem services)		Great potential for portfolio growth (with companies seeking to mitigate its risks related to the environment and ecosystem services)
Cervecería Costa Rica (affiliate of Florida Ice & Farm)		X		<ul style="list-style-type: none"> Secure quality of water. (The forest that is being protected by the scheme protects and feeds the aquifers from which the company obtains water for the production of beer, juices and other beverages.) 	Strong. End products depend on good quality raw materials, which are consequently (partly) dependent on the water quality		TBD-- benefits of preserving forest to protect aquifers are visible only in the very long term.

**Table 6:
Illustrative Private Sector Cases of PES Purchase**

	Company	Sector	Ecosystem services Paid For	Type of Ecosystem Service	World Region	Motivation		
						Regulatory compliance (e.g. law, cap-and-trade or international convention)	Direct business benefits (e.g. business opportunities, secure access to NR, branding / reputation)	Indirect business benefits (e.g. secure license to operate, improved staff pride, good husbandry by CEO)
1	The Empresa Electrica Platanar	Energy sector (hydro power)	The company pays landowners and local people with land titles for managing forests in the upstream watershed. Payments go through FONAFIFO	Water	Latin America (Costa Rica)		Secure constant regular waterflow	
2	Perrier Vittel S.A.	Food- and beverage industry	Paying farmers to adopt more environmentally sound practices so as to protect Vittel's sources	Water	Europe (France)		Securing supply and access to quality drinking water	
3	ForestRe / Companies using the Panama Canal (e.g. P&O Nedlloyd)	Financial intermediary / transport industry	Reduce of sedimentation in the Panama Canal	Water	Latin America (Panama)	Business opportunity --- from the point of view of ForestRe	Cost effective solution to run-off problems in the Panama Canal --- from the point of view of the	

							shipping companies.	
4	Cervezeria Costa Rica	Food- and beverage industry	Protection of the watershed to secure high quality drinking water for its beer and water bottles.	Water	Latin America (Costa Rica)	Secure water quality	Public relations; increase customer awareness of environmental friendliness of production	
5	Nestle	Food- and beverage industry		Raw materials (e.g. water, reduce of pesticides, etc.)	Europe (France)			Securing high quality raw materials over the long term and improving corporate image
6	Hancock New Forests Pty, Ltd.	Financial intermediary	Climate regulation (through carbon sequestration via carbon credits) + water regulation and recreation and nature based tourism (salinity and biodiversity benefits).	Carbon + biodiversity	Australia	Business opportunity		
7	AMRAD CUT	Pharmaceutical industry	Natural medicines and pharmaceuticals	Biodiversity	Australia	Regulation under CBD	Access to raw material collected by third party	Public relations

8	Peugeot	Car industry	Climate regulation (i.e. carbon off-setting)	Biodiversity	Europe (France)		Improvement of company image, with shareholders and customers
9	ChevronTexaco	Petrochemical industry	<i>Several:</i> - biologically rich land, - climate regulation.	Carbon + biodiversity	North America (USA)	Regulation under Kyoto Protocol	<ul style="list-style-type: none"> • Better relation with regulators; • Being ahead of government regulation, • Increase environmental competitiveness. <p>Regarding biodiversity:</p> <ul style="list-style-type: none"> • Gain permission to operate • Increase competitiveness on other oil companies regarding "environmental friendliness"
10	Rio Tropicales	Tourism industry	Securing forest cover along the rivers the rafting company uses	Scenic beauty	Latin America (Costa Rica)	Secure forests along riverside	

SECTION VI: FUTURE PROSPECTS

In the coming decades, the environment will become a systemic and core strategic issue for business. While the transition toward this new paradigm is still in its early days, many signals suggest it is rapidly accelerating.

First, key stakeholders, including insurance companies and investors, are increasingly noting links between environmental performance, strong management teams, and returns on investment. Second, consumers are becoming aware of, and interested in, strong corporate environmental performance. Third, and finally, policy makers—particularly in Europe—are exploring more innovative approaches to environmental regulation, both of carbon as well as chemicals and other issues. This experimentation is likely to continue in the coming years.

On a more general level, there are additional signals.³⁹ First, declining function of life-supporting ecosystem services is being increasingly noted as relevant to business operating environments. Second, rising demand for ecosystem services—as evidenced by estimates of increasing water demands—is driving businesses to assess their dependence on natural resources. Global demand for clean water is expected to double, if not triple, in the next 50 years. Third, there are growing conflicts over environmental goods and services, such as, over fresh water for irrigation and drinking needs (Pakistan and the Klamath Basin in the U.S.), as well as citizen street action around “unclean” water used in manufactured beverages (India). Fourth and finally, there are growing challenges to companies’ ‘license to operate’ that relate to ecosystem services. Civil society debates surrounding agricultural biotechnology, biofuels, water bottling, and fishing practices all touch upon the issue of protecting ecosystem services.

The net effect is that both expectations and business operating climates are in transition. This shift is neither complete nor widespread, but it is increasingly gaining momentum. And thought leaders’ understanding of environmental aspects of corporate social responsibility (CSR) are being transformed by new research on ecosystems that has been covered in a wide range of mainstream media outlets, including *The Economist* and *BusinessWeek*. These emerging business expectations can be best understood in terms of evolving stakeholder expectation related to corporate social responsibility, as laid out below.⁴⁰

³⁹<http://www.millenniumassessment.org/en/Products.aspx>

⁴⁰ Developed by Jackie Prince Roberts for Forest Trends (2006/2007).

**EVOLVING STAKEHOLDER EXPECTATIONS RELATED TO
CORPORATE SOCIAL RESPONSIBILITY (CSR)**

20TH CENTURY CSR PARADIGM	EMERGING 21ST CENTURY CSR PARADIGM / NEW EXPECTATIONS
Environmental regulations will impact the bottom line	Diminished or degraded resources will impact the bottom line, through additional costs in the short-term and diminished ability to win new projects in the long-term.
Sustainability focuses on clean air, clean water, less waste, energy efficiency and protection of biodiversity.	Sustainability includes protecting an array of “ecosystem services” such as climate regulation, water filtration, flood regulation, crop pollination, and provision of water, fiber, fuel and food. Ethical case for action growing more mainstream, especially when cast in terms of climate change.
Markets focus on internalizing negative externalities: SO ₂ trading Qualitative description of ecosystem services No specific carbon expectations	Markets focus on internalizing positive externalities: extensive discussion of private sector payments for ecosystem services such as provision of clean water. Increasingly quantitative descriptions of ecosystem services. Emerging regulatory requirements for carbon management and expectations for a carbon strategy which may include voluntary purchases of carbon credits .
Competitive advantage through cost savings	Competitive advantage from developing expertise on managing risk (i.e., how to avoid ecosystem damages) and maximizing efficient use of ecosystem services – ability to win new projects key.
Lenders, insurers, investors focused on materiality only (i.e., lawsuits, accidents) Wetlands mitigation banking requirements relatively narrow	Lenders, insurers, investors adopting environmental screens, Equator Principles and other environmental and social standards Wetlands mitigation banks need to incorporate consideration of all ecosystem services provided by wetlands, such as water filtration, erosion protection, and flood control – and consider who gets those benefits. Biodiversity offsets also emerging.
Contingent environmental liabilities for damages to natural resources	Contingent environmental liabilities in the future may focus on damages to ecosystem services.

This paradigm shift will mean that businesses may increasingly be held responsible for maintaining the health and viability of ecosystems in their areas of operation. As a result, ecosystem services will need to be integrated into core strategy and operations. And markets and payments for ecosystem services will likely become management tools for addressing expectations and opening pathways to innovative corporate leadership—both in sourcing materials for products and in communicating brand differentiation and value.

Within this emerging CSR context, the private sector will act not just as buyers of ecosystem services, but also as sellers. This shifting dynamic will add much greater corporate interest in markets and payments for ecosystem services.

The evolution of corporate expectations that is underway will add far greater nuances to the set of potential business benefits associated with engaging in markets and payments for ecosystem services, including:⁴¹

BUSINESS BENEFIT	ASSESSING CORPORATE VALUE
<p>1) Secure access to new resources</p> <p><i>(factor for long-term growth)</i></p>	<ul style="list-style-type: none"> • Explore where new resources essential for corporate growth overlap with highly sensitive ecosystems – on the land and in marine settings, such as by drawing on: <ul style="list-style-type: none"> • WRI data showing that ¾ of active mine and exploratory sites overlap with areas of high conservation value. • Consider how corporate track records for recognizing and minimizing the impacts increases the ability to win concessions and new projects, such as by drawing on: <ul style="list-style-type: none"> • GSEES Index showing that “The [oil and gas sector] companies with the best social and environmental track record, as measured by the GSEES Index, [derived by Goldman Sachs for the World Bank] dominate the next generation of legacy assets.” (Goldman Sachs Investment Bank, 2004).
<p>2) Ensure access to key raw & processed materials</p> <p><i>(factor for long-term growth)</i></p>	<ul style="list-style-type: none"> • Assess the connection between consistent and high quality supply of water— or other key raw or processed materials—and a healthy ecosystem • Consider whether business growth may be limited by raw material availability • Research corporate case studies illustrating that critical inputs, such as water, need to be proactively protected, such as: <ul style="list-style-type: none"> • Coca-Cola in India • Perrier Vittel’s efforts to protect freshwater
<p>3) Increase investor confidence</p>	<ul style="list-style-type: none"> • Explore examples of strong corporate responses to emerging issues being rewarded by investors
<p>4) Invest in brand equity</p>	<ul style="list-style-type: none"> • Consider cases where ecological damages have hurt a company’s brand name and even share price, or where leadership on an issue has created lots of positive media coverage, through data from: <ul style="list-style-type: none"> • newspaper clippings • existing market research or customer feedback tracking systems
<p>5) Manage Contingent Environmental Liabilities</p>	<ul style="list-style-type: none"> • Assess examples of companies halting operations due to failure to manage contingent environmental liabilities, such as: <ul style="list-style-type: none"> • With Shell, in Sakhalin, Russia where the environmental protection agency suspended environmental approvals and the issue of settling environmental non-compliance remains unresolved, including the agency's claim, purportedly for \$10 billion in damage to the Sakhalin land and marine environment charged against Shell's project management. • Review research that compliance and assurance are becoming more complex, such as: <ul style="list-style-type: none"> • SustainAbility’s work which asserts: "... technical compliance may no

⁴¹ Developed by Jackie Prince Roberts for Forest Trends (2006/2007).

	<p>longer be an adequate defence against social and environmental activists in the court of public opinion and even in the court of law. Technical innocence or escaping accountability through legal expertise and subtle arguments on points of legal interpretation and precedent are becoming increasingly unacceptable in a society which expects real world performance and behavior standards.” (Geoff Lye and Francesca Müller, SustainAbility Report “The Changing Landscape of Legal Liability”)</p>
<p>6) Improve relationships with NGOs</p> <p><i>(factor for license to operate)</i></p>	<ul style="list-style-type: none"> • Assess scientific consensus on the importance of restoring and maintaining ecosystems, with calls for significant engagement by the private sector, such as: <ul style="list-style-type: none"> • The Millennium Ecosystem Assessment noted that the “increasing pressure on ecosystem services will change the expectations of important constituencies.”⁴² • The number of non-governmental organizations—many of which are focused on ecosystems—is increasing to about 51,500 international non-governmental organizations, compared to about 12,000 in the early 1980s.
<p>7) Anticipate or shape regulations</p>	<ul style="list-style-type: none"> • Review the increasing number of companies acting proactively on ecosystem service issues, particularly climate change / carbon
<p>8) Improve relationships with local governments & communities</p> <p><i>(factor for license to operate)</i></p>	<ul style="list-style-type: none"> • Assess examples of how a company’s relationships with local governments and communities affects timelines and costs of projects, such as: <ul style="list-style-type: none"> • Shell’s Sakhalin 2 project in Russia which demonstrates that ignoring ecological issues can result in difficult community relations, project delays and/or added costs. • In contrast, innovative payments for ecosystem services can create goodwill and direct social investments for a company, with the potential to result in shorter and less controversial permit and licensing cycles.
<p>9) Ensure access to capital, insurance, and other financial instruments</p>	<ul style="list-style-type: none"> • Explore examples of banks that screen their customers according to environmental principles, such as: <ul style="list-style-type: none"> • The World Bank and IFC environmental policies. • Banks, such as Goldman Sachs, Citigroup, HSBC, and ABN-AMRO, have new environmental policies that include such issues as prohibitions against financing or investing industrial activity in ecological no-go zones. • Examine links between sources of capital and future business needs. • Consider examples of insurance companies increasing scrutiny of environmental risks, which will result in either increased costs for coverage or even loss of coverage.
<p>10) Lower operations & maintenance (O&M) costs</p>	<ul style="list-style-type: none"> • Explore the connection between intact ecosystems (forest cover, wetlands, etc.) and effects that increase maintenance costs or slow operations, such as: <ul style="list-style-type: none"> • reduced siltation, reduced erosion, and improvement of other “natural processes”

⁴² Millennium Ecosystem Assessment Ecosystems and Human Well-Being: Opportunities and Challenges for Business, p.24

11) Increase customer satisfaction	<ul style="list-style-type: none"> • Consider how customers are using “supply chain management” to demand corporate operations that align with a company’s environmental goals
12) Lower costs of compliance and better relations with regulators	<ul style="list-style-type: none"> • Assess how companies that have a track record of being environmentally-focused can realize lower costs of complying with regulations, such as in: <ul style="list-style-type: none"> • Europe, the United States, Australia, Brazil and other countries with legislation to protect wetlands and/or endangered species. • Brazil’s directive protecting native vegetation. • Canada’s protection of fisheries. • European and U.S. state-level climate legislation. • The U.S. Clean Water Act which permits trading to meet water quality guidelines.
13) Increase employee satisfaction	<ul style="list-style-type: none"> • Review examples of higher employee retention at companies with strong environmental records • Consider adding environmental issues to current employee surveys to assess concerns
14) Enhance R&D (research and development)	<ul style="list-style-type: none"> • Explore examples of how ecosystem services have enabled innovation and/or broadened strategic possibilities, such as: <ul style="list-style-type: none"> • New knowledge about using ecosystem services for water filtration, which saved New York City over \$6 billion dollars. • Research by WWF that bees’ pollination services are worth around \$62,000, or 7% of a coffee farm’s annual income.
15) Competitive edge, or early identification of emerging issues	<ul style="list-style-type: none"> • Review increasing ‘signals’ that ecosystem services is an emerging issue, as evidenced by: <ul style="list-style-type: none"> • Media coverage is increasing, particularly within the mainstream business press including <i>The Economist</i>, <i>Fortune</i>, <i>Newsweek</i>, <i>Wall Street Journal</i>, and <i>Business Week</i> • Non-governmental organizations interested in the issue, particularly witness an expanded number of initiatives on the topic, such as: <ol style="list-style-type: none"> (1) The World Business Council on Sustainable Development (2) Business for Social Responsibility, and (3) Collaboration between Stanford, World Wildlife Fund and The Nature Conservancy focused on launching an international network of projects that build natural assets and ecosystem services into cost-benefit analyses associated with land use and resource decisions. (4) Private Sector foundations show increased interest • Assess businesses benefiting from a “first mover advantage” – initiating and publicizing initiatives that benefit ecosystems before anyone else in their industry. • Consider actions of key competitors, that may ‘up the ante’ by successfully managing environmental issues that affect everyone in the industry, thereby necessitating all companies in the industry improve performance, often according to the parameters set out by the market leader.
16) Identify new revenue streams	<ul style="list-style-type: none"> • Wetland mitigation banks, conservation banks, water trading, carbon offsets, and even biodiversity offsets potentially provide new sources of revenue for businesses.

When considered as a set, business drivers for entering into markets and payment agreements for ecosystem services are on the rise. And therefore market and payment prospects—particularly for carbon and water, which have clear regulatory and business operational drivers—are expected to become quite strong in the coming decades.

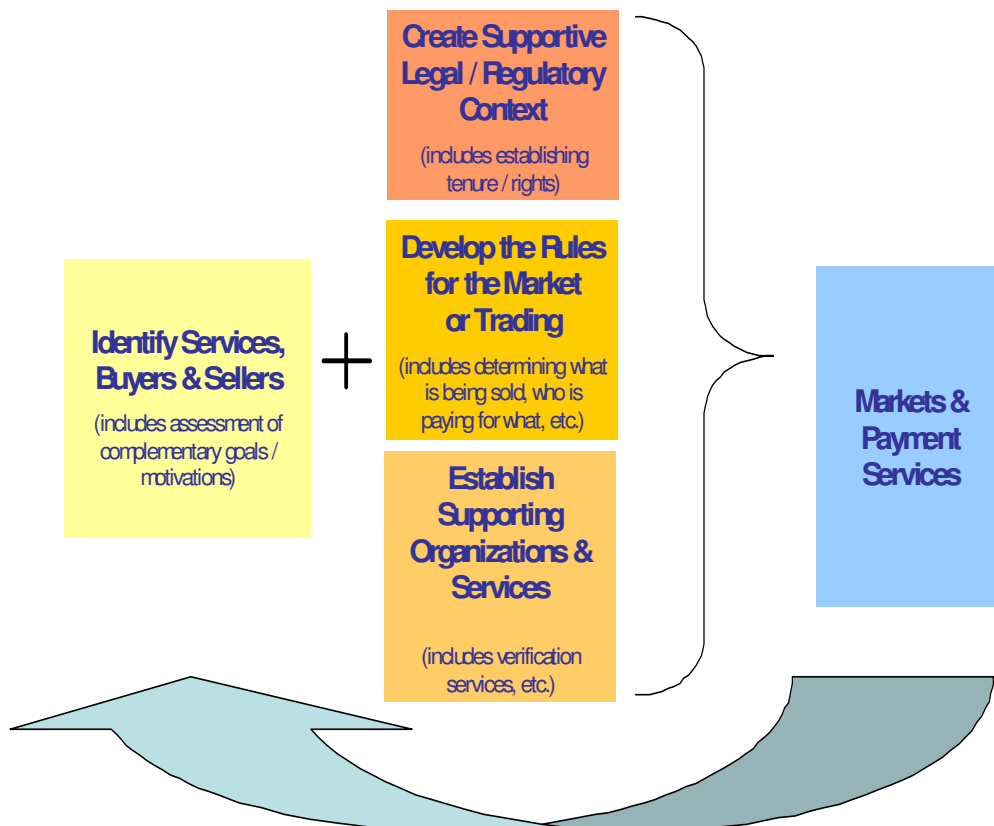
SECTION VIII: INSTITUTIONAL ARRANGEMENTS AND BARRIERS

The complexity of markets and payments for ecosystem services necessitates an enabling context, particularly for private sector entrants, many of whom are interested in mitigating risks. The key elements of creating markets and/or payments for ecosystem services include:

- legal and regulatory framework needed to support payments schemes;
- market rules and standards necessary to guide individual transactions; and
- technical services necessary to implement and monitor trading.

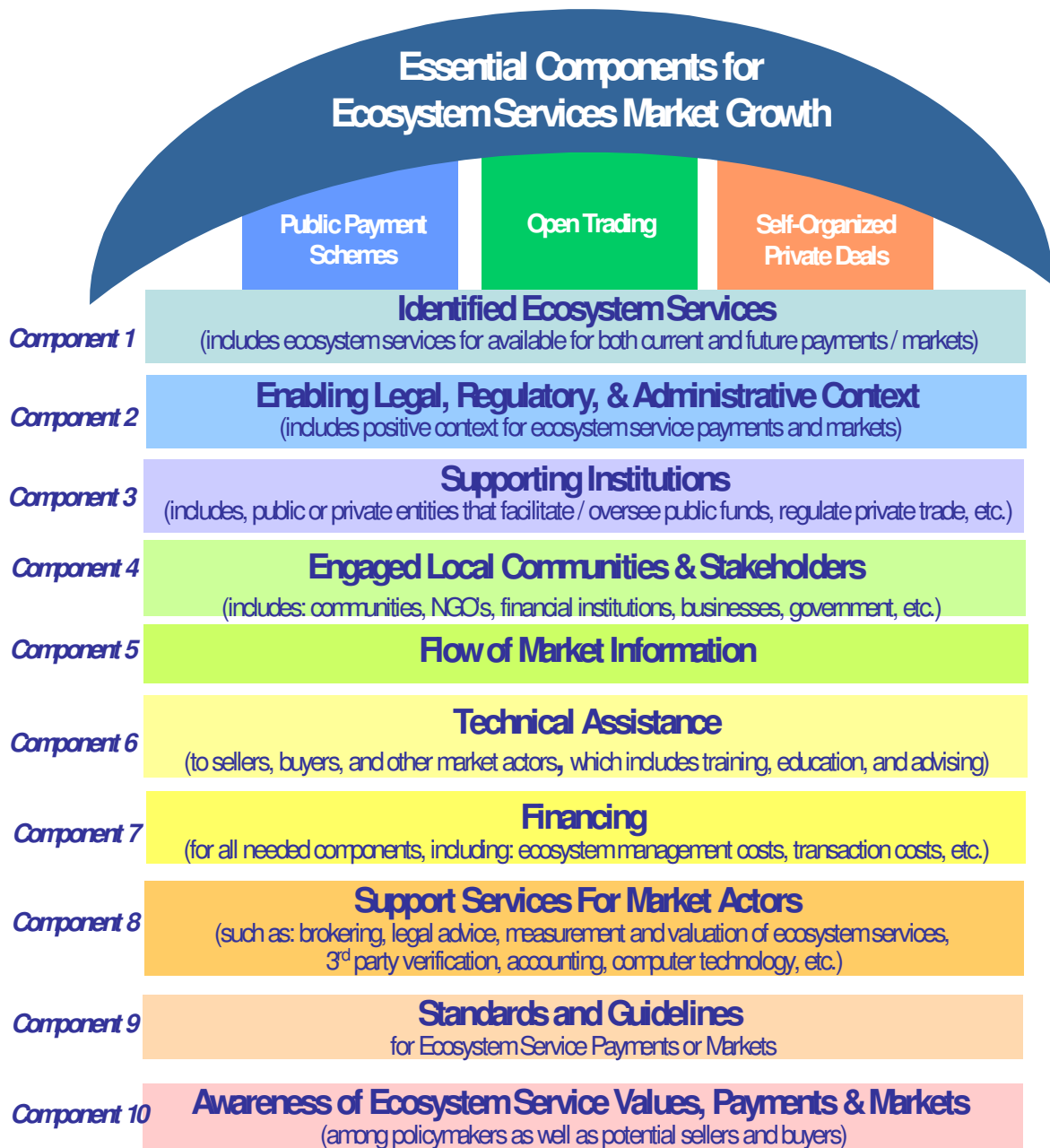
These components are outlined in the following graphics.

**Figure 8:
Components in Structuring Ecosystem Services Payments &
Creating Ecosystem Services Market**



Adapted from Brand, David. 2002. "Investing in the Environmental Services of Australian Forests," in S. Pagida, J. Bshop, and N. Landell-Mills (editors). *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*. London, UK: Earthscan Publications.

**Figure 9:
Essential Components for Establishing
Ecosystem Services Payments and Markets**



In many countries, most these elements are not yet in place. The result is that entering into ecosystem service deals can carry a degree of risk, which is described in Box 1.

Box 1:
**Potential Corporate Risks Associated with
Engaging in Markets & Payments for Ecosystem Services**

High Transaction Costs: Companies will conduct a cost–benefit analysis to determine if there are other less costly options for environmental protection and compliance.

Increased Regulatory Scrutiny: Concerns exist that revealing the environmental services that a company has and manages, such as endangered species habitat, may result in greater regulation and scrutiny. In some instances, this fear is ungrounded, because in a trade of endangered species habitat, the seller is absolved of all responsibility once the transaction has occurred. In wetlands banking, brokers are beginning to take on regulatory liability as part of the deal. However, in some instances, the answer is less clear. For example, Shell Oil has invested in a carbon sequestration project in Indonesia but worries that it will now be held accountable for the fate of the orangutan population that lives thereⁱ.

Real Estate-Related Risks: Many believe that revealing the presence of a protected habitat on their land (*e.g.* wetlands) will decrease their property value or access to agricultural subsidies. However, with environmental services markets, as long as companies are willing to commit the land to sustainable management practices (which introduces some limitations on what can be done), this property value could increase instead.

Long-Term Value Proposition: The sale value of certain environmental services trades, such as biodiversity, often increases on time horizons much longer than the typical business cycle (10–20 years versus quarterly). Others, such as greenhouse gas emissions, wetlands mitigation or water quality, will have more immediate benefits.

Lack of Guarantee: If a company pays a landowner to manage the land in a sustainable manner, the company needs a guarantee that this will indeed happen, and that the ecological benefits are manifested. Risk can be minimized by building the guarantee into the contractual agreement, but given the difficulty in proving ecological benefits, breeches of contract may be harder to prove than in other types of transactions. In regions with poor governance, companies may find it harder to reap the benefits of transactions due to a lack of clear property rights, transparent interaction and government accountability.

Newness of Regulated Markets vs. Slowness of Regulators: Since governments tend to move more slowly than the private sector, approving compliance-driven transactions can take time. For example, species trading in the U.S. has taken an average of 2.5 years.ⁱⁱ During this lag time, corporate personnel may change or internal support may erode in a company. Due to these issues, government may have to remove itself from day-to-day trades and oversee the structure of regulation-driven markets instead.

Market Fungibility for Locally-Specific Commodities: Certain environmental services will be less fungible than others in a given area. For example, endangered species habitat is very fungible in California compared to other states, due to the number of endangered species. This difference across different areas will make it tricky for companies to implement company-wide policies for environmental services.

Public Misinterpretation: Some argue that environmental services represent an attempt to translate every living thing into an “own-able” commodity. To be clear, one cannot buy environmental services themselves—one can only pay for other humans to manage an environmental service in such a way as to enhance its function and thereby provide value to a company. Another risk of public perception involves trust. If a company is seen as untrustworthy, stakeholders may push for the company to simply fix the damage for which it is responsible rather than compensate through trading. As is often the case with new models, the early movers tend to experience increased scrutiny.”

Excerpted from: Business for Social Responsibility. 2006. “Environmental Markets: Opportunities and Risks for Business.” San Francisco, CA: BSR Trends Report (http://www.bsr.org/meta/BSR-Trends-Report_Enviro-Markets.pdf)

With regard to regulatory carbon markets, there are a growing number of institutional arrangements for engaging with the private sector. As these are legislation-specific, suffice it to say that while there have been issues with developing these mechanisms to date. Experimentation is rapid and ongoing and it is clear that the approaches will be honed soon—given the speed of developments in carbon markets.

Voluntary carbon markets are another matter entirely. There are risks to entering these markets. While these markets are growing rapidly, they are not yet mature. The major concerns are whether purchasing credits will actually result in permanent, equivalent offsets, and if credits will be recognized by customers and/or future regulatory schemes. These risks, however, may be balanced for some companies by the benefits associated with taking a leadership position on climate change. In response to these and other risks, a growing body of verification standards are emerging, which include:

**Table 7:
Major Verification Standards for the Voluntary Carbon Offset Market⁴³**

	Gold Standard	The Voluntary Carbon Standard	Climate Neutral Network	Green-e	Climate, Community, Biodiversity Standard	Chicago Climate Exchange	ISO 14064
Additionality Tests							
Environmental and Social Co-Benefits							
Requires Monitoring							
Reporting/Registration							
Uses WRI/WBCSD GHG Protocol							
Certification Outside U.S.							
Compatible with Other Standards							
Sequestration Projects							
Off-Grid Renewables							
Energy Efficiency							
Methane							

⁴³

http://ecosystemmarketplace.com/documents/cms_documents/VoluntaryCarbonOffsetsReport_Dec8_FINAL.pdf

	Gold Standard	The Voluntary Carbon Standard	Climate Neutral Network	Green-e	Climate, Community, Biodiversity Standard	Chicago Climate Exchange	ISO 14064
Renewable Energy Credits							

Source: Ricardo Bayon, Katherine Hamilton and Amanda Hawn. 2006. *Voluntary Carbon Markets*. London: Earthscan.

The Voluntary Carbon Standard is rapidly gaining prominence in the voluntary market. This independent standard was launched in 2006 by The Climate Group, the World Economic Forum and the International Emissions Trading Association. The Standard borrows heavily from regulated carbon markets on issues like additionality, documentation and monitoring. The current draft examines the balance between being prescriptive and rigorous and the need to encourage innovation and flexibility in the market. However, it is noteworthy that the standard currently does not accept forestry projects.

The Climate, Community and Biodiversity Alliance’s (CCBA) voluntary standard helps to design and identify land management projects that mitigate greenhouse gases while supporting biodiversity and community development. Without this kind of standard, reforestation can lead to biodiversity loss as monocultures of the same species and age tree are planted.

Another impediment related to carbon offsets—though it is not institutional in nature—is that offsetting has its critics, who assert that emissions must be reduced rather than offset. Critics feel that companies are simply throwing money at a problem, rather than considering new management practices with longer-term impacts. In essence, critics charge that offsetting is a form of “greenwash.” These criticisms are yet another reason why offsets should be seen as only one part of a corporate climate strategy and should be selected only when reducing emissions is not feasible.

Overall, a few key barriers exist including:

BARRIER TYPE / CONSTRAINT	ISSUE	EXPLANATION
Lack of Demand	Companies are unsure about ecosystem services	Businesses are, overall, less familiar with what ecosystem services are and/or why a firm should pay for these services.
Lack of Demand	Companies do not immediately perceive benefits from investing in ecosystem services	Ecosystem services have generally little priority for businesses within current corporate assessment methods. The priceless remains under-valued. Signals—from investors, insurers, and key stakeholders—may begin to shift perceptions, however, as is occurring related to carbon.
Lack of Demand	The transaction costs are too high	Potential ‘seller’ communities represent a crucial link in the chain. Without their willingness and support, deals are in most cases doomed to fail, especially when these communities are the suppliers of the service.

		Financial compensation to suppliers of these services must cover opportunity costs. At the same time, the deal becomes less interesting for an investor's point if transactions costs are high. This balance will be addressed with experience in putting together more deals and learning from those deals. The challenge is having an adequate 'early adopters' pipeline of private sector buyers.
Untested Supply	There is often a lack of defined property rights, especially in developing countries	This lack of clarity over who owns land hampers involvement in ecosystem services deals, particularly with potential suppliers who are poor, lack capacity and therefore have no means to enter the market.
Unclear 'Proof of Concept'	There is often a lack of scientific evidence supporting ecosystem service benefits	There is currently in most cases no evidence of monetary benefits for managing and securing ecosystem services. Take the case of the hydroelectric power companies in Costa Rica. Although companies appear to be satisfied with the PES contracts that they have with FONAFIFO and local communities—as all private companies have renewed their contracts—the rationale behind the payments are based on 'common wisdom,' rather than scientific evidence. That is, there is no scientific evidence for the companies that the service they pay for actually delivers the water services. The relationship between particular natural resource actions and hydrological flows is not yet established with a level of certainty that other business contracts are often required to meet.
Enabling Regulation	There is often a lack of an aggregator or a common regulator that ensures the conditions are met to implement the deal	<p>Markets for ecosystem services require in most instances at least a sufficient supply of the service to secure the availability and quality, as evidenced by:</p> <ul style="list-style-type: none"> • The Panama Canal suffers from large "environmental" risks and high maintenance costs, due to deforestation practices along the slopes of the canal. In order to reduce the maintenance costs landowners are being approached about their willingness to pay for reforesting the watershed, thereby reducing run-off and siltation of the canal. Every landowner, or at least a considerable number, should be interested, otherwise siltation cannot sufficiently be reduced and hence potential buyers are not interested. • In market deals where payments are made for services related to the scenic beauty, it can be considered common wisdom that the quality of the scenic beauty can only be secured if a sufficient number of landowners are willing to protect the scenic landscape. • A sufficient number of landowners to engage in PES is also true for securing certain biodiversity services. For example, in areas where tourists are attracted to the presence of charismatic macro-fauna, protection relies on landscape level action. <p>A solution would be for the government to set up a fund or a pooled transaction where beneficiaries (e.g. transport</p>

		<p>companies in the Panama Canal; tourism companies that have interests to secure landscape beauty and biodiversity, etc.) pay a compulsory fee for the service to landowners that is sufficiently high to cover at least the opportunity costs for prospective sellers.</p>
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In light of these barriers, there are a few key pathways forward to increase corporate engagement in markets and payments for ecosystem services.

First, the biophysical component of many payments for ecosystem services needs to be assessed and understood before major demand will emerge. This barrier is being addressed in carbon markets. However, many other initiatives, especially related to water services, lack hard scientific evidence that ecosystems indeed deliver the services for which buyers are paying. In many carbon initiatives, reporting occurs in terms of the anticipated amount of carbon sequestered (often in metric tons of carbon per hectare). Yet, this reporting structure has not been replicated for other services. Understanding the ‘dose-response’ function relating land use / management and the provision of ecosystem services is crucial in order to further engage private sector buyers.

Second, the potential risks and opportunities associated with these markets need to be discussed much more fully within the private sector. Despite the growing number of market deals that have been found during this review, there is not widespread awareness of these markets and payments for ecosystem services, with the marked exception of carbon markets. And even when awareness exists, most companies and private organizations perceive little, if any, clear benefit associated with paying for these services.

Igniting further discussions about these markets and payments among private sector thought leaders is likely to increase awareness of ecosystem services and expand discussion of both risks as well as benefits of ecosystem service investments. These benefits include both ‘hard’ business benefits, such as securing business operations or cost-efficiency, as well as ‘soft’ ones, such as regulatory good-will or reputational risk management.

SECTION VIII: CAPACITY AND INSTITUTION BUILDING NEEDS⁴⁴

Ensuring the success of any natural resource-based business over time requires attention to the predictable ecological flows on which it relies. Horticulture, agriculture, and forestry all need water and good soil, yet water is becoming increasingly scarce at key times in the growing season in many regions. Soil erosion is also a growing problem.

While payments for ecosystem services offer a new approach to securing revenue streams for maintaining, conserving, and restoring ecological functions globally, its uptake remains significantly hampered—particularly in Latin America, Asia, and Africa.

In order to better understand why PES is not currently a common tool for conservation, Forest Trends conducted a 2005 study focusing on what is required for deals to work on the ground in Latin America, Asia, and Africa. The research included 57 interviews with

⁴⁴ The research reported in this section was conducted by Sissel Waage in 2005.

specialists within NGOs, governments, and businesses working on the establishment of PES globally.

Engaging Private Sector Buyers

The biggest barrier to mainstreaming PES in developing regions of the world is the lack of buyers. Some buyers are simply unaware of the PES concept, while others feel it is too risky a mechanism to trust. Many potential buyers lack a clear understanding of what they are buying, as the linkages between specific management practices and ecosystem services outcomes are often unclear. This challenge is particularly true for watershed services and the soil sequestration of carbon.

Addressing these issues often requires specific technical skills. Ideally, a base of intermediaries would exist with the skills to assess linkages between management and ecosystem service outcomes, either in-country or at least in-region. At present, however, such technical assistance is limited and tends to be costly.

Connecting Buyers and Sellers

Once willing and able buyers exist, they must be connected to sellers of ecosystem services quickly and efficiently. Today, the transaction costs associated with identifying sellers are significant. In order to assist with the due diligence process on both buyers' and sellers' sides, effective intermediary organizations also need to be developed and expanded. For example, significant ramping up of PES in parts of Asia and Africa is likely to involve a range of other players in facilitating this process, such as:

- Universities and/or researchers capable of assessing potential areas for ecosystem service deals, such as through using Geographical Information Systems (GIS) to identify the most promising areas for financial arrangements between buyers and sellers by creating map overlays of: soil; forestry cover / land use cover; slope; landownership; community settlements; water catchments, and other key factors.
- Brokers—which could come from the private, public, or nonprofit sectors—focused on reducing transaction costs by facilitating introductions of prospective buyers and sellers.
- Technical assistants who can build capacity among prospective sellers as well as the potential buyers in the private sector.

Structuring Deals

Even after buyers and sellers have identified one another, the issue of negotiating and structuring deals serves as another barrier to the development of PES. Structuring payments for ecosystem services requires specialized knowledge of the relationships between natural resource management practices and the desired flow of ecosystem services. In addition, communities may face barriers to the negotiation of deals stemming from a lack of tenure rights, literacy, or familiarity with contracts. Communities can also encounter unfamiliar terrain in terms of the logistics related to receipt and expenditure of funds, particularly when revenues are paid to the community as a whole, rather than to individuals. Further, and even more importantly, rural community members and rural development advisors—in areas around the world—have expressed fundamental concerns about the establishment of markets for natural resources, and the prospects that the truly poor will not accrue benefits or may

even find they become dispossessed of current resource tenure and/or access rights. These concerns, and the lack of trust they fuel, must be addressed to establish PES fully and effectively in many locales.

Transparency and Security

The fourth barrier is related to the third, but important enough to flag separately, in that it focuses on establishing the accountability and transparency mechanisms for money exchange and deal security over time. These mechanisms may be sanctioned by government and could be run by ministries or agencies. Alternatively, NGOs, for-profit companies, or multi-entity hybrid models could emerge. The essential element is to create a context in which the parties entering into deals feel confident that revenues generated by the PES scheme will be administered appropriately and will go to the uses outlined in the agreement.

If this fourth barrier is to be overcome in a way that will stand over time, it will have to mesh effectively with the current institutional context, both formal and informal. Without consideration of how institutional interactions will occur—between new and old oversight practices within existing entities and/or across new and old entities—it is likely that unintended institutional complexities and consequences will occur. Therefore, the challenge of meshing PES accountability and transparency mechanisms with existing institutions—from a government through a rural community level—is a related barrier to overcome.

Next Steps: Capacity Building

The barriers described above led us to identify a core set of capacity building needs.

First and foremost, people need to be given the tools to assess PES opportunities under a variety of circumstances. When and where is PES appropriate? Buyers, sellers and regulators need to be able to answer this question at any given point in time.

Practitioners also need to understand a range of issues, including: the relationship between management practices and maintenance of ecosystem services; how to conduct baseline studies; and how to structure monitoring plans. People from the business, community, and government sectors will all have distinct interests, levels of expertise, and specific needs in terms of what they need to know and understand, given their different roles. Therefore, capacity building efforts surrounding ecosystem dynamics and best management practices are likely to be related but distinct for the various audiences.

Third, all parties involved in a PES scheme will need to learn how to administer and manage the scheme over time. As with the technical issues, various parties are likely to have a range of needs that will have to be tailored to the specifics of certain services (water vs. biodiversity) and particular deals. For example, for private deals, government entities may only be concerned with enabling policies and laws. Communities may require much more detailed capacity building in terms of fund management if they are to receive the revenues. For schemes involving the public sector, complex questions related to moving earmarked funding in and out of the central treasury may emerge. Therefore, the most effective capacity building will be audience and issue specific.

Fourth, and finally, capacity building is needed in PES-related systems thinking. This need stems from the importance of ensuring that PES have positive impacts, which are not

overburdened by transaction costs and do not result in unintended adverse consequences. This need can be addressed by adapting the well-developed domains of work related to community interactions (and participatory methods for identifying socio-economic dynamics, such as PRA and RRA), ecosystem dynamics and institutional incentives (especially related to governments and businesses involved with deals).

Without serious efforts to highlight the dynamics of the human, ecological, and economic systems that are at play within PES, it is possible that the design will overlook key issues and result in unintended consequences. Specifically, the concern is that without addressing potential negative ripple effects of the projects, equity issues will be overlooked and poverty further entrenched. Therefore, a key element of fully empowering and enabling all players in PES will require understanding a set of clear frameworks and approaches that provide a structure in which everyone involved—from business through community and government—can openly discuss the many issues that PES raises.

SECTION IX: CONCLUSION

The engagement of the private sector in markets and payments for ecosystem services is nascent. For many businesses, significant questions remain about why they should begin paying for something that they neither have funded to date, nor which they expected any entity other than the government to fund. Further questions emerge about quantifiable returns, particularly given the elevated risk level (which usually is enticing only if returns are also higher than average).

With carbon markets, amounts of carbon sequestered are often estimated in terms of tons of CO₂ per hectare. In this way, investors know, given certain risks, the returns on their investment. However, it is far more difficult to respond to corporate questions related to, for example, cubic meters of water purified per day or the number of individuals in an endangered wildlife population that are ‘less threatened’ due to new management practices.

These questions point to the ongoing scientific challenges related to measurable evidence that ecosystems deliver services in a certain quantity and quality—particularly related to water and biodiversity deals. And finally, the relative newness of these markets and payments translates into a lack of experience within companies to put together these deals, which in turn leads to high transaction costs.

Nonetheless, the private sector is beginning to engage with markets and payments for ecosystem services. Forest Trends’ 2005 research found about 100 types of ‘private PES’ and approximately 1,100 transactions. Latin America is seeing significant private sector engagement as is North America and Europe. The sectors that are most active in these types of markets include:

- Construction / land developers (through biodiversity offsetting regulation, for example by wetland mitigation banking)
- Tourism
- Oil / petrochemical industry and energy companies
- Food- and beverage industry
- Water utilities (retail)

Almost all of the companies engaged in payments for ecosystem services assert that they intend to accrue a “business benefit”, either in terms of financial or non-financial benefits. While the financial benefits are quite straightforward, such as cost-efficiency or finding a niche market, the non-financial benefits cover the gamut—from “regulatory good will” to “license to operate” and “public image”.

Yet important barriers to engagement remain, including:

- Lack of clarity concerning what (exactly) is being bought and what level of assurance will be given that what is being purchased is being delivered,
- Lack of quantifiable benefits associated with investing in ecosystem services, and
- High transaction costs.

In order to scale up private sector investments in ecosystem services, more scientific research is needed that investigates the biophysical component on which payments are based.

Today, important opportunities exist to accelerate private sector engagement with markets and payments. First, there is a need to continue documenting and highlighting the business benefits associated with private sector firms investing in ecosystem services, both in terms of positive press as well as financial business benefits. Second, the growing media coverage of the carbon market offers an opportunity to highlight other markets as well. The carbon market has both regulatory and voluntary elements, which can be used to discuss the dimensions of water and biodiversity markets and how these may play out over time. Third, the expanding interest of financial institutions presents an opportunity to create business incentives for engagement in ecosystem service markets, particularly as pension fund managers and banks put together more screens for their investment decisions.

The potential to engage the private sector in payments for ecosystem services is real and significant. The promise, however, lies in considering the private sector both as a prospective buyer *and* seller of ecosystem services. It is in this dual role that companies will be able to perceive not only risks, but also potential rewards when considering investments in ecosystem services.

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APPENDIX II: TYPES OF PAYMENTS FOR BIODIVERSITY PROTECTION⁴⁵

<p>Purchase of High-Value Habitat</p> <ul style="list-style-type: none"> ▪ Private land acquisition (purchase by private buyers or NGOs explicitly for biodiversity conservation) ▪ Public land acquisition (purchase by government agency explicitly for biodiversity conservation)
<p>Payment for Access to Species or Habitat</p> <ul style="list-style-type: none"> ▪ Bioprospecting rights (rights to collect, test and use genetic material from a designated area) ▪ Research permits (right to collect specimens, take measurements in area) ▪ Hunting, fishing or gathering permits for wild species ▪ Ecotourism use (rights to enter area, observe wildlife, camp or hike)
<p>Payment for Biodiversity-Conserving Management</p> <ul style="list-style-type: none"> ▪ Conservation easements (owner 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 paid to use and manage defined piece of land for conservation purposes, for 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 commitment to protect the area from practices that harm biodiversity) ▪ Management contracts for habitat or species conservation on private farms, forests, grazing lands (contract that details biodiversity management activities, and payments linked to the achievement of specified objectives)
<p>Tradable Rights under Cap & Trade Regulations</p> <ul style="list-style-type: none"> ▪ 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, that can be purchased by developers to ensure they meet a minimum standard of biodiversity protection)
<p>Support Biodiversity-Conserving Businesses</p> <ul style="list-style-type: none"> ▪ Business shares in enterprises that manage for biodiversity conservation ▪ Biodiversity-friendly products (eco-labeling)

⁴⁵ Source: 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 (pages 30-31).

APPENDIX III: EXAMPLES OF WATER MARKET PAYMENTS⁴⁶

NAME OF CASE STUDY	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 agricultural practices and for reforestation of sensitive infiltration zones	Reforestation but little impact because program focuses on agriculture	Vittel pays each farm about US\$230 per hectare per year for seven years. The company spent an average of US\$155,000 per farm or a total of US\$3.8 million
Reforestation but little impact because program focuses on agriculture	Regularity of water flow for hydroelectricity 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 \$US 45/ha/yr, those who sustainably manage their forests receive \$US 70/ha/yr, and those who reforest their land receive \$US 116/ha/yr.
Cauca River, Colombia: Associations of Irrigators' Payments	Improvements of base flows and reduction of sedimentation 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 \$US 1.5-2/litre on top of an already existing water access fee of \$US 0.5/litre. The total investment was over US\$ 1.5 billion between 1995-200
Trading Schemes						
United States: Nutrient Trading	Improved water quality	Point source polluters discharging 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	Reduction of water salinity	State Forests of New South	An association of irrigation farmers	Water transpiration credits earned by State Forests for	Large-scale reforestation, including planting of	Irrigators pay \$US 40/ha per year for 10 years to the government agency:

⁴⁶ Source: 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 (pages 30-31).

NAME OF CASE STUDY	WATER-RELATED ECOLOGICAL SERVICE PROVIDED	SUPPLIER	BUYER	INSTRUMENTS	INTENDED IMPACTS ON FORESTS	PAYMENT
Reforestation		Wales		reforestation and sold to irrigators	desalination plants, trees and other deep rooted perennial vegetation	State Forests of NSW. Revenues are used by SF to reforest on private and public lands. Private landowners receive an allowance but rights remain within the State Forestry

The Business and Biodiversity Offset Program (BBOP)

[\(http://www.forest-trends.org/biodiversityoffsetprogram/\)](http://www.forest-trends.org/biodiversityoffsetprogram/)

A partnership between companies, governments and conservation experts to explore biodiversity offsets. We are:

- Demonstrating conservation and livelihood outcomes in a portfolio of biodiversity offset pilot projects;
- Developing, testing, and disseminating best practice on biodiversity offsets; and
- Contributing to policy and corporate developments on biodiversity offsets so they meet conservation and business objectives.

The BBOP partners wish to show, through a portfolio of pilot projects in a range of industry sectors, that biodiversity offsets can help achieve significantly more, better and more cost-effective conservation outcomes than normally occurs in infrastructure development. The BBOP partners also believe that demonstrating no net loss of biodiversity can help companies secure their license to operate and manage their costs and liabilities. Our vision and expectation is that biodiversity offsets will become a standard part of business practice for those companies with a significant impact on biodiversity. The routine mainstreaming of biodiversity offsets into development practice will result in long-term and globally significant conservation outcomes.

The Ecosystem Marketplace (www.ecosystemmarketplace.com)

Markets depend on transparent and reliable information to function: think Bloomberg and the Wall Street Journal; think streaming stock quotes; think Morningstar; and think of the kind of information the SEC requires. Markets grow and evolve, and they do so, in part, because of the transformative power of reliable and transparent information. Enter the Ecosystem Marketplace. Launched in 2004 by supporters including The Nature Conservancy, ABN-AMRO, the Citigroup Foundation, the World Conservation Union, SURDNA and the USDA Forest Service among others, The Ecosystem Marketplace currently provides: analysis and commentary by market leaders; a one stop resource center for local communities and landowners to identify potential investors; a Marketwatch section tracking actual trades in land-based environmental markets; and original feature articles authored by world-class journalists (whose work regularly appears in The New York Times, The Economist, The Wall Street Journal and The Financial Times) about key developments and trends in the realm of market-based conservation.

Forest Trends (www.forest-trends.org)

An international non-profit organization that works to expand the value of forests to society; to promote sustainable forest management and conservation by creating and capturing market values for ecosystem services; to support innovative projects and companies that are developing these new markets; and to enhance the livelihoods of local communities living in and around those forests. We analyze strategic market and policy issues, catalyze connections between forward-looking producers, communities and investors, and develop new financial tools to help markets work for conservation and people.

Forest Trends' Business Development Facility (BDF)

<http://www.forest-trends.org/programs/bdf.htm>

A consulting service that provides technical assistance to forest operators interested in developing revenue streams from ecosystem services and products. We support forest operators in assessing, identifying and developing opportunities such as carbon offsets, watershed mitigation, and biodiversity conservation, as well as recreation and extractive products. By securing commercial and financial partners, we enable our clients to execute on opportunities that have significant impact on their bottom line. We work with forest operators interested in pursuing non-timber revenue streams to maximize the value of their forest, but may not have the in-house capability, time and resources to do so.

The Katoomba Group (www.katoombagroup.org)

An international working group composed of leading experts from forest and energy industries, research institutions, the financial world, and environmental NGOs, all dedicated to facilitating strategic partnerships that can launch green forest products in the market place. To accomplish this, the Katoomba Group builds collective understanding of how market-based instruments for environmental services are constructed and the conditions in which they can work. The group met for the first time in Katoomba, Australia in May 2000.

Endnotes

ⁱ ten Kate, K., Bishop, J., & Bayon, R. (2004). "Biodiversity Offsets: Views, Experience and the Business Case." Glad, Switzerland: The World Conservation Union and Insight Investment.

ⁱⁱ Electric Power Research Institute (2006). "Multi-Industry Eco-Asset Workshop Proceedings." Palo Alto, California: EPRI workshop.